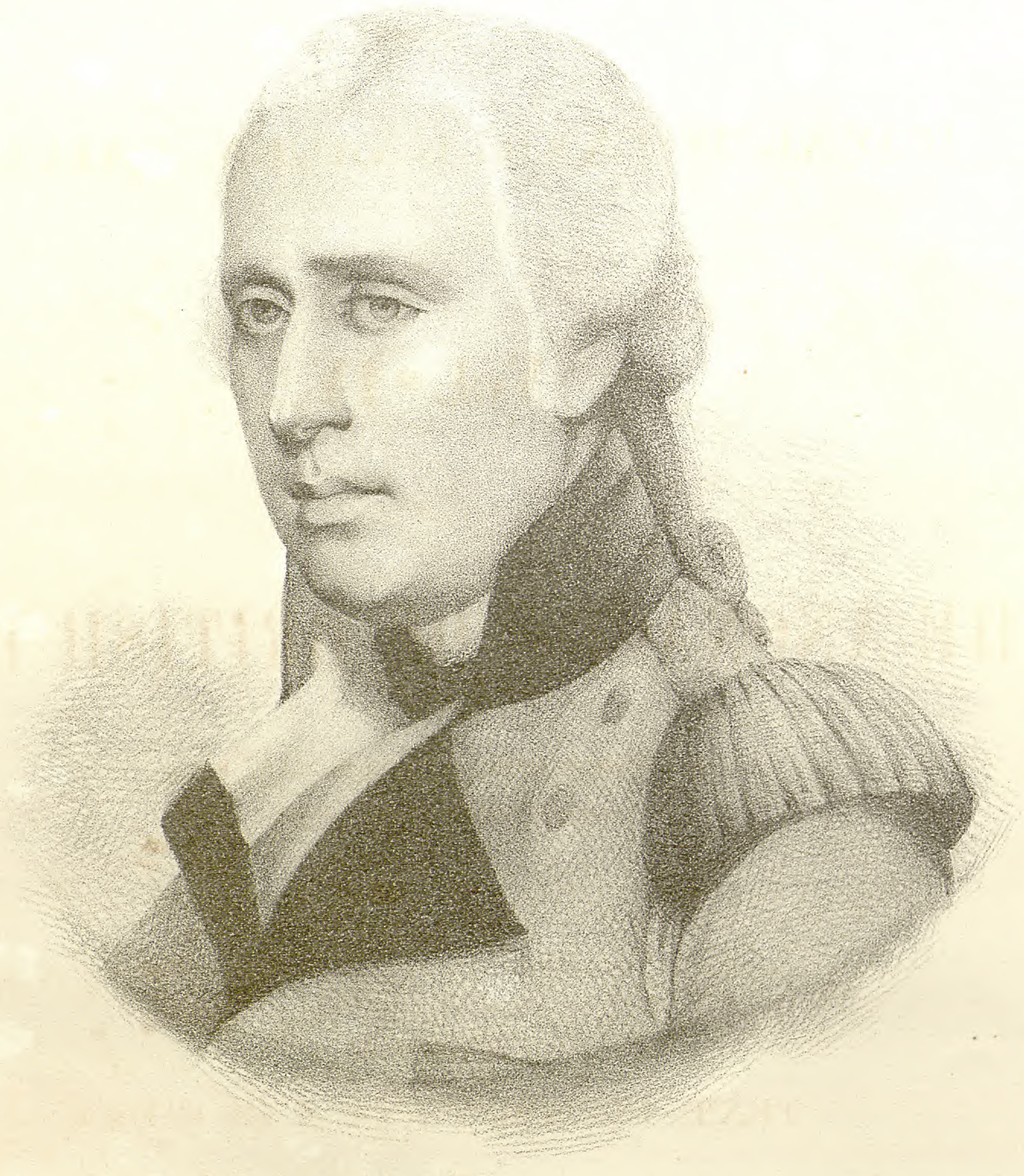
ANNALS

OF THE

ROYAL BOTANIC GARDEN, CALCUTTA.

Vol. IV.



COL. ROBERT KYD,

HONORARY SUPERINTENDENT OF THE HON'BLE THE EAST INDIA COMPANY'S

BOTANICAL GARDEN AT CALCUTTA,

1786 — 1793.

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1893
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ANNALS

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ROYAL BOTANIC GARDEN, CALCUTTA.

Vol. IV.

THE ANONACEÆ OF BRITISH INDIA.

By GEORGE KING, M.B., LL.D., C.I.E., F.R.S.,
Superintendent of the Garden.

PART I.

TEXT, FRONTISPIECE AND INDEX.

Mo. Bot. Garden,
1894

CALCUTTA:
Printed at the Bengal Secretariat Press.

LONDON:
Sold by B. Quaritch, 15, Piccadilly; Keegan Paul, Trench, Trubner & Co., Ld.;
A. Constable & Co., 14, Parliament Street; Luzac & Co., 46, Great Russell Street;
E. A. Arnold, 37, Bedford Street, Strand.
1893.

TO THE MEMORY

OF

Robert Kyd,

LIEUTENANT-COLONEL OF ENGINEERS IN THE BENGAL ARMY

OF THE HONOURABLE EAST INDIA COMPANY,

FOUNDER

AND FIRST SUPERINTENDENT OF

THE ROYAL BOTANIC GARDEN, CALCUTTA,

THIS VOLUME IS DEDICATED

ON THE ONE HUNDREDTH ANNIVERSARY OF HIS DEATH

BY

THE PRESENT SUPERINTENDENT.

ROYAL BOTANIC GARDEN, CALCUTTA,
26th May 1893.

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PART II.–PLATES

STELECHOCARPUS TO ANAXAGOREA.

CALCUTTA:
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PART III.–PLATES

GONIOTHALAMUS TO GRIFFITHIA.

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Printed at the Bengal Secretariat Press.

LONDON:
Sold by B. Quaritch, 15, Piccadilly; Keegan Paul, Trench, Trubner & Co., Ld.;
A. Constable & Co., 14, Parliament Street; Luzac & Co., 46, Great Russell Street:
E. A. Arnold, 37, Bedford Street, Strand.
1893.

PREFACE.

The hundredth anniversary of the death of the founder of this Garden appears to be an appropriate occasion for putting on record as much as can now be traced of his career, and of the early history of the Garden itself. Robert Kyd belonged to an old Forfarshire family, several members of which had preceded him in the service of the Honourable East India Company. He was born in 1746. At the age of eighteen he became a cadet of the Bengal Engineers, and on the 27th October 1764 he received his commission as Ensign in that corps. His promotion to the rank of Lieutenant followed in the year after (16th October). Two and a half years later (on 3rd April 1768) he became Captain, getting his Majority on 29th May 1780, and his Lieutenant-Colonelcy on 7th December 1782. He died at Calcutta on 26th May 1793. From the fragmentary evidence which is still extant it appears that Colonel Kyd was a man of wide and varied sympathies and experience, and that, during the later years of his service, he attained a position of so much influence that his suggestions on various weighty matters were not only listened to but promptly acted upon. Himself a keen gardener, he had brought together, round his country house at Shalimar, a collection of various plants of economic and horticultural interest which had been sent to him, partly by correspondents in the interior of the country, but which had chiefly been brought to him by Captains of the Company's ships returning from their voyages to the Straits and to the Malayan Archipelago. Colonel Kyd conceived the idea of supplying the Company's Navy with teak timber grown near the ports where it could be used in ship-building, and of increasing their commercial resources by introducing into India the cultivation of the spices which, in those days, formed so important an item in their trade, but for supplies of which they had to depend on their factories in Sumatra and Penang. He communicated this idea to the Governor-General of the day; and, in a letter written on 1st June 1786, he officially submitted a scheme for the establishment of a Botanical Garden, or Garden of Acclimatization, near Calcutta. This scheme also included proposals for introducing, into territories subject to the Company, the cultivation of cotton, tobacco, coffee, tea, and various other commercial products. To have suggested to the local representatives of what was then practically a Trading Company, the provision (at a considerable annual cost) of facilities for the pursuit of pure, as distinguished from economic, botany would probably not have increased the chances of the acceptance of the Garden scheme. The scientific aspect

of the matter was therefore, with commendable sagacity, excluded from mention in the original proposal. Warren Hastings had in 1785 been driven into resignation of the office of Governor-General by the successful machinations of his enemies in England; Colonel Kyd's proposal did not therefore come officially before that great and far-seeing statesman, but before Sir John Macpherson, who acted as Governor-General pending the arrival of Lord Cornwallis from England. Sir John Macpherson recorded a minute in its favour; and a copy of this minute, together with the proposal itself, were sent home by the Calcutta Government, warmly recommended to the Court of Directors, in a public general letter dated 21st August 1786. So much in fact were the local Government impressed with the advantages of Colonel Kyd's proposed scheme that, without waiting for a reply to this letter from the Board, they secured land for the Garden "in anticipation of sanction;" and, in a letter dated 27th July 1787, they reported this action to the Directors. This second letter, however, must have crossed a despatch, dated London, 31st July 1787, in which the Board not only conveyed their sanction to the formation of the Garden suggested by Colonel Kyd, but warmly approved his action in bringing the proposal to their notice.

Colonel Kyd's country house and garden* stood near the village of Sibpur, on a promontory round which the Hooghly bends in passing the site of the present Fort William (at that time only recently completed), and which was known then (as it is now) as Shalimar. And it was land in the vicinity of Shalimar, and separated from his own private garden only by a ditch, which Colonel Kyd selected for the proposed Botanic

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* The following extract is from the late Dr. T. Anderson's "Notes on the foundation of the Botanic Garden, Calcutta," in the Journal of the Agri-Horticultural Society of India, volume I, new series, p. 171:—

'I have endeavoured to discover the site of Colonel Kyd's garden, referred to by Dr. Roxburgh in the second volume of the "Flora Indica," page 629. It is currently reported that Colonel Kyd built the house on the river bank, which I have already referred to, and the grounds around that house, extending westwards to the eastern boundary of Bishop's College, seem to have been Colonel Kyd's private garden. These grounds are known as Kyd's Garden, Royd's Garden (Sir John Royd, Judge of the Supreme Court, to whom Roxburgh dedicated his genus of Capparidaceæ *Roydsia*), Barwell's Garden, and in 1819 I find them styled Metcalfe's Garden. The land on which Colonel Kyd is supposed to have built the Shalimar House belongs to the zamindars called the Sibpur Chowdries. The land is held from them on a perpetual lease (mowrasipottah) said to be drawn up in Colonel Kyd's name, and this lease is now in the possession of the widow of Rajah Kissennath, near Murshidabad. Until 1820 this garden of Shalimar, which I believe was Colonel Kyd's private garden, was separated from the Botanical Gardens merely by a ditch, crossed by a masonry bridge, over which was brought a metalled road, which ran in a continuous line on a bund from the Shalimar House into what was then part of the Botanical Garden. This road and bridge still exist.'

The following extract from the diary of a friend of Major Alexander Kyd gives a rather depreciatory account of the garden house which that officer had inherited from Colonel R. Kyd. The concluding note by another hand, which states the price at which Major Kyd sold it, shows, however, that it must have been rather a good house, for in those days Rs. 40,000 went much further than the same sum would do now: '21*st January* 1795.—Breakfast at Major Kyd's. The house and grounds very neat and well laid out, but only two good apartments in it, which are at the extremities of the two wings. The little octagon room in the middle, to which there is a dome, is so small as scarcely to dine six people with servants behind their chairs, and the ornaments are so multiplied as to give that a trifling appearance, which, were it on a sufficient scale, would have a grand effect; but all this blame is not to be imputed to the Major: it arose from his unwillingness to pull down the old house in which the octagon room was as having been built by his uncle, from whom he inherits it. The building has, however, upon the whole, an imposing appearance on the outside, and is abundantly convenient.' In 1795 Major Kyd sold his "Garden House" to Nabob Sydat Alli for Rs. 40,000.

Garden. The piece of land thus selected measures more than three hundred acres in extent, and is of rather irregular shape. It consists of a rather narrow strip running along the right bank of the Hooghly for about a mile and a half, but expanding towards its lower extremity into a large square block. The upper part of this piece of land was in the hands of some villagers, "who had no other title than possession to produce as giving them right of tenure." These squatters appear to have been compensated and turned out. The lower part of the land (where it expands into a square block) had been the site of an old fort or outpost, and it is marked in old charts of the Hooghly river as "thana." A creek appears to have run up through this piece in the direction of the great Banian, which appears even then to have been rather a large tree.

Colonel Kyd, whose office at this time was that of Military Secretary to Government, was appointed Honorary Superintendent of the Garden, a post which he retained until his death. He never lived within the Garden. In fact there was no dwelling-house within its limits until his successor, Dr. Roxburgh, built the present Superintendent's house in 1795. Colonel Kyd probably, as was the fashion of the day, had a town house in Calcutta. But he appears to have passed a good deal of his time at Shalimar; and in his will he directed that he should be buried in his garden there. The part of the Botanic Garden nearest to Colonel Kyd's house was devoted to the planting of teak trees, in accordance with the Company's earnest desire to supply themselves with timber for ship-building. The experience of thirty-four years having shown that good teak timber cannot be successfully raised on the muddy soil of the Gangetic delta, this part of the garden (extending to about 40 acres) was in the year 1820 given up by Government to the Lord Bishop of Calcutta (Dr. Middleton) as the site for a Christian College. The Garden was thus reduced to its present area of 270 acres. During the hot season of 1793 Colonel Kyd appears to have become very sick, and to have known that he was about to die; for on the 18th of May he made a new will, which was filed in the Supreme Court of Calcutta on the 10th of June 1793, Colonel Kyd having died on the 26th of May. The will is so interesting, and throws so many lights on Kyd's character, that I venture to print part of it as an appendix to this brief memoir. By this will the bulk of Colonel Kyd's property was left to his relative Alexander Kyd, then a Major in the Bengal Engineers. In spite of the instructions given in his will, Colonel Kyd was buried in the South Park Street Cemetery in Calcutta. The tomb is covered by an oblong platform of masonry, and is described as being situated immediately to the right on entering the gate; but, as it is marked by no tablet or monument, it is not now distinguishable. A beautiful marble urn by Banks the sculptor was, however, in 1795 erected to his memory in the Botanic Garden on a site selected by Dr. Roxburgh. This urn is still in excellent preservation and is much admired. It stands upon a marble pedestal, on which this inscription is carved—'*Roberto Kyd, mil. trib. horti Fundatori: posuit A. K. MDCCXCV.*'

The Major Alexander Kyd to whom Colonel Robert Kyd bequeathed the bulk of his property was the son of Captain James Kyd, Royal Navy, of Elie in Fifeshire. Alexander arrived in Calcutta in 1772 without any appointment, but bringing letters to his uncle Thomas Kyd, who was either a first cousin or a cousin once removed of Colonel Robert Kyd. Thomas Kyd is described as "Commander of a ship of the country service in the East Indies;" and, when young Alexander Kyd arrived in Calcutta, Thomas was absent on a voyage from which he never returned. The lad therefore came under the protection of his relative Colonel Robert Kyd, whose letter to his (the boy's) father (happily preserved by a descendant of the family) gives so interesting a glimpse into the Anglo-Indian life of these remote days, and so signally illustrates the kind-heartedness of Colonel Kyd, that I print it also as an appendix. Alexander Kyd returned to India in 1775 as an Ensign of Engineers. He was a Major when his relative Colonel Robert Kyd died, leaving him his heir. Alexander Kyd appears also to have been a distinguished and capable officer, who ultimately held important posts in the service of the Company. His house was in Kyd Street, and is one of those which for many years has been occupied by the United Service Club. He passed through all the grades of the Military service until, in 1819, he attained the rank of Lieutenant-General. Seven years later (on 25th November 1826) he died in London. He was survived by three sons—James, Robert, and Alexander. They were all three educated in England, but returned to India early in life. Of Alexander little can be discovered, he having left India after a very brief sojourn. James and Robert became ship-builders, the former joining Mr. A. Waddell, the Company's Master Builder; while Robert became the partner of another ship-builder. In 1807 Mr. Waddell retired, and James Kyd was appointed Master Builder in his stead. And being shortly after joined by Robert, the two brothers became joint proprietors of the well-known docks at Kidderpore. Robert Kyd died in 1825. James survived until 1836, and on his decease the dockyard was purchased by Government, and the name of Kyd disappeared from the list of Indian public servants. James Kyd's charming house near the dockyard, which in later days became the residence of the Superintendent of Marine, was pulled down a year or two ago in connection with the formation of the new docks; and with that house the last trace of the Kyds disappeared from Kidderpore.

The portrait of Colonel Robert Kyd, which forms the frontispiece to this volume, is copied from a coloured crayon in the possession of the Agri-Horticultural Society of India, which was presented to the Society (I believe by Mr. Blechynden) some years ago. In preparing this brief memoir I have had the kind assistance of Major-General C. E. Nairne, R.A., and of the Revd. A. Kyd Nairne, descendants of the Kyd family; also of Miss Kathleen Blechynden, in the possession of whose family are various papers connected with the Kyds. I am also indebted for some of the facts

given in the preceding pages to "A few notes on the foundation of the Botanical Garden, Calcutta," which were contributed by Dr. T. Anderson, a former Superintendent of this Garden, to the Journal of the Agri-Horticultural Society of India (volume I, new series, p. 169). The copy of Colonel Kyd's will was obtained from the High Court of Calcutta.

ROYAL BOTANIC GARDEN,

Sibpur, Calcutta, 26th May 1893.

PAPERS CONNECTED WITH THE FOUNDATION OF THE BOTANIC GARDEN, CALCUTTA.

Letter from LIEUTENANT-COLONEL ROBERT KYD, *Corps of Engineers, to the Governor-General and Council, dated* 1*st June* 1786, *proposing the formation of a Botanic Garden at Calcutta.*

IN the course of last month I did myself the honour of communicating to you some thoughts that occurred to me on the means of lessening or preventing a calamity to which this country has been some time subject. Whether what I presumed to offer to the Board's consideration has yet come under their notice or appeared to merit it, I know not; but it has occurred to me that the subject on which I now propose to address you, though widely different in its nature, may not appear less important to you on acccunt of its immediate relation to the great national object of our conquests in India in the extension of its commerce.

About ten years ago, while I was on an excursion to our eastern frontier in search of health, and rambling through the woods which surround the garden at Fizgong in company with a friend, we stumbled on a tree, the unusual foliage of which attracted our notice, and which on application to the bark immediately discovered itself to be some species of Cinnamon. On relating the circumstance to the Resident, we found that this tree was not indigenous to the soil, nor was it to be found anywhere else in the neighbourhood; we also observed that it had not propagated, but stood alone, and had so far attracted the notice of the natives that they ascertained its leaves to be the same as the aromatic leaf known by the name of *taj paat*, a spice universally used in Indian cookery, and generally imported from Assam. By the assistance of the late Captain Cowe, who then commanded at Dacca, I procured from the borders of the province of Assam some of the plants of the tree in question, and one or more of these plants were deposited in the late Governor-General's gardens. This led to further enquiry, and the tree was found to be the Cassia or true Cinnamon tree, but presumably of an inferior species. It was also found to be a native of the Bhutan mountains, from which country the Governor-General likewise obtained some other specimens, in a year or two following.

Much about this time, I believe, Captain Price, the present Marine Paymaster, but then in command of the Bengal squadron employed in the blockade and reduction of Pondicherry, took the opportunity, when touching at Colombo, to bring from thence some plants of the true Cinnamon tree, foreseeing the possibility of its cultivation in our provinces. These were added to the stock in the Governor-General's gardens. I can aver that both trees have with very little attention thriven in an uncommon degree, and that last December, when I was about to leave Bengal, the Ceylon species had actually given fruit, and I saw a rising plantation of not less than 8 or 10 young trees.

The East India Company, I believe, have been often jealous of the benefits accruing to the Dutch from their possession of the island of Ceylon. If this arises principally from its production of cinnamon, the Board may inform them that this very valuable tree now begins to flourish in Bengal from the stock procured about five years ago from this very island. Not expecting that this tree would have blossomed last year, I missed the opportunity of taking a drawing of it; but enclosed is a sketch from nature, of the fruit not quite ripe, at which period it assumes a different form and acquires nearly a purple colour, resembling the fruit of the coffee shrub. It was just beginning to blossom when I left Bengal in December last, but the flowers were too imperfectly expanded for me to delineate distinctly the sexual parts, which are in themselves very minute.

I have likewise the honour to enclose a drawing (taken hastily) showing the disposition and hanging of the tree and its branches. A scale is wanted, but it may be estimated at 16 or 17 feet. I have further to add that the tree of the same sort supposed to be Cassia brought from the borders of Assam, and which, on the most authentic intelligence, I can inform the Board flourishes in the greatest abundance

in a state of nature all over the skirts of the Sylhet Province, is in taste, flavour, smell of its leaves and bark, the same as that from Ceylon. It has not yet given fruit so as completely to demonstrate its quality, but from what I have said it will be obvious to the Board that, with the smallest encouragement from the Court of Directors, they may in the course of five years have a plantation of the Cinnamon tree as extensive as they choose, from our now actually holding in possession the means of effecting it, free from all visionary and systematic suppositions.

I have been induced to throw out these communications in hopes of their being the means of awakening the nation at large to a sense of the inestimable treasures which we already hold in our extensive dominions in this part of Asia, and, if possible, to divert the Administration not only from thinking of making further acquisitions by new settlements (except in as far as they may prove absolutely necessary for the preservation and security of what we already hold), but also to embrace the opportunity of peace to reject such unprofitable parts of our empire as have only proved useless burthens to our more valuable possessions, and that they may also illustrate the small degree of encouragement which it is requisite to afford to the efforts made by private industry to enable us to outstrip our rivals in every valuable production which nature has confided to this part of the globe, and which she has showered down with so bountiful and partial a hand over our possessions.

I also do myself the honour of enclosing a drawing of the long and black pepper plants, both of which species, I can inform the Board, rise to maturity and give fruit in perfection, although reared in the vicinity of the Presidency under a very imperfect knowledge of the requisite mode of cultivation.

I shall not presume to intrude anything further on the subject, resting assured that the Board will foresee the inferences to be drawn from these communications.

But I take this opportunity of suggesting to the Board the propriety of establishing a Botanical Garden, not for the purpose of collecting rare plants (although they also have their use) as things of mere curiosity or furnishing articles for the gratification of luxury, but for establishing a stock for disseminating such articles as may prove beneficial to the inhabitants, as well as to the natives of Great Britain, and which ultimately may tend to the extension of the national commerce and riches; and this I conceive can be best effected by Government procuring from the different parts of India, and establishing a nursery stock, from which private individuals may be supplied gratis who may think themselves qualified to adventure on a general cultivation of the innumerable articles which our possessions will furnish the means of raising with success, of which I shall beg leave to suggest the enclosed very imperfect enumeration.

And I have to add that the charges attending such an institution ought not, I conceive, to exceed Rs. 150 or Rs. 200 per month, considering the great influence and assistance which this Government is capable of affording it.

Minute of the Governor-General on the foregoing letter.

I HAVE great pleasure in laying before the Board the accompanying letter and memorandum from Colonel Kyd.

The establishment of a Botanical Garden as a nursery for rearing and propagating for the public benefit the productions of other countries and climates, and such as may be equally conducive to increase the commerce and improve the culture of these Provinces, is an institution I have long had at heart, and to forward which the Board are, I know, perfectly disposed. The late Governor-General was a great encourager of the introduction of new articles of commerce and foreign production into these Provinces, and I regretted very much that the state of the Company's finances prevented our purchase for them of his garden, in which these plants were reared. If agreeable to the Board, I will look out for a spot in a proper situation where a garden may be formed, as a General Plantation or Nursery where the cultivation of the cinnamon, and the different articles mentioned by Colonel Kyd, may be attempted. It

will be necessary to prevent much expense in either establishing or carrying through this institution. If the Board approve of the design, I could lay before them a plan which in carrying on this business will secure the Company against much or any unnecessary expense.

J. M.

(JOHN MACPHERSON,

Governor-General.)

Extract from a Public General Letter from the Governor-General and Council, Calcutta, to the Hon'ble the Court of Directors,—dated the 21st August 1786, *paragraphs* 50 *to* 53.

50. We forward to you a separate number in this packet, copy of a Minute recorded by the Governor-General, introducing a letter from Lieutenant-Colonel Kyd, proposing the establishment of a Botanical Garden as a nursery for rearing and propagating for public benefit the productions of other countries, as a means of increasing the articles of commerce and improving the culture of these Provinces.

Per *Severn* packet and *Ranger*, 21st August and 11th September 1786.

We beg leave to refer you to the letter itself for a fuller information of the Colonel's expectations and the grounds upon which he has formed them. We are impressed with a conviction of the practicability of bringing this plan to maturity, without incurring any considerable expense, and shall take the most effectual measures to this end, as soon as a suitable place is selected and the Governor-General shall have had leisure to furnish the plan he proposes for carrying it into execution.

52. The cultivation of the cinnamon and pepper seems practicable, and we are sanguine in our expectations of greatly improving the indigo plant, as well as of introducing the date and sago trees. These may prove of infinite service to this country should it ever experience a failure in the crops.

53. The drawings of plants alluded to will be put into the letter packet by the *Ranger* that they may reach you in good preservation.

Extract from a Public General Letter from the Governor-General and Council, Calcutta, to the Hon'ble the Court of Directors,—dated 27th July 1787, *paragraphs* 114 *and* 115.

114. The intended establishment of a Botanical Garden was noticed to you last year. A proper spot of ground having been selected for it by Colonel Kyd in the vicinity of Calcutta, and a mode adopted of satisfying the possessors (who had no other title than possession to produce giving them a right of tenure), the undertaking has since been in progress. It is attended with very little expense to the Company under the present management, and holds out a flattering prospect of rearing by care and attention in Bengal the valuable productions of all parts of India. To this end we have made application to your different Presidencies, and through them to more distant places for sundry plants, trees, &c., suggested by Colonel Kyd, and we beg leave to extend this application to you, as we are persuaded from an experiment made by Captain Cumming of the *Brittanica*, who brought a great variety in good condition to Bengal, that it may be effected at a very trifling expense.

Cons. 21st May 1787, Botanical Garden.

Cons. 12th March.

Cons. 18th May.

115. On this subject we beg leave to refer to your particular attention a letter from Colonel Kyd, and a list of the different plants that he wishes to have sent out, which are forwarded in a separate number in the packet.

Cons. 18th May.

Per ship *Ravensworth*, 27th July 1787.

Extract from a Public General Letter from the Hon'ble the Court of Directors, to the Governor-General in Council, Calcutta,—dated 31st July 1787.

Paragraphs 39, 50 and 53.—We have received great pleasure from the perusal of Lieutenant-Colonel Kyd's letter referred to in these paragraphs, proposing the establishment of a Botanical Garden, and give our most hearty approbation to the institution, as the charges thereof are estimated at not more than Rs. 200 per month. The experiment respecting the cinnamon tree in particular must be made in different parts and soils of those extensive Provinces, in order to ascertain with certainty whether this spice can be produced in Bengal equal to that which grows on the island of Ceylon. We have likewise perused a former letter from Lieutenant-Colonel Kyd, of the 13th April 1786, relative to the sago tree, and its efficacy and importance in cases of famine and pestilence. We hope you will give this subject all the consideration that it may appear to merit. You must keep us constantly advised of the progress that may be made in the Botanical Garden, and continue to send us drawings of such of its productions as you may deem worthy of our attention. We are aware that, by extending your experiments too far, the expense may increase to an amount of which you may not at present have any idea. The establishment therefore must be confined in the manner pointed out by Colonel Kyd, as mentioned in the last paragraph but one of his letter of the 1st of June last. But so sensible are we of the vast importance of the objects in view, that it is by no means our intention to restrict you in point of expense in the pursuit of it. In the cultivation of the cinnamon tree in particular, we foresee a great source of wealth to the Company, and of population and opulence to the provinces under your administration. Most earnestly therefore do we recommend it to you to proceed in your endeavours to propagate this spice in different places, and that you avail yourselves of the abilities and zeal of Lieutenant-Colonel Kyd herein, and who, by the attention he has shown to a matter which may one day prove of the greatest benefit to his constituents and to his country, stands most deservedly high in our esteem and favour.

LIEUTENANT-COLONEL R. KYD'S *Will.*

THE last will and testament of Robert Kyd, Lieutenant-Colonel in the East India Company's service on the Bengal establishment, hereby revoking and declaring null and void all former wills. * * * * * * I leave to my friends Charles William Boughton Rous, John Shore, and William Larkins a ring each, value fifty guineas, and entreat their acceptance of this memorial of my affection, respect and esteem for their character. The rest of my fortune I leave to Major Alexander Kyd aforesaid. * * * * * To my friend John Fleming, Surgeon in the East India Company's service, a ring three thousand rupees value, in testimony of my regard for his humane attention. To my friend Herbert Harris for his kind attention to me during my sickness, a ring of one thousand rupees value. To Doctor Hare a ring of one thousand rupees value. To my native servant, known by the name of Rajemahl Missah, the monthly sum of eight rupees during his life, in retribution for the unsuitable education given to him, entailing separation from his native soil and kindred. To the other native known by the name of George, in reparation of the injury done him by his former master, in alienating him from his tribe (understood Rajpoot), converting him to Christianity, and secluding him from all future connection with his family, the monthly sum of six rupees during his life; to both on condition of their continuing to serve Major Alexander Kyd during his residence in India. To all my other servants one month's pay on my decease. To Raja Kishore Roy, the talukdar of Sibpur, a ring value fifty rupees. I further leave to my niece, Miss Rachael Lindsay, now Mrs. Dickson, the sum of five hundred pounds. To the two orphans at my gardens, known by the names of Boonchey and Chooneah, I desire fifty rupees be given to each. The remaining part of my fortune, I say the remainder of my fortune, including my house, garden at Sibpur, and all monies or effects of mine whatever in Europe and here, I leave to the aforesaid Major Alexander Kyd, and appoint him, Charles William Boughton Rous, John Shore, William Larkins, and Henry Wilsone and Company (my present acting attorneys in Calcutta) executors of this my last will and testament, which I beg and entreat of them to cause to be executed. It is my further desire that I may be buried in my

own garden without the attendance or offices of any priest whatever. In witness whereof I, the said Robert Kyd, have to this my last will and testament set my hand and seal, declaring this to be my last will and testament, and revoking all former wills. Dated this eighteenth day of May in the year of our Lord one thousand seven hundred and ninety-three.

ROBERT KYD L.S.

Signed, sealed, published and declared by the above-named as his last will and testament in the presence of us, who at his request, in his presence, and in the presence of each other, have subscribed our names as witnesses thereto in Calcutta, where no stamps are to be had.

HERBERT HARRIS.
J. FLEMING.
DANIEL TEMPLETON.

A true copy carefully collated by me with the original will which was delivered out of Court b order of 2nd January 1794.

WM. JACKSON,
Regr. & Not. Pub.

IT is my desire that Mr. Henry Wilsone keep up the establishment now employed of labourers for keeping my garden in order, consisting of a serang, four labourers, and a number of children, and also the two Europeans now in charge of the small vessel; that the two boys Missah and George be allowed to remain at the gardens until Major Kyd's arrival, which may be expected in July. All my loose papers in the several tin boxes had best be kept for Major Kyd's previous examination. In addition to what is mentioned in my will respecting my being buried in my own garden, that my burial may be attended with no military ceremony, and that I trust my friend Captain Apsley will pay due attention to this article, and see my last remains committed to the ground in my own garden, on the west side of the pucka-walled tank near to where an alligator pear tree now stands, and that my funeral expenses do not exceed three hundred rupees.

There are in the house at Sibpur three boxes containing botanical drawings of the plants in the environs of this petty district; also a box and several books containing an unfinished collection of the birds indigenous to this tract, as also of such as migrate here from the adjoining frontiers during the cold and hot weather: also of the fish frequenting the Hooghly. These, having been collected at the Company's expense, are public property and should be transmitted to the Court of Directors, although unarranged in botanical or artificial order which I had reserved for a future day.

ROBERT KYD.

Gardens, 18*th May* 1793.

A true copy carefully collated by me with the original codicil which was delivered out of Court by order of the said 2nd January 1794.

WM. JACKSON,
Regr. & Not. Pub.

I DO hereby certify that this is a true copy of the original in my custody, dated this 24th day of April 1893.

R. BELCHAMBERS,
Registrar of the High Court of Judicature at Fort William in Bengal, Original Jurisdiction.

Letter from CAPTAIN ROBERT KYD, *Calcutta, to* CAPTAIN JAMES KYD, R.N., *Elie, Fifeshire, dated 28th February* 1773.

YOUR son Sandy arrived here three weeks ago and delivered me your letter from Elie, dated March last. Though we have received no certain account of your brother's death, yet his loss must be looked upon as certain, seeing it is now three years since he sailed from this river on a voyage to the coast of Africa, and he has not yet been heard of. So that the army was the only resource left for your son, and into that he must have entered under great disadvantages, which I will now point out to you. First, he must have entered as a cadet; and there are now more than two hundred on that list, all of whom must have been commissioned before him, and this could not have taken place in less than two years, during which time he would have learned nothing here but what he already possesses from his military education at Douay, with the almost inevitable risk of imbibing his share of the vices and prejudices peculiar to this climate. This has determined me to send him home again in the first ship (which sails in two or three days), and the plan I have to lay down to him and to you is as follows.

On his arrival in England he must proceed again to Douay and qualify himself for an engineer and artillery officer. And he assures me that, from his former acquaintance and connections there, he will find no difficulty of gaining admittance into the academy. Meanwhile, you must lose no time in using all your interest with G. Dempster and Sir J. Cockburn, and with any other person in the direction, in order to get him appointed an Ensign in the Corps of Engineers, infantry or artillery, on the Bengal establishment, and no other; and, failing an ensigncy, he must be appointed a cadet, in which, I think, you cannot fail. In this latter case, an Ensign's commission in the King's must likewise be bought: for, by the rules of this service, it will give him rank of all the cadets of the season in which he comes out, and will also entitle him to be employed as an officer upon his arrival. You must perceive that (exclusive of the advantages your son will receive from ten or twelve months' study at Douay) he also will be further advanced in the army in point of rank than if he had remained here; and, in order that no time may be lost, I have resolved to accommodate him with a sum of money, which he himself thinks equivalent to the expenses that will be incurred during his two years' absence, which will in a great measure provide against the worst that can possibly happen, namely, of your failing to procure him either of the aforesaid appointments from the India House. I have also introduced him to some of my friends here, who, in case of any accident happening to myself, will receive and provide for him in a manner next to what he would have expected from myself. Respecting your son's genius and parts, I am perfectly satisfied with them, and doubt not he will make the desired proficiency in the studies which I have already pointed out to him.

This plan which I have laid down for your son may probably startle you upon first reading: and, if upon due consideration it should not appear to you in the same light that it does to me, I am confident that, upon your submitting it to any Indian lately returned from this part of the continent and acquainted with the state of affairs, every part of what I now write to you will be confirmed. Nor have I presumed on the strength of my own judgment alone to decide in this matter, but I have the unanimous approbation of all the friends whom I have consulted.

I have omitted mentioning your getting your son appointed to the civil branch on this establishment, apprehending that this may be attended with too much difficulty, if not expense; but, if you can muster interest enough, by all means do it; but do not alter the plan of his education, for here it is equally necessary to know how to brandish the sword as to wield the pen.

THE ANONACEÆ OF BRITISH INDIA

By G. KING.

INTRODUCTION.

The family of *Anonaceæ* is a very natural one. It consists of about six hundred species of woody plants, a large proportion of which are climbers. Not one of them is herbaceous or annual; all have simple exstipulate alternate leaves; while their seeds have in every instance large ruminate albumen and a small embryo. With the exception of the two Australian shrubs which form the genus *Eupomatia*, the flowers of all have a convex or flat receptacle or torus, and a double perianth of which the symmetry (except in the genera *Tetrapetalum* and *Disepalum*) is trimerous. The stamens are, in all the genera except *Eupomatia*, hypogynous; and, in by far the majority of the species, they are numerous, their connectives and anther-cells being elongate and having either lateral or extrorse dehiscence (introrse only in *Eupomatia*). The pistils are numerous and distinct, and they ripen into a number of indehiscent 1- or more-seeded, often pulpy, berries which, in all the Asiatic species, remain quite distinct from each other; but which in some American and African species become united. The floral organs do not present so great a variety of structure as is the case in many other orders. The various forms presented by these have been admirably described and illustrated by M. Baillon in the pages of *Adansonia*[1] and in his *Histoire des Plantes*[2]; and, in later years, by Drs. Engler and Prantl in their *Pflanzenfamilien*[3]: while the taxonomic value of the various modifications in form of the vegetative and reproductive organs has been discussed both by the first of the authors just named, and by Sir J. D. Hooker and the late Dr. T. Thomson in their fragmentary *Flora Indica*. To the books just named, and to other works on morphology, I would refer the reader who has access to a good botanical library.

[1] *Adansonia*, vols. 7 and 8.
[2] Vol. 1 (Paris, 1868), pp. 193 *et seq.*
[3] *Natürl. Pflanzenfamilien*, III, pp. 23 *et seq.*

And it is only for the isolated worker in the bookless waste of an Indian station or forest camp that I venture here to offer a few remarks on the organography of this family.

The calyx consists of a single whorl of three sepals which may either be free or more or less completely united. The freedom or union of the sepals is, however, a character so inconstant in its co-ordination with special characters in other organs, that it can be relied upon only for the separation of species. The sepals may have either imbricate or valvate æstivation; or in the bud they may not touch at all. The sepaline æstivation, however, varies so much in flowers which are similar in other respects that it also fails to afford characters of far-reaching significance. The six petals of the corolla are arranged in two whorls, but to this there are some exceptions: for in the genus *Enantia* the outer whorl is absent; while in some species of *Unona*, *Anona* and *Rollinia*, and in the African genus *Clathrospermum*, the inner whorl is either greatly reduced in size or is altogether suppressed. *Eupomatia* differs from all other members of the family by having neither calyx nor corolla. All the petals are, in the majority of species of the family, larger than the sepals. And, of the two corolline whorls, the petals of the outer are usually the larger. In some cases (*e.g.*, in certain species of *Sageræa*, *Popowia* and *Artabotrys*) the two rows are of equal size; while in a species of *Uvaria* to which generic rank* was given by Zollinger, and notably in *Miliusa* and *Phœanthus*, the petals of the inner whorl are much larger than those of the outer. The æstivation of the corolla resembles that of the calyx, but is much more constant. It is therefore of more use in affording characters to the systematic botanist. For example, the large tribes *Unoneæ* and *Uvarieæ* are practically separated by the nature of the petaline æstivation—the former having valvate and the latter imbricate petals. Absolute uniformity between the two corolline whorls in the matter of æstivation does not, however, obtain: for in some species of *Uvaria* that of the outer whorl is imbricate, while that of the inner is valvate.

As regards shape, considerable differences obtain amongst the petals of the family; there being numerous gradations from rotund to ovate, obovate and oblong; from lanceolate to linear and even to triquetrous or cylindric; while, in a few species, those of the inner row are spathulate with long filiform claws. Considerable modifications also occur in the bases of the petals, especially in those of the inner row. In some cases the bases are merely hollowed out so as partially to embrace and cover the andro-gynœcium; while in others there are distinctly saccate expansions of the bases of the petals by the union of which by their edges the whole of the andro-gynœcium is entirely covered. In some genera (*e.g.*, *Rollinia*) the petals have dorsal processes. As these diversities in the petals are usually co-related to certain diversities in other organs, they have important uses in classification: and, as a matter of fact, they afford the characters on which the late Mr. Bentham and Sir Joseph Hooker founded their division of the whole order into tribes; while, in M. Baillon's classification, they form the basis of the subdivisions of the series *Anoneæ* to which he relegates the bulk of the order. Although in the majority of the species the petals are free from each other, there are numerous exceptions in which the members of the same whorl are united by their edges either at the bases when the latter are saccate, or throughout their whole length. There are also the less frequent cases (*e.g.*, *Monodora*) where the petals of both whorls are united into a short common tube. Characters of far-reaching significance to the systematist are not, however, obtainable from either the partial or entire union of petals; and this on

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* *Anomianthus*, Zoll.

account of the want of constancy in co-ordination already alluded to. For example, the *Unonas* of the section *Dasymaschala* have their outer petals united (their inner petals being also suppressed), although in no other respects do they differ from the *Unonas* with free petals. As regards direction there is some diversity, the petals of the species which have been grouped in the tribe *Uvarieæ* being spreading and almost rosaceous in their arrangement; those of the genus *Artabotrys* having saccate connivent bases, while the limbs are free and divergent. The inner petals of *Oxymitra* and of many other genera are, on the other hand, connivent; while the group of plants which have been collected under the genus *Mitrephora* have their spathulate petals coherent by their broad limbs to form an open mitre-like or lantern-like corolla. In texture, the petals in this order have a tendency to be coriaceous, although a certain number are membranous. As regards colour, an unusually large proportion are greenish-yellow or green.

As a general rule, the stamens of *Anonaceæ* are numerous, and are arranged in spirals on a convex or flat torus. Some species have, however, only from 6 to 12 stamens: these will be found in the genera *Bocagea*, *Orophea* and *Mitrephora*.

In the stamens of this family the filament forms a very inconspicuous, and the connective a very conspicuous, part. In a large proportion of the species the connective is thick and is either oblong quadrate or cuneate, the truncate end projecting over the apex of the anther so as completely to conceal the anther-cells when looked at from above. The elongated anther-cells are, in such stamens, attached vertically either at the sides or on the posterior surface of the connective. This type of stamen has been called the *Uvarieoid*. On the other hand, there are species in which the connective, instead of being thick with a broad truncate apex, is compressed and produced at the apex into a pointed or flattened appendage by which, when looked at from above, the apices of the anther-cells are not concealed. Stamens of this latter sort are usually associated with the anomalies in the petals which have already been referred to; and the plants possessing them have been grouped in the genera *Miliusa* and *Bocagea*. To this type of stamen the term *Miliusioid* has been applied. Intermediate between these two types of stamen is one where the apices of the connectives are variously modified into hammer-like or sausage-like processes. Examples of this are to be found in the genera *Clathrospermum* and *Popowia*. To some extent (as in the *Uvarieæ*) characters taken from the structure of the stamen are found to be constantly co-related to certain characters in other organs. In other cases, however (*e.g.*, in the genus *Phœanthus*), stamens with the Uvarieoid character are associated with petals like those of *Miliusa*; while, in the species of *Orophea*, Miliusioid stamens are associated with the corollas of *Mitrephoræ*. In many species a certain number of the stamens are transformed into linear sub-petaloid staminodes. As a rule, it is the outer stamens which are thus modified; but in *Anaxagorea* and *Eupomatia* it is the inner which are thus altered. In the latter genus the anther-cells, moreover, are introrse.

In the altogether anomalous *Eupomatia* the floral disc is concave; and, on its concavity, the numerous pistils are arranged, the stamens being really perigynous, although apparently epigynous. In some of the species of *Xylopia* there is a slight hollowing of the central part of the torus; and in this pit the bases of the pistils are sunk, the stamens being, however, truly hypogynous. In all the other members of the family the floral receptacle or ortus is either convex or very slightly concave, and the gynœcium is most emphatically superior. With the exception of the species of *Monodora*, where the pistils

are, from the first, united so as to form a unicellular ovary with numerous parietal placentas, and of those species of *Anona* and *Aberemoa* and *Rollinia* where the pistils cover a convex receptacle and become syncarpous after fertilization, the whole of the members of the family have multiple and perfectly apocarpous fruits. Each pistil, as a rule, ripens into an indehiscent one or several-seeded, often pulpy, berry with membranous, leathery or occasionally woody or bony pericarp which is in some instances highly coloured. Truly follicular fruits are found only in *Anaxagorea ;* but the elongated fruits of certain species of *Xylopia* and *Alphonsea* dehisce in an irregular way. As a rule, the ripe carpels of *Anonaceæ* are ovoid or globular ; more or less elongated pod-like fruits are, however, not uncommon. Some of the latter, *e.g.*, those of many species of *Unona* and of some species of *Orophea*, are not only much elongated, but are also constricted between the seeds. Traces of constriction in more or less elongated fruits are also to be met with in other genera. It is found, however, that, from the form of the fruit, characters of only specific value can be taken. In many species of *Anonaceæ* the ovules in each ovary are numerous ; in others they are reduced to two or even to one. In the latter case the ovules are usually ascending, but in a few they are basilar and erect. In cases where the ovules are numerous, the direction of individuals varies with their position on the placenta, being descending, horizontal or ascending, according as they are attached near its apex, middle or base. The arrangement of the ovules in a multi-ovular placenta in either a single or in double vertical row is really a matter of no importance ; for it is regulated by the exigencies of space and pressure during the swelling of the ovules after fecundation.

It should not be forgotten in connection with this character that originally every placenta is double. The number of the ovules in a pistil, and their arrangement in cases where they are numerous, are not characters which are co-related to others in a way which makes them of much real value to the systematist except in an artificial manner. An illustration of the use of this character in the latter manner is found in the separation of *Ellipeia* from *Uvaria* by the number of the ovules, the floral organs in these genera being in other respects practically alike. As already mentioned, the seeds of this family contain invariably a large quantity of ruminate albumen which, in some species, is penetrated by membranous projections or septa proceeding from the integuments. The embryo is always small, and, in some species, it is minute. The integuments of the seed are usually thin and almost invariably smooth, but, when dry, there often cling to the testa shrivelled masses of the pulp which in so many species fills the spaces between the seeds; and such dried masses appear often to have been mistaken for an arillus. No doubt, however, a small true arillus does occur in a few species. Observations on the behaviour of the seeds of the family in germination have hitherto been confined to that of certain species of *Anona*. On this subject I make the following extract from Sir John Lubbock's recently published and most interesting work "On Seedlings":—

"The seedlings of *Anona* are strong and vigorous, but present a singular anomaly, inasmuch as the cotyledons are in some species torn from the axis during germination. The seeds of *A. laurifolia* split longitudinally, the strong radicle strikes straight downwards, fixing the seedling firmly in the soil, and the hypocotyl forms an ascending or elongating loop. The large seed remains under ground, while the hypocotyl at length pulls out the plumule, and straightens, leaving the cotyledons behind. If a seed is cut open at this point the cotyledons are seen to be oblong or oval, obtuse, petiolate, almost equalling the length and breadth of the seed, and much undulated or wrinkled in order to accommodate themselves to the inequalities of the much ruminated endosperm. They exhibit an ascending, incurved, feather-nerved venation very

similar to that of the leaves, and at this stage are surrounded or included between two equal halves of the endosperm with a small quantity of the same between them. *A. cherimolia* behaves in exactly the same way, and the cotyledons are invariably torn from the axis and left in the subterranean seed."

The inflorescence in this family presents no character of note with the exception of the curious fasciation of the peduncles in the species grouped under the genus *Artabotrys*. Few-flowered, axillary or leaf-opposed cymes or racemes, and even solitary flowers, prevail in the order; panicles being rare, and spikes unknown. The simple alternate ex-stipulate leaves of the family are always entire and, for the most part, they are membranous or sub-coriaceous; rarely coriaceous, and never fleshy. Glandular dots or markings occur in the leaves of a few species—notably in those of some species of *Anona*.

Although the genera *Anona*, *Uvaria* and *Xylopia* are Linnæan, and *Unona* is of Linnæus filius, the earliest recognition of these plants as the type of a family is to be found at page 365 of the second volume of Adanson's *Familles des Plantes* (published in 1763), where that author distinguished the group which he called *Les Anones*. *Les Anones* of Adanson, however, included various plants which have in more recent times been relegated to other families than *Anonaceæ*. The whole of the then-known plants which have since been formed into the families *Magnoliaceæ* and *Menispermaceæ*, certain of the *Dilleniaceæ* and *Ranunculaceæ* of the present day, together with the genera *Ochna* and *Fagara*, were grouped by Adanson with the true *Anonaceæ* as we now understand them. The systematic writer who next gave special attention to the family was Antoine de Jussieu; and his *Anoneæ*, in addition to the Linnæan genera already mentioned, included the genus *Cananga* which had been founded by Aublet in 1775. Jussieu, moreover, referred the majority of the other genera included by Adanson to the natural order *Magnoliæ*. The inventor of the name *Anonaceæ* was L. C. Richard; but the first botanist who really understood the group and who defined the limits of it pretty much as they stand to-day was Dunal, whose Monograph appeared in 1817. That author included in the family nine genera, viz., the Linnæan *Anona*, *Uvaria* and *Xylopia*, *Unona* of the younger Linnæus (in which he included *Desmos* and *Melodorum* of Loureiro), *Porcelia* (founded by Ruiz and Pavon in 1794), *Guatteria*, Ruiz and Pavon (also 1794, but now admitted to be reducible to the earlier published *Cananga* of Aublet), *Asimina* of Adanson, and his own genus *Monodora* (= *Anona Myristica*, Gærtn.) The only extraneous genus which Dunal admitted was *Kadsura*. Dunal's arrangement was followed by M. Alph. DeCandolle in his *Memoire sur la Famille des Anonacees*, published in 1832, except that he excluded *Kadsura*, himself described four new genera (viz., *Habzelia*, *Cœlocline*, *Miliusa*, and *Hexalobus*), and included the genera *Rollinia*, *Anaxagorea*, *Artabotrys*, *Orophea*, *Bocagea*, *Polyalthia*, and *Duguetia* which had been published since Dunal wrote. *Asimina* and *Porcelia*, however, he reduced to *Uvaria*. Still later Blume, in his *Bijdragen* and *Flora Javæ*, either founded as genera, or separated as sections which have since been maintained as genera, *Mitrephora*, *Stelechocarpus*, *Goniothalamus* and *Oxymitra*. And it was Blume who first recognized the true affinities of *Kadsura*, and who erected it, with its near ally *Schizandra*, into a new family named *Schizandreæ*—a group which was united to *Magnoliaceæ* by Drs. Hooker and Thomson in 1862, and which has by most subsequent authors been treated as a tribe of that family.

As DeCandolle left it in 1832, the family of *Anonaceæ* stood very much as it does to-day, although its members were far less numerous. It consisted for the most part of plants of which the salient features were the ternary symmtery of the

perianth; the double polypetalous corolla; the numerous hypogynous extrorse stamens with more or less enlarged, often cuneate, connectives; and the convex receptacles bearing numerous apocarpous pistils. The gamopetalous species with the pistils united into a single unilocular, multi-ovular ovary and with large, many-seeded fruit had been formed into the genus *Monodora;* while the genus *Miliusa* had been provided for the species with flowers in which the petals of the outer row are very small and sepaline in character, while the inner petals are large, more or less gibbous and united towards their bases, the stamens having their connectives pointed and not truncate at the apex. A little later than the date of M. DeCandolle's Monograph, the abberant plants with flowers in which the perianth is replaced by a large deciduous bract, with perigynous stamens, and with concave floral receptacles in which the pseudo-inferior carpels are buried, had already found a home in the genus *Eupomatia* of R. Brown. The large accessions of new material which have been received both from the New and Old Worlds during the years that have elapsed since the publication of the genus *Eupomatia*, have contained but few forms strikingly different from those which form the bulk of the order as DeCandolle left it; and many of them might, by a little modification of generic diagnoses, have been included in genera already existing. During this period of sixty years there have been published about twenty-five new genera which appear worthy of being maintained; and of these the most strikingly divergent from the Anonaceous type are *Disepalum* and *Tetrapetalum*, in which the floral symmetry is not trimerous, and *Enantia*, where the outer whorl of the corolla is absent. Of these twenty-five genera, four are tropical American, viz., *Oxandra*, A. Rich., *Cympopetalum*, Benth., *Heteropetalum*,[1] Benth., and *Sapranthus*, Seem.; four are African, viz., *Cleistochlamys*, Oliv., *Enantia*, Oliv., *Clathropermum*,[2] Planch., and *Piptostegia*,[3] Oliv.; and the remaining seventeen, viz., *Cyathostemma*, Griff., *Sageræa*, Dalz., *Popowia*, Endl., *Sacccpetalum*, Benn., *Cyathocalyx*, Champ., *Phœanthus*, H. f. & Th., *Sphœrothalamus*, Hook. fil., *Discpalum*, Hook. fil., *Tetrapetalum*, Miq., *Ellipeia*, H. f. & Th., *Kingstonia*, H. f. & Th., *Alphonsea*, H. f. & Th., *Drepananthus*, Maing., *Mezzettia*, Becc., *Eburopetalum*, Becc., *Enicosanthemum*, Becc., and *Marcuccia*, Becc., are Indo-Malayan.

During these same sixty years the whole order has been critically examined by Sir Joseph Hooker and the late Mr. Bentham in their *Genera Plantarum*, by M. Baillon in his *Memoires*, in *Adansonia*,[4] in his *Dictionaire de la Botanique*, and in his *Histoire Des Plantes*[5]; also more recently by Dr. Prantl in Engler and Prantl's *Pflanzenfamilien*. Messrs. Hooker and Bentham have arranged the whole family into five *tribes* by characters derived from the form and arrangement of the petals and stamens: while M. Baillon has arranged it under four series, two of which (the third and fourth, containing a single genus each) are separated from the others by characters taken from the arrangement of the carpels; the other two (the first and second) being separated from each other by the form of the outer row of petals. The second contains only two genera, while the first contains twenty-five; and for the grouping of these twenty-five genera of the first series into sub-series, M. Baillon depends on almost the very characters on which Messrs. Bentham and Hooker rely for dividing the whole family into *tribes*.

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(1) & (3) These genera are reduced to *Phœanthus* by M. Baillon.
(2) Reduced to *Popowia* by Baillon. | (4) Vol. VIII. | (5) Vol. I.

The points of harmony and contrast in these two arrangements will perhaps be best understood by printing them side by side, thus :—

M. Baillon's arrangement.

SERIES I. ANONEÆ.—Floral receptacles convex ; gynœcium polycarpous ; the ovaries quite free at first ; perianth hypogynous, triple ; the two inner rows corolline, the outer sepaline (*i.e.*, calyx single).

SUB-SERIES 1. UVARIEÆ. *Uvaria, Sphærothalamus, Sageræa, Tetrapetalum, Cananga, Aberemoa, Cleistochlamys, Oxandra.*

2. UNONEÆ. *Unona, Anaxagorea, Disepalum, Bocagea, Popowia.*

3. XYLOPIEÆ. *Xylopia, Anona.*

4. ROLLINEÆ. *Rollinia, Artabotrys, Cyathocalyx, Hexalobus.*

5. OXYMITREÆ. *Oxymitra, Atrutregia, Mitrephora, Orophea, Cymbopetalum, Enantia.*

SERIES II. MILIUSEÆ.—Receptacles and gynœcium as in Anoneæ ; perianth hypogynous ; the two outer rows sepaline, the inner row corolline (*i.e.*, calyx double).
Miliusa, Phœanthus.

SERIES III. MONODOREÆ.—Receptacle convex ; ovary superior, unilocular with numerous multi-ovular placentas. Fruit conformable to the ovary, polyspermous, its pericarp woody. Perianth triple ; corolla variable, gamopetalous.
Monodora.

SERIES IV. EUPOMATIEÆ.—Carpels inserted in the interior of a receptacular sac in shape like the inflorescence of a fig. Stamens perigynous (pseudo-epigynous, only the outer ones fertile). Perianth replaced by a brac which protects the flower.
Eupomatia.

MM. Bentham & Hooker's arrangement.

TRIBE I. UVARIEÆ.—Petals flat, spreading during the flowering, all (or at least the inner) imbricate. Stamens densely crowded ; the connective dilated at the apex and concealing the anther-cells. *Sageræa, Stelechocarpus, Uvaria, Porcelia, Sphærothalamus, Ellipeia, Guatteria, Duguetia.*

TRIBE II. UNONEÆ.—Petals flat, slightly unequal, or the inner small or absent ; all spreading during flowering, or rarely concave and connivent, valvate in two series. Stamens as in Uvarieæ. *Cyathocalyx, Artabotrys, Hexalobus, Cananga, Unona, Asimina, Trigyneia, Disepalum, Polyalthia, Anaxagorea, Popowia.*

TRIBE III. MITREPHOREÆ.—Petals valvate; the outer gaping, the inner erecto-connivent or connate round the andro-gynœcium. Stamens as in Uvarieæ. *Richella, Oxymitra, Goniothalamus, Mitrephora, Monodora, Phœanthus, Anomianthus, Heteropetalum, Cymbopetalum.*

TRIBE IV. XYLOPIEÆ.—Outer petals fleshy, connivent, or scarcely gaping; the interior smaller, covered, or minute or absent. Stamens as in Uvarieæ. *Rollinia, Anona, Melodorum, Xylopia, Habzelia.*

TRIBE V. MILIUSIÆ.—Petals various. Stamens loosely imbricate, the connective scarcely or not at all dilated beyond the conspicuous dorsal anthers. *Miliusa, Saccopetalum, Orophea, Alphonsea, Clathrospermum, Bocagea, Eupomatia.*

I also subjoin a synopsis of the arrangement followed by Dr. Prantl in the *Pflanzenfamilien* of himself and Dr. Engler.

Dr. Prantl's arrangement.

A. Perianth consisting of 3, rarely 2, whorls; perianth and stamens hypogynous, or stamens only inserted on a disc surrounding the pistils.

.a Pistils in the flower apocarpous, mature carpels the same or connate.

a. Filaments (connectives) not dilated above the anther, sometimes few; mature carpels apocarpous; hairs simple . . . I. *Miliuseæ.*

β. Connective above the anther broader than the latter, truncate or elongated (except in *Anona rhizantha*).

I. At least the outer petals imbricate, spreading or suberect. Stamens many . . . . . II. *Uvarieæ.*

II. Petals valvate.

1°. Petals not constricted above the concave basal part, not gibbous on the dorsal surface.

x. Petals of about the same size, spreading or little connivent; stamens many; hairs simple . . . . . III. *Unoneæ.*

xx. Petals all of them or the inner ones erect, covering each other with their surfaces; stamens many; fruit not adherent; hairs simple . . . . . IV. *Melodoreæ.*

xxx. Inner petals mostly clawed, upwards touching each other along their edges or glued together; stamens sometimes few; fruit free; flowers small . . . . . V. *Mitrephoreæ.*

2°. Petals concave near their base, above the base more or less constricted, then again dilated or elongated or laterally compressed . . . . . VI. *Xylopieæ.*

b. Fruit syncarpous, unilocular; ovules parietal; petals more or less connate at their base, valvate . . . . . VII. *Monodoreæ.*

B. Perianth wanting; stamens perigynous; pistils many, free . . . . VIII. *Eupomaticæ.*

The genera are arranged by Dr. Prantl in these tribes as follows :—

In Miliusiæ, *Alphonsea*, *Bocagea*, *Mezzettia*, *Clathrospermum*, *Kingstonia*, *Oxandra*, *Sageræa*, *Miliusa*.

In Uvarieæ, *Uvaria*, *Ellipeia*, *Tetrapetalum*, *Stelechocarpus*, *Asimina*, *Porcelia*, *Sphærothalamus*, *Guatteria*, *Cleistochlamys*, *Cardiopetalum*, *Duguetia*.

In Unoneæ, *Anaxagorea*, *Trigyneia*, *Cymbopetalum*, *Enantia*, *Unona*, *Cananga*, *Polyalthia*, *Disepalum*, *Ararocarpus*.

In Melodoreæ, *Oxymitra*, *Melodorum*, *Piptostigma*, *Phœanthus*, *Heteropetalum*, *Atrutregia*.

In Mitrephoreæ, *Mitrephora*, *Popowia*, *Orophea*, *Rauwenhoffia*.

In Xylopieæ, *Xylopia*, *Hexalobus*, *Cyathocalyx*, *Artabotrys*, *Anona*, *Rollinia*.

In Monodoreæ, *Monodora*.

In Eupomatiæ, *Eupomatia*.

The family with which the *Anonaceæ* are most nearly allied is the *Magnoliaceæ*; the ternary symmetry, multiple fruits, alternate, simple, entire leaves, and the woody habit being the chief points of agreement. On the other hand, the limitation of the pieces of the perianth to nine in *Anonaceæ*; the dehiscence of the fruit and the frequent presence of stipules and of an arillus in *Magnoliaceæ* afford points of difference. In the seeds of both orders albumen is present, which in *Anonaceæ* is invariably, and in

Magnoliaceæ never, ruminate. The diclinous flowers of *Stelechocarpus* point to an alliance not only with the scandent Magnoliads *Kadsura* and *Schizandra*, but also with *Menispermaceæ*. The relationship to *Menispermaceæ* rests, however, on much stronger grounds than this: for in the seeds of that order albumen occurs which, although often curved in a fashion not obtaining in *Anonaceæ*, is in some species ruminate, and in not a few is broken up into areolæ by the intrusion of membranous projections from the surface of the seed. *Menispermaceæ*, however, differ from *Anonaceæ* in the small size of their flowers and the nature of the inflorescence, in the number of pieces of the perianth, the structure of the stamens, and in the form of the embryo. With *Myristica* there is an alliance through the copious ruminate albumen, the woody habit and the leaves; but the invariably diclinous apetalous flowers and the monadelphous stamens of the Nutmegs are characters which really place the two orders far apart. In the opinion of M. Baillon there is a relationship to *Monimiaceæ* through *Eupomatia*. But the latter genus is aberrant from the Anonaceous type in so many particulars that it seems scarcely warrantable to found, on its characters, an alliance with a family which presents so few features in common with the majority of *Anonaceæ*.

By far the larger proportion of the species of *Anonaceæ* are natives of warm climates, their distribution being confined between 40° North and 40° South latitude. They are most abundant in the tropics of the Old World, less so in the warmer parts of both North and South America, and altogether absent in Europe. The most anomalous genera of the order—*Eupomatia* and *Monodora*—are confined respectively to Australia and Africa; while the species of the three genera in which the ripe carpels are united, viz., *Aberemoa*, *Rollinia*, and *Anona*, are American, with the exception of a few of the latter which are natives of tropical Africa. It is true that some species of *Anona* are now very abundant in an apparently wild state in some parts of the Malay Archipelago and the continent of British India; but the researches of R. Brown[1] and of Von Martius[2] have conclusively shown that they were introduced into India by the Portuguese on account of their edible fruits, and that they are really natives of South America and, according to the latter author, of the Antilles. The genera *Sapranthus*, *Porcelia*, *Cananga*, *Oxandra*, the true *Bocageas*, *Rollinia*, *Cymbopetalum* and *Heteropetalum* are confined to America; while *Cleistochlamys*, *Hexalobus*, *Enantia*, *Clathrospermum* and *Piptostigma* are exclusively African. *Uvaria*, *Unona*, and *Xylopia* are distributed in Asia, Africa, Australia, and America: species of *Anaxagorea* and *Phœanthus* are found both in Asia and in tropical America. *Popowia* and *Miliusa* extend to Asia and Australia; while *Oxymitra* and *Artabotrys* are distributed both in Asia and Africa. The remaining genera are exclusively Asiatic, viz., *Stelechocarpus*, *Sageræa*, *Cyathostemma*, *Ellipeia*, *Sphærothalamus*, *Tetrapetalum*, *Cyathocalyx*, *Dropanthus*, *Canangium*, *Polyalthia*, *Disepalum*, *Goniothalamus*, *Orophea*, *Mitrephora*, *Melodorum*, *Saccopetalum*, *Alphonsea*, *Kingstonia*, *Mezzettia*, *Eburopetalum*, *Enicosanthemum*, and *Marcuccia*.

Although I have considered it necessary in the preceding paragraphs to give an outline of the arrangement of the whole family, the present monograph attempts to give a detailed account only of those species which are indigenous to British India proper, to that part of the Malayan Peninsula which is under British protection, to the islands

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[1] R. Brown, *Botany of the Congo*, 6. (Misc. Works, ed. Benn. I. 105).
[2] Von Martius *Fl. Brasil; Anonaceæ*, 51.

of Singapore, Pangkore and Penang, and to the Nicobar and Andaman groups. This is the geographic area covered in the later volumes of Sir Joseph Hooker's *Flora of British India*; and it may, in the broad sense, be considered for botanical (though not for political) purposes as *British* India, as distinguished from *Dutch* or *Netherlands* India which consists of the Malayan Archipelago. The majority of the species indigenous to the British Indian area have already been dealt with by Sir Joseph Hooker and the late Dr. T. Thomson in that splendid fragment their *Flora Indica* (published in 1855), and still more recently by Sir Joseph Hooker in the first volume of his *Flora of British India*. It is with no idea of improving upon the work of these distinguished authors that I have re-described the same species in the following pages; but chiefly in order that the species which have been discovered since the order was dealt with by them may be described, and that the relations of the new to the older species may be understood. From the general arrangement followed in the *Flora of British India* I have deviated in the present Monograph only in three particulars: (1) I have substituted, as suggested by M. Baillon, the name *Canangium* for the *Cananga* of Rumphius; (2) I have accepted the genus *Griffithia*, which was originally proposed (but never published) by Maingay for the plant named *Polyalthia magnoliæflora* in the *Flora of British India*; and (3) I have restored the genus *Sageræa*, Dalz., which in the *Flora of British India* is reduced to *Bocagea*.

The Malayan Peninsula remains even now but partially explored, and there can be no doubt that its complete examination must bring to light many new *Anonaceæ*. In this fact there exists, therefore, a powerful reason against the present publication. On the other hand, the liberality of the Government of Bengal makes it possible at the present time for an account of this difficult family, not only to be printed, but also to be most fully illustrated by figures. Moreover, no one can tell when the mountain range which forms the backbone of the Peninsula may be explored, and the collection of a complete set of herbarium material may still be very distant. For these two reasons I am therefore content to incur the charge of having published the present Monograph prematurely.

As the family is not an easy one even for experts in systematic botany, I have given a figure of each species. These figures have been drawn from the completest materials at my command, and mostly by the Bengali artists attached to the Herbarium of the Royal Botanic Garden, Calcutta. Some species, of which good specimens do not exist in the Calcutta collection, have been figured by Miss M. Smith, from specimens contained either in the Herbarium at Kew, or in the Wallichian Herbarium in possession of the Linnæan Society of London. The figures of almost the whole of the species peculiar to Ceylon have been copied from original drawings made in the Herbarium of the Royal Botanic Garden at Peradeniya, which were in the most kind and liberal way put at my disposal by my excellent friend Dr. Henry Trimen, F.R.S., Director of that institution. For many of the illustrations of the species peculiar to Western India, I am indebted to the kind permission of Colonel R. H. Beddome, F.L.S., to copy the figures of his *Flora Sylvatica* and *Icones Plantarum*. For the loan of specimens in connection with the present work I have to return my warmest thanks to Dr. Trimen, and also to Mr. Ridley, F.L.S., Director of the Botanic Garden, Singapore; to Mr. T. Curtis, of the Botanic Garden and Forest Department, Penang; to Mr. L. Wray, Junior, Director of the Museum at Laroot; to Dr. Lawson, F.L.S., Director of the Botanical

Department, Madras; to Mr. J. S. Gamble, F.L.S., Director of the Forest School, Dehra Dun; and to Mr. J. F. Duthie, F.L.S., Director of the Botanical Survey of Northern India. I have also to acknowledge, with grateful thanks, the kindness and courtesy of the authorities of the Royal Herbarium at Kew, who facilitated my researches in every possible way by putting the resources of that superb collection at my disposal during a prolonged course of study there. To my good friend and colleague Dr. D. Prain I am indebted for much excellent advice and criticism during the progress of the work. Dr. Prain has also to a large extent corrected the proofs of the lithographs, which have all been executed by Bengali artists in Calcutta.

ANONACEÆ.

Trees or shrubs, often climbing and aromatic. *Leaves* alternate, exstipulate, simple, quite entire. *Flowers* 2- rarely 1-sexual. *Sepals* 3, free or connate, usually valvate, rarely imbricate. *Petals* 6, hypogynous, 2-seriate, or the inner absent. (*Flowers* dimerous in *Disepalum*.) *Stamens* many, rarely definite, hypogynous, closely packed on the torus; filaments short or 0; anthers adnate, cells extrorse or sublateral, connective produced into an oblong, dilated or truncate head. *Ovaries* 1 or more, apocarpous, very rarely (*Anona*) syncarpous with distinct or agglutinated stigmas; style short or 0; ovules 1 or more. *Fruit* of 1 or more, sessile or stalked, 1- or many-seeded, usually indehiscent carpels. *Seeds* large; testa crustaceous or coriaceous; albumen dense, ruminate, often divided almost to the axis into several series of horizontal plates; embryo small or minute; cotyledons divaricating.

TRIBE I.—UVARIEÆ. *Petals* 2-seriate, one or both series imbricate in bud. *Stamens* many, close-packed; their anther-cells concealed by the overlapping connectives (imperfectly concealed in some species of *Sageræa*). *Ovaries* indefinite.

Sepals imbricate; trees or shrubs.

Flowers small, globular, scarcely opening; often unisexual and from the older branches or trunk; ovules 6 to 8, or indefinite.

Trees; flowers 1-sexual; ovules many; torus conical or hemispheric	1. *Stelechocarpus.*
Trees or shrubs; flowers uni-sexual or hermaphrodite; torus flat	2. *Sageræa.*
Flowers large, elongate, hermaphrodite, axillary or extra-axillary; ovules one or two	3. *Griffithia.*

Sepals valvate; climbers.

Flowers small, mostly hermaphrodite; petals incurved; ovules 6 to 8; torus flat	4. *Cyathostemma.*

Flowers usually large and from the leafy branches; petals spreading; torus flat.

Flowers 2-sexual; ovules many . . . . . 5. *Uvaria.*
Flowers 1- or 2-sexual; ovules solitary, rarely 2 . 6. *Ellipeia.*

Tribe II.—Unoneæ. *Petals* valvate or open in bud, spreading in flower, flat, or concave at the base only; inner sub-similar or 0. *Stamens* many, close-packed; their anther-cells concealed by the overlapping connectives. *Ovaries* indefinite.

Flowers trimerous.

Petals conniving at the concave base and covering the stamens and ovaries.

Ovaries 1—3, many-ovuled; peduncles not hooked . . . . . 7. *Cyathocalyx.*
Ovaries many, 2-ovuled; peduncles hooked . . . 8. *Artabotrys.*
Ovaries many; ovules 4 or more; peduncles straight . . . . . 9. *Drepananthus.*

Petals flat, spreading from the base.

Ripe carpels indehiscent.

Ovules many, 2-seriate; petals lanceolate; stamens with acute apical appendages . . 10. *Canangium.*
Ovules 2—6, 1-seriate on the ventral suture . 11. *Unona.*
Ovules 1-2, basal or sub-basal . . . . . 12. *Polyalthia.*
Ripe carpels follicular . . . . . 13. *Anaxagorea.*
Flowers dimerous . . . . . 14. *Disepalum.*

Tribe III.—Mitrephoreæ. *Petals* valvate in bud, outer spreading; inner dissimilar, concave, connivent, arching over the stamens and pistils (divergent in some species of *Mitrephora*). *Stamens* many (few in *Orophea*), closely packed; anther-cells (except in *Orophea*) concealed by the overlapping connectives. *Pistils* numerous (few in some species of *Orophea*).

Inner petals clawed.

Inner petals connivent in a cone, but not vaulted . . 15. *Goniothalamus.*

Inner petals vaulted.

Stamens about 6, Miliusoid; inner petals longer than the outer . . . . . 16. *Orophea.*
Stamens numerous, Uvarioid; inner petals not longer or very little longer than the outer . . 17. *Mitrephora.*

Inner petals not clawed.

Flowers globose; petals sub-equal . . . . . 18. *Popowia.*
Flowers elongate; inner petals much shorter than the outer . . . . . 19. *Oxymitra.*

TRIBE IV.—XYLOPIEÆ. *Petals* valvate in bud, thick and rigid, connivent; the inner similar but smaller, rarely 0.

Outer petals broad; torus convex	20. *Melodorum.*
Outer petals narrow, often triquetrous; torus flat or concave	21. *Xylopia.*

TRIBE V.—MILIUSEÆ. *Petals* valvate in bud, the outer sometimes very small like the sepals. *Stamens* often definite, loosely imbricate; anther-cells (except in *Phœanthus*) not concealed by the connectives. *Ovaries* solitary or indefinite.

Ovaries indefinite.

Sepals and outer petals similar and minute; inner petals very large, often cohering by their edges.

Ovules 1 or 2; stamens numerous, quadrate, with broad truncate apical processes concealing the anther-cells from above	22. *Phœanthus.*
Ovules 1 or 2, rarely 3 or 4; stamens few or numerous, compressed; the apical process of the connective compressed, not broad or truncate, and not* concealing the anther-cells from above	23. *Miliusa.*
Ovules 6 or more, the inner petals much larger than the outer and saccate at the base; stamens indefinite	24. *Saccopetalum.*
All the petals larger than the sepals, often saccate at the base, sub-equal or the inner smaller	25. *Alphonsea.*

Ovaries solitary.

Outer petals valvate, inner imbricate	26. *Kingstonia.*
All the petals valvate	27. *Mezzettia.*

* NOTE.—Some species of *Sageræa* have the anther-cells imperfectly concealed by the connectives, much as in *Miliusa*.

1. Stelechocarpus, *Blume*.

Trees. *Leaves* coriaceous. *Flowers* dicœcious, in fascicles from the old wood. *Sepals* 3, small, elliptic or orbicular, imbricate. *Torus* conical. *Stamens* indefinite; connective dilated, truncate. *Ovaries* indefinite, ovoid; stigma sessile; ovules 6 or more. *Ripe carpels* large, berried, globose, 4—6-seeded. Distrib.—Species 3 or 4, all Malayan.

Leaves pellucid-punctate	1. *S. punctatus.*
Leaves not pellucid-punctate.	
Flowers of both sexes alike	2. *S. nitidus.*
Male flowers smaller than the female	3. *S. Burahol.*

1. STELECHOCARPUS PUNCTATUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 4. A tree 20 to 30 feet high; young branches slender, cinereous-puberulous, becoming glabrous. *Leaves* membranous, minutely pellucid-punctate, elliptic-ovate, shortly acuminate, slightly narrowed in the lower fourth to the rounded sub-oblique base; upper surface shining, glabrous, except the pubescent impressed midrib; lower surface shining, paler than the upper, sparsely puberulous or glabrous, the reticulations minute and distinct; main nerves 12 to 14 pairs, bold and prominent on the lower, slightly impressed on the upper, surface; length of blade 7 to 10 in., breadth 3 to 4 in.; petiole ·15 to ·2 in., stout, pubescent. *Male flowers* in several-flowered fascicles from woody tubercles on the trunk, pedunculate; buds turbinate, nearly ·5 in. in diam.; peduncles 1 to 1·5 in. long, stout, thickened upwards, ebracteolate, puberulous. *Sepals* very coriaceous, rotund, concave, conjoined at the base, spreading, rugose, pubescent outside, glabrous inside. *Petals* very coriaceous, rotund, concave, glabrous; the outer 3 puberulous outside; the inner three smaller than the outer, quite glabrous, otherwise like them, and all of a dark brownish colour. *Anthers* sessile, flat, the cells elongate on the anterior surface, the back striate; apex without any appendage from the connective. *Female flowers* and *fruit* unknown.

Perak,—*King's Collector* No. 7183.

Although female flowers and fruit of this have not yet been found, I describe it as a new species of *Stelechocarpus* without any hesitation. Its male flowers have exactly the *facies* of those of *S. Burahol*, Bl.; but they are larger, and they differ as to shape of their petals. The leaves of this species are distinctly pellucid-punctate (while those of *S. Burahol* are not), and they are broader and have slightly more nerves than those of *S. Burahol*. When boiled, the flowers of the two have exactly the same peculiar sweetish smell.

PLATE 1. Stelechocarpus punctatus, *King*. 1, Leaf-twig; 2, fascicle of male flower-buds from the trunk—*of natural size;* 3, male flower dissected; 4, anthers—*enlarged*.

2. STELECHOCARPUS NITIDUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 5. A tree 30 to 60 feet high; all parts glabrous except the inflorescence; young branches darkly cinereous, slender. *Leaves* coriaceous, oblong-lanceolate, shortly acuminate, the base acute; both surfaces shining, very minutely scaly, the midrib and nerves deeply impressed on the upper, bold and prominent on the lower; the reticulations distinct on both; main nerves 10 to 12 pairs, curved, sub-ascending, inter-arching within the edge; length of blade 6 to 9 in., breadth 1·8 to 3·25 in.; petiole ·35 in. *Male flowers* in many-flowered fascicles from tubercles on the trunk, pedicellate; buds turbinate; flowers when open probably nearly 1 in. in diam.; pedicels stout, thickened upwards, 1 to 1·5 in. long, scurfy-puberulous, each with several sub-rotund glabrous bracteoles mostly near its base. *Sepals* very coriaceous, shortly oblong, obtuse, concave, spreading, conjoined at the base, puberulous or glabrescent, warted externally. Outer 3 petals much larger than the sepals and somewhat larger than the inner 3 petals, rotund, concave, very coriaceous, glabrous, with scurfy warts externally near the middle; inner 3 petals coriaceous, rotund, blunt, cucullate, glabrous. *Female flowers* like the males; stamens none; *ovaries* very numerous, obscurely 3-angled, adpressed-sericeous. *Torus* hemispheric. *Ripe carpels* broadly ovoid, blunt, 2·5 in. long, 1·75 in. in diam.,

puberulous, minutely warted; pericarp thick, fleshy. *Seeds* about 8 in two rows, flattened, 1·25 in. long and ·5 in. thick.

Perak: in dense forest at low elevations,—*King's Collector* Nos. 7629 and 8224.

This species has the flowers of both sexes alike. The carpels of this species are much larger than those of *S. Burahol*, Bl.; and its leaves are more thickly coriaceous and shining, the nerves and midrib being much more depressed on the upper, and prominent on the lower, surface.

Plate 2. Stelechocarpus nitidus, *King*. 1, Leaf-twig; 2, fascicle of male flowers from the trunk; 3, flower opened out artificially; 4, ripe carpel; 5, seeds; 6, flower, dissected; 7, male flower with the petals removed; 8, female flower with the petals removed—*of natural size;* 9, stamens; 10, ovaries—*enlarged*.

3. Stelechocarpus Burahol, *H. f. & T. Fl. Ind.* 94. A tree 20 to 60 feet high; young branches slender, dark-coloured, glabrous. *Leaves* thinly coriaceous, oblong-lanceolate, acute or very shortly acuminate, the base cuneate; both surfaces glabrous, shining, the reticulations minute and distinct, the lower with minute black dots, the upper with very minute scales; main nerves 10 to 12 pairs, sub-ascending, prominent, inter-arching ·2 in. within the margin; length of blade 5 to 8 in.; breadth 1·75 to 2·75 in.; petiole ·3 to ·9 in. *Male flowers* much smaller than the female (only about ·4 in. in diam.), in fascicles of 8 to 16 from minutely bracteolate woody tubercles from the branches and trunk, pedicellate; the pedicels slender, ebracteolate, tomentose, from ·5 to ·75 in. long. *Sepals* coriaceous, triangular, spreading. *Petals* much longer than the sepals, oblong, sub-acute, warted, pubescent inside; anthers with obtuse, terminal, dilated, 2-lobed apical appendages from the connective; ovaries 0. *Female flowers* three times as large as the males, and on similar pedicels; calyx not persistent; corolla as in the male. *Ovaries* numerous, on an ovoid-conic torus, oval or obovate; the outer surface compressed, the inner with a vertical ridge, and adpressed pale hairs; stigma sessile, minutely lobed. *Fruit* on stout peduncles 2 to 3 in. long, thickened upwards. *Ripe carpels* few, shortly stalked, globose, obovate, about 1·5 in. long and 1·25 in. in diam.; when young puberulous, verrucose, afterwards nearly smooth; pericarp pulpy, coriaceous externally. *Seeds* 4 to 6, large, oval, sub-compressed, sub-rugose. *Hook. fil. Fl. Br. Ind.* i. 47; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 5.—Uvaria Burahol, *Blume Bijdr.* 14; *Flora Javæ Anon.* 48, *t.* 23 *and* 25 *C.; Scheff. in Nat. Tijdsch. Ned. Ind.* xxxi. 5.

Singapore,—*Lobb*. Distrib.—Java.

There is sometimes a remarkable difference in the length of the petioles in this species, some of those *on the same specimen* being three times as long as others.

Plate 3. Stelechocarpus Burahol, *H. f. & T.* 1, Leaf-twig; 2, branch with male flowers (from a specimen grown in the Botanic Garden, Buitenzorg); 3, female flower; 4, torus of female flower with pistils; 5, ripe carpels; 6, transverse section of ripe carpel; 7, vertical section of unripe carpel; 8, seed—*of natural size;* 9, male flower; 10, stamens—*enlarged;* 11, torus of female flower and pistils—*much enlarged*. (*Nos.* 2 *to* 11 *are copied from Blume's Fl. Jav. Anon., t.* 25.)

2. Sageræa, *Dalz.*

Trees. *Leaves* shining, and branches glabrous. *Flowers* small, axillary or fascicled on woody tubercles, 1—2-sexual. *Sepals* orbicular or ovate, imbricate. *Petals* 6, imbricate

in 2 series, nearly equal, usually orbicular, very concave. *Stamens* 6—21, imbricate in 2 or more series, broadly oblong, thick, fleshy; anther-cells dorsal, oblong, connectives produced. *Ovaries* 3—6; style short; stigma obtuse or capitate; ovules 6 to 8, on the ventral suture. *Ripe carpels* globose or ovoid, stalked. Distrib.—Species 6, tropical Asiatic.

A genus closely allied to *Bocagea*, St. Hilaire, but differing from that in having its sepals and petals much imbricate instead of valvate; in bearing more ovules, and more seeds in its ripe carpels; in its anther-cells being more lateral and not so entirely dorsal as in *Bocagea*, and in the apical process of the connective being truncate. The flowers of *Sageræa* are small and the sepals and petals are very concave; and in these respects, as well in the comparative fewness of the seeds in their ripe carpels, they diverge from those of typical *Uvarieæ*. Hooker *filius* and Thomson (in their *Flora Indica*), Bentham and Hooker (in their *Genera Plantarum*), and Baillon (in his *Histoire des Plantes*, Vol. I. 202, 281) retain *Sageræa* as a genus,—an example which I would have followed without any hesitation had not Sir Joseph Hooker united it with *Bocagea* in his *Flora of British India*. The extreme imbrication both of the sepals and petals appears to me, however, in spite of Sir Joseph Hooker's more recent view, so insurmountable an argument against its reduction to a genus in which both these sets of organs are very distinctly valvate, that I adhere to his earlier view that *Sageræa* should remain distinct and take its place in the tribe *Uvarieæ*.

Flowers unisexual.

Leaves 8 to 12 in. long with 14 to 16 pairs of nerves; stamens 12 to 18; ripe carpels globular	1. *S. elliptica.*
Leaves 4 to 5·5 in. with 6 to 8 pairs of nerves; stamens 9; ripe carpels ovoid	2. *S. Listeri.*

Flowers hermaphrodite.

Flowers ·6 to ·75 in. in diam; sepals ovate, orbicular, sub-acute; stamens 24; ovaries glabrous, 7-ovuled	3. *S. Thwaitesii.*
Flowers ·3 in. in diam.; sepals orbicular; stamens 12 to 18; ovaries hairy, with about 12 ovules	4. *S. laurina.*

1. Sageræa elliptica, *Hook. fil. & Thoms. Fl. Ind.* 93. A large tree; all parts glabrous except the ciliate perianth; young branches rather stout, angled. *Leaves* coriaceous, narrowly oblong, acute (obtuse when very old); the base narrowed, obtuse or minutely cordate, oblique; both surfaces shining; main nerves 14 to 16 pairs, preading, faint; length 8 to 12 in., breadth 2·25 to 3·5 in.; petiole ·15 in., very thick. *Flowers* monœcious, solitary and axillary, or fascicled on tubercles on the larger branches, small, red; pedicels ·25 in. long, with several basal and medial bracts. *Sepals* small, semi-orbicular, glabrous, ciliate. *Petals* thick, ovate-orbicular, concave, tubercular outside, glabrous, the edges ciliate, ·25 in. long; the inner smaller than the outer. *Stamens* 12 to 18, the connective sub-quadrate at the apex; anthers extrorse. *Ovaries* in female flower about 3, glabrous; ovules about 8. *Ripe carpels* sub-sessile, globose, glabrous, 1 in. in diam. *Seeds* several. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 7.—Sageræa Hookeri, *Pierre Flore Forest. Coch.-Chine, t.* 15.—Bocagea elliptica, *H. f. & Th. Fl. Br. Ind.* i. 92; *Kurz F. Flora Burma*, i. 50.—Uvaria elliptica, *A. DC. in Mem. Soc. Genev.* v. 27; *Wall. Cat.* 6470, 7421.—Diospyros? frondosa, *Wall. Cat.* 4125.

Burmah to Penang.

An imperfectly known species, badly represented in collections.

Plate 34. Sageræa elliptica, *H. f. & Th.* 1, Leaf-twig; 2, flowering branch; 3, ripe carpel—*of natural size;* 4, flower dissected; 5, anther—*enlarged.*

2. Sageræa Listeri, *King n. sp.* A tree with pale, fibrous, deciduous bark; young branches rather slender, pale; all parts, except the flower and ripe fruit, glabrous. *Leaves* coriaceous, elliptic-oblong to elliptic, shortly acuminate, the base cuneate or rounded; upper surface shining; the lower dull, darker than the upper when dry; main nerves 6 to 8 pairs, curved, spreading, very faint; length 3·75 to 5·5 in., breadth 1·5 to 2·5 in.; petiole ·4 in. *Flowers* sub-globular, solitary, axillary, sessile, ·3 in. in diam.; bract close to flower, sub-orbicular, pubescent outside. *Sepals* much imbricate, very concave, orbicular, whitish, pubescent outside, glabrous inside, ·15 in. in diam. *Petals* like the sepals, but larger and more densely pubescent outside; the inner row rather smaller than the outer. *Stamens* 9, the connective broad, flattened, not produced at the apex; anther-cells lateral, extrorse. *Ovaries* (not seen). *Ripe carpels* broadly ovoid, narrowed to the base, minutely pubescent, 1 in. long. *Seeds* about 12, in two rows, flattened.

Chittagong Hill Tracts,—*Lister, Heinig.*

This closely resembles *S. elliptica*, but has smaller leaves with fewer nerves and fewer stamens; while the carpels are ovoid, not globose. Its timber is said to be of excellent quality.

Plate 35A. Sageræa Listeri, *King.* 1, Flowering branch; 2, ripe carpel—*of natural size;* 3, flower dissected—*slightly enlarged;* 4, flower-bud—*much enlarged.*

3. Sageræa Thwaitesii, *Hook. fil. & Thoms. Fl. Ind.* 93. A glabrous tree; young branches rather stout, dark-coloured. *Leaves* coriaceous, elliptic to elliptic-oblong, the base sub-cuneate, rarely rounded; both surfaces faintly reticulate; main nerves 10 to 12 pairs, spreading, very faint; length 5·5 to 14 in., breadth 2·35 to 3·75 in.; petiole ·5 in., channelled. *Flowers* bisexual, ·6 to ·75 in. in diam., sub-globular, pale orange, fascicled on the larger branches; pedicels ·75 to 1 in. long with several bracteoles at the base. *Sepals* ovate-orbicular, sub-acute, glabrous; *outer petals* larger than the sepals and than the inner petals. *Stamens* about 24; the anthers large, dorsal; the connective transversely elongate and truncate at the apex. *Ovaries* 3, glabrous, oblong-ovoid, about 7-ovuled; style very short; stigma grooved. *Ripe carpels* globose, smooth, ·75 in. in diam.; stalks ·15 in. *Seeds* compressed, broadly grooved. *Thwaites' Enum.* 6; *Beddome Ic. Pl. Ind. Or., t.* 41.—Bocagea Thwaitesii, *H. f. & Th. Fl. Br. Ind.* i. 94.

Ceylon.

Plate 36. Sageræa Thwaitesii, *H. f. & Th.* 1, Branch with flower-buds; 10, flower-bud showing the imbrication of the petals; 2, carpels ripe and nearly ripe—*of natural size;* 3, 4 & 5, seeds—*slightly enlarged;* 6, flower seen from above; 7, sepals, torus and pistils; 8, anther; 9, section of pistil—*much enlarged.* (*All copied from a drawing made in the Peradeniya Herbarium and lent by Dr. H. Trimen,* F.R.S.)

4. Sageræa laurina, *Dalz. in Kew Journ. Bot.* iii. 207. A tree; young branches rather slender. *Leaves* coriaceous, oblong-lanceolate, slightly unequal-sided, the apex

sub-acute, the base sub-cuneate or rounded; upper surface shining, the lower dull, paler, the midrib puberulous; main nerves 10 or 12 pairs, spreading, very faint; length 4·5 to 10 in., breadth 1·5 to 3 in.; petiole ·25 in. *Flowers* ·3 in. in diam., yellow, bisexual, solitary, or in fascicles of 2 to 10 on small woody tubercles on the branches below the leaves; pedicels ·4 or ·5 to 1 in. long with numerous scaly bracteoles at the base. *Sepals* orbicular, connate for half their length, glabrous, ciliate on the margins like the petals. *Petals* very concave, orbicular; the outer ·3 in. long, larger than the inner. *Stamens* 12 to 18; the outer row sometimes imperfect; connective very broad, projecting above the dorsal anthers. *Ovaries* 3 to 5, oblong, hairy; ovules about 12 in 2 rows; style short, lateral, glabrous; stigma small, capitate, entire. *Ripe carpels* sub-sessile, globose, glabrous, 1 in. in diam. *Dalzell & Gibson, Bombay Flora* 2; *Hook. fil. & Thoms. Fl. Ind.* 93.—S. Dalzelli, *Bedd. Ic. Pl. Ind. Or., t.* 42.—Guatteria laurifolia, *Graham Cat. Bombay Plants* 4.—Bocagea Dalzelli, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 92.

Western Peninsula: in the Concan,—*Law, Graham, Stocks.* Travancore,—*Beddome.*

Plate 35B. Sageræa laurina, *Dalzell.* 1, Flowering branch; 2, fascicle of flowers from an old branch—*of natural size;* 3, flower-bud; 4, flower dissected; 5, ovaries and calyx—*enlarged;* 6 & 7, anthers; 8, pistil; 9, section of pistil—*much enlarged.* (*Nos.* 2 *and* 3 *to* 10 *are copied from Beddome Ic. Pl. Ind. Or., t.* 42.)

3. Griffithia, *Maingay* MSS.

Trees or shrubs. *Flowers* bisexual, rather large, axillary, solitary or in pairs. *Sepals* broad, short, much imbricate. *Petals* 6, imbricate in 2 series, ovate; the inner row smaller and much thicker than the outer, excavated at the base. *Stamens* numerous, flattened, elongate; the connective truncate, not produced; anther-cells long, linear, dorsal. *Ovaries* numerous; ovules solitary or a pair, basal; style filiform; stigma broadly clavate. *Ripe carpels* ovoid, stalked, with a single ovoid, smooth, furrowed seed. Four species—all Malayan.

This genus was originally founded by Maingay for the reception of the plant which appears in the *Flora of British India* as *Polyalthia magnoliæflora*, and which differs notably from typical *Polyalthia* in having imbricate petals. Since Maingay's time good specimens of two closely allied plants possessing similar characters have been collected in Perak. These all have the single or paired ovules, the seed and the general *facies* of *Polyalthia*, but they have the imbricate sepals of *Sageræa*, the imbricate petals of *Guatteria*, the style and stigma of *Goniothalamus* and *Cyathocalyx*, and the stamens of *Uvaria.* With so many aberrant characters, it appears advisable to re-establish Maingay's unpublished genus. It is unfortunate that the name *Griffithia* has already been applied to a group of Rubiaceous plants, which is, however, now recognised as a section of the genus *Randia.*

Leaves glabrous or glabrescent beneath.

Flowers 2·5 to 3 in. long . . . . . 1. *G. magnoliæpetala.*

Flowers 1 in. long . . . . . 2. *G. cupularis.*

Leaves softly pubescent beneath . . . . . 3. *G. fusca.*

1. Griffithia magnoliæpetala, *Maingay mss.* A tree 30 to 40 feet high; young branches rusty-tomentose. *Leaves* thinly coriaceous, obovate-oblong, shortly acuminate, the base rounded or minutely cordate; upper surface glabrous, the nerves and midrib minutely tomentose; under surface at first pubescent, ultimately glabrous or glabrescent; main nerves 15 to 20 pairs, rather straight, oblique, prominent beneath, the transverse veins sub-horizontal, distinct; length 8 to 12 in., breadth 2·5 to 3·5 in.; petiole ·25 in., stout, tomentose. *Flowers* large, shortly pedunculate, solitary, axillary, 2·5 to 3 in. long; peduncle ·3 in. long, tomentose, with a sub-amplexicaul bract. *Sepals* coriaceous, connate to the middle, short, broadly ovate, acute, spreading, tomentose. *Petals* more or less imbricate, coriaceous, white, oval or ovate-lanceolate, sub-acute, tomentose. *Torus* conical. *Ovaries* hirsute. *Carpels* 1·5 in. long, shortly stalked, oblong, tapering at either end; the apex mucronate, pubescent. *Seed* with smooth shining testa. Polyalthia magnoliæflora, *Hook. fil. Fl. Br. Ind.* i. 64; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 54.

Malacca,—*Maingay.* Perak.—*King's Collector* No. 10039.

Evidently a rare species. Sir J. D. Hooker states (*F. B. Ind. l. c.*) on Maingay's authority that the flowers have the colour and odour of those of a *Magnolia.*

Plate 218. Griffithia magnoliæpetala, *Maingay.* 1, Branch with flower-bud; 2, flower; 3, flower-bud with the outer petals removed; 4, calyx; 5, view of concave surface of outer petal; 9, transverse section of flower-bud a little below the apex; 10, a similar section on a level with the apices of the sepals; 14, immature carpel; 15, section of the same showing the single seed; 16, ripe carpel—*of natural size;* 6, inner aspect of inner petal; 7, inner petal in profile; 8, the same seen in vertical section from base to apex—*slightly enlarged;* 11, stamen; 12, pistil; 13, vertical section of ovary—*much enlarged.* [*No.* 1 *is copied from Maingay's specimen in the Kew Herbarium* (*Kew Distrib. No.* 93). *Nos.* 2 *to* 16 *are copied from Maingay's original drawing* (*made from fresh flowers*) *deposited in the Kew Herbarium.*]

2. Griffithia cupularis, *King n. sp.* A shrub or tree; young branches pubescent, ultimately glabrous, cinereous and striate. *Leaves* membranous, oblong, sometimes slightly obovate, shortly acuminate, slightly narrowed to the rounded, sometimes sub-oblique, base; upper surface glabrous, shining, the midrib pubescent; lower surface paler, glabrous, slightly shining, the midrib and 12 to 14 pairs of oblique, puberulous main nerves non-interarching; length 6 to 9 in., breadth 2 to 3 in.; petiole. ·25 in. *Flowers* solitary or in pairs, axillary or extra-axillary; buds sub-globose; the fully developed flower about 1 in. long; pedicels tomentose with several large, sub-orbicular, and sheathing bracteoles, one close to the flower. *Sepals* much imbricate, broadly semi-orbicular, very obtuse, tawny-tomentose outside, sub-glabrous inside, completely enveloping the petals in bud, but only about a quarter of their length when fully developed. *Petals* imbricate, concave, thick, coriaceous, tawny-tomentose on both surfaces, but especially on the outer, with a glabrous patch at the base of all on the inner surface; outer row broadly ovate, obtuse, when fully grown about 1 in. long; inner petals shorter and much thicker, the base excavated. *Stamens* very numerous, compressed; the filaments very short, the connective truncate and not produced above the long, linear, dorsal anthers. *Ovaries* about 12, oblong, oblique, villous, with 1, sometimes 2, basal ovules; style lateral,

shorter than the ovary; stigma clavate. *Ripe carpels* ovoid or sub-globose, blunt at each end, densely tawny-tomentose, ·8 in. long; stalks about ·35 in. *Seed* solitary, ovoid, with a prominent vertical groove.

Perak,—*King's Collector* Nos. 3856, 5514, 6643, 7630.

PLATE 219. Griffithia cupularis, *King*. 1, Flowering branch; 2, young bud; 3, bud nearly expanded; 4, ripe fruit; 5, seed; 6, flower dissected—*of natural size;* 7 & 8, anthers; 9 & 10, pistils—*enlarged*.

3. GRIFFITHIA FUSCA, *King n. sp.* A small tree 10 to 20 feet high; young branches minutely rufous-tomentose, speedily becoming glabrous and furrowed. *Leaves* thinly coriaceous, oblong to oblong-oblanceolate, acute; the base rounded, never cordate; upper surface shining, quite glabrous except the puberulous midrib; the lower sparsely and softly pubescent; main nerves 12 to 16 pairs, oblique, curved at the tips and inter-arching faintly close to the edge, prominent on the lower, depressed on the upper, surface; length 6 to 8 in., breadth 1·75 to 2·75 in.; petiole ·2 to ·3 in., stout. *Flowers* solitary, extra-axillary; the buds globular at first, but pointed and elongating with age; the outer petals imbricate near the apex, the inner imbricate in the upper half; pedicels stout, ·25 to ·4 in. long, yellowish-tomentose, with 2 ovate bracteoles near the base. *Sepals* slightly imbricate at the base, broadly ovate, sub-acute, spreading, minutely tomentose outside, glabrous inside. *Petals* thick, concave, ovate-oblong, sub-acute, cream-coloured; the outer about 1 in. long in the newly-expanded bud, but probably lengthening after the expansion of the flower; the inner shorter and narrower, all minutely tomentose externally, pubescent internally in the upper two-thirds, and glabrous in the lower third. *Stamens* numerous, the connective with flat, horizontal, apical process; the anthers linear, dorsal. *Ovaries* few, elongate, ovoid, villous, 1-ovuled; style short, cylindric; stigma sub-capitate, pubescent. *Ripe carpels* ovoid, slightly apiculate, densely but minutely rusty-tomentose, ·65 in. long.

Perak,—*King's Collector* Nos. 8346, 10110, 10130 and 10404; *Wray* No. 1432.

A species resembling *G. magnoliæpetala*, Maingay; but differing from that in its smaller flowers, leaves pubescent underneath, and more hairy carpels. The sepals in this are much less imbricate than in *G. magnoliæpetala*, and so are the petals; in other respects the two are closely allied. From some fragments of a fully developed flower which accompany one of the Perak specimens, I gather that the outer petals lengthen much after the expansion of the bud and probably measure as much as 2 inches, while their shape becomes linear-obtuse. In the accompanying drawing I show the shape of the petals as they are found in a far-advanced bud.

PLATE 220. Griffithia fusca, *King*. 1, Branch with young fruit; 2, flowering twig with buds just opening (the leaves removed); 3, calyx; 4, calyx and andro-gynœcium—*of natural size;* 5, nearly expanded flower-bud dissected; 6 & 7, stamens; 8 & 9, pistils—*enlarged*.

NOTE.—There are in the Calcutta Herbarium imperfect specimens of what is evidently a fourth species of this genus, with narrow much elongate petals; but the materials are too incomplete for description.

4. Cyathostemma, *Griffith.*

Scandent shrubs. *Flowers* sub-globose, in di- or tri-chotomous pendulous cymes from the old wood (flowers dimorphous in sp. 5). *Sepals* 3, connate, hirsute. *Petals* 6, 2-seriate, short, sub-equal, their bases fleshy, all valvate at the base, the tips imbricate. *Torus* flat, margin convex. *Stamens* many, linear; anthers sub-introrse; process of connective oblique, incurved. *Ovaries* many; style cylindric, glabrous, notched; ovules many. *Ripe carpels* oblong-ovoid, many-seeded.

The petals in this genus are so unmistakably imbricate in æstivation, that I remove it from the tribe *Unoneæ* to *Uvarieæ*. The ripe carpels, moreover, much resemble those of some species of *Uvaria*. Of the five species described below, three are quite new. The first (*C. viridiflorum*) is the plant upon which Griffith founded the genus; while the fourth has been hitherto referred to *Uvaria* under the specific name *U. parviflora*.

Flowers uniform and hermaphrodite.

Flowers in more or less elongated pendent cymes.

Leaves oblong-lanceolate or oblanceolate; inner petals contracted at the base	1. *C. viridiflorum.*
Leaves obovate-elliptic to obovate-oblong; petals not contracted at the base	2. *C. Scortechinii.*
Flowers in stem-fascicles of 10 to 14, or in axillary pairs; leaves with pubescent midribs	3. *C. Wrayi.*
Flowers in 2- or 3-flowered extra-axillary or leaf-opposed fascicles or cymes; leaves quite glabrous	4. *C. Hookeri.*
Flowers dimorphous, the females with a few abortive anthers	5. *C. acuminatum.*

1. Cyathostemma viridiflorum, *Griff. Notulæ* iv. 707; *Ic. Pl.* iv. *t.* 650. Scandent; the young branches thin, glabrous, dark-coloured when dry. Leaves coriaceous, oblong-lanceolate or oblanceolate, apiculate; the base slightly narrowed, minutely cordate; both surfaces rather dull; the upper glabrous except the minutely tomentose midrib; the lower darker, puberulous on the midrib and 8 to 10 pairs of rather prominent spreading main nerves; length 4·5 to 7·5 in., breadth 1·5 to 2 in.; petiole ·2 in. *Cymes* dichotomous, on peduncles several inches long, from warty tubercles on the older roughly striate branches, few-flowered, corymbose, minutely rusty-tomentose, with an oblong bract at each bifurcation and another about the middle of each pedicel. *Flowers* ·5 in. in diam. *Sepals* broadly cordate, spreading or sub-reflexed. *Petals* acute, the base contracted, especially in those of the inner row, coriaceous, tomentose. *Ovaries* tomentose. *Ripe carpels* stalked, 1 to 1·5 in. long, oblong-ovoid, blunt, glabrous; stalk ·75 in. *Hook fil. Fl. Br. Ind.* i. 57; *Kurz For. Fl. Burm.* i. 33; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 8.

Eastern Peninsula,—*Griffith.* Penang,—*Maingay* (*Kew Distrib.*) No. 36.

A species known by only a few imperfect specimens. According to Griffith, the wood of this species resembles that of a *Menisperm.* Kurz gives this as a native of the Andamans; but I have seen no specimen from those islands.

PLATE 37. Cyathostemma viridiflorum, *Griff.* 1, Leaf-twig; 2, branch bearing cymes; 5, carpel—*of natural size;* 3, flower; 4, section of flower—*enlarged.* [*The flowers are copied from Griff. Ic.* 650: *the other parts are drawn from Maingay's specimen No.* 36 (*Kew Distrib.*)]

2. CYATHOSTEMMA SCORTECHINII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 9. A climber 50 to 70 feet long; branches of all ages, except the very youngest, dark-coloured, glabrous; the very youngest slender and rufous-pubescent. *Leaves* coriaceous, obovate-elliptic to obovate-oblong, shortly apiculate, slightly narrowed to the sub-cuneate, not cordate, base; upper surface rather dull, glabrous, except the minutely pubescent midrib; lower glabrous, the midrib slightly muriculate, the reticulations fine, distinct; main nerves 8 to 11 pairs, prominent beneath; length 6 to 10 in., breadth 2·5 to 4 in.; petiole ·25 in. *Cymes* di- or tri-chotomous, on pedicels 2 to 12 in. long from the older branches, minutely rufous-tomentose, bracteate in the upper half; the bracts numerous, ovate to rotund, concave. *Flowers* ·5 in. in diam. *Sepals* sub-rotund, united into an obscurely 3-angled flattish cup. *Petals* equal, not much longer than the stamens, sub-rotund, puberulous, coriaceous. *Connective of stamens* produced at the apex, obliquely truncate. *Ovaries* numerous, cylindric, pubescent; stigma truncate; ovules numerous. *Ripe carpels* oblong, slightly oblique, apiculate, transversely furrowed, glabrous, shortly stalked, 1·25 to 1·5 in. long; pericarp thin. *Seeds* 8 to 10, flattened, ovoid, smooth.

Perak,—*Scortechini, King's Collector* No. 5857. Singapore,—*Ridley.*

The specimens collected by the late Father Scortechini were referred by him to *Cyathostemma viridiflorum*, Griff., from which species, however, this differs by its larger, more obovate, more glabrous, leaves; flat calyx-cup formed by the entirely connate sepals; more rotund petals, not contracted at the base; and narrower, shorter-stalked fruit.

PLATE 38. Cyathostemma Scortechinii, *King.* 1, Leaf-twig; 2, flowering branch; 3, ripe carpels; 4, seed—*of natural size;* 5, flower dissected; 6, ovaries; 7, anthers—*enlarged.*

3. CYATHOSTEMMA WRAYI, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 9. A creeper 20 to 60 feet long; young branches rufous-puberulous, ultimately glabrous and darkly cinerous. *Leaves* membranous, broadly oblanceolate, shortly and rather obtusely acuminate, narrowed below the middle to the rounded base; both surfaces finely reticulate; the upper dull when dry, glabrous, the midrib minutely pubescent; lower surface shining, glabrous, except the sparsely puberulous midrib; main nerves 8 to 9 pairs, oblique, forming double arches inside the margin, impressed on the upper, prominent on the lower, surface; length 7 to 9 in., breadth 2·5 to 3 in.; petiole ·2 in. *Flowers* in fascicles of 10 to 14 from tubercles on the older branches, or in pairs from the axils of the leaves, sub-globular, about ·5 in. in diam.; pedicels ·25 to ·4 in. long, granular, sparsely pubescent and with a small ovate bracteole near the base. *Sepals* broadly ovate, spreading, rufous-puberulous and granular outside, glabrous inside, ·1 in. long. *Petals* concave, cartilaginous, slightly imbricate, minutely puberulous, especially towards the edges; the outer row ovate-orbicular, sub-acute, ·35 in. long; the inner row smaller, thicker, blunter and more imbricate than the outer. *Stamens* numerous; the connectives with a rather thick, truncate, 4- or 5-sided process concealing the apices of the linear dorsal anthers. *Ovaries* numerous, obliquely oblong, curved, glabrous, pubescent

at the base, 1- to 2-ovuled, with a conical, narrow, inflexed stigma. *Ripe carpels* reddish, ovoid, ·4 to ·6 in. long, glabrous, with a single ovoid or 2 plano-convex, shining, pale brown seeds; stalks about as long as the carpels, slender.

Perak,—*Scortechini*, *Wray*, *King's Collector*.

Plate 39. Cyathostemma Wrayi, *King*. 1, Branch with extra-axillary flowers; 2, part of old branch with clustered flowers; 3, carpels—*of natural size;* 4, flower; 5, the same dissected; 6, anthers; 7, ovaries—*enlarged*.

4. Cyathostemma Hookeri, *King in Journ. As. Soc. Bengal*, 61, *pt.* 2, 10. A climber 40 to 80 feet long; all parts, except the inflorescence, quite glabrous. *Leaves* membranous, broadly oblanceolate to oblong or ovate-elliptic, acute or very shortly and obtusely acuminate, the base rounded or sub-cuneate; both surfaces shining, glabrous, minutely reticulate; main nerves 9 or 10 pairs, spreading or ascending, curving, inter-arching within the edge; length 5·5 to 7 in., breadth 2·25 to 2·75 in.; petiole ·3 in. *Flowers* ·25 in. in diam., sub-globose, in extra-axillary or leaf-opposed fascicles or cymes of 2 or 3; pedicels slender, puberulous, ·3 to ·4 in. long with 1 or 2 bracteoles. *Sepals* spreading, broadly and obliquely ovate, sub-acute, slightly thickened at the base, ·1 in. long. *Petals* concave; the outer row slightly longer than the sepals but narrower, obovate, contracted into a pseudo-claw at the base, sparsely puberulous outside; the inner row narrower, thicker and more concave, oblique. *Stamens* numerous, short, with a thick incurved apical process from the connective; anther-cells dorsal. *Ovaries* numerous, oblong, thickened upwards, puberulous; the stigma large, sub-quadrate, slightly 2-lobed. *Ripe carpels* numerous, oblong to ovoid, blunt at each end, glabrescent, ·75 to 1·75 in. long and ·6 to ·9 in. in diam.; stalk 1·5 to 2 in., stout. *Seeds* 6, in a single row, compressed, oblong, pale brown, shining. Uvaria parviflora, *Hook. fil. & Thoms. Fl. Ind.* 103; *Fl. Br. Ind.* i. 51.

Penang,—*Phillips*, *Curtis* No. 1213. Perak,—*Scortechini*, *Wray*, *King's Collector*. Distrib.—Borneo,—*Beccari* No. 1811.

For upwards of seventy years this plant had been known only by Phillips' scanty specimens from Penang. In 1887 Mr. Curtis sent flowering specimens of it, together with a single ripe carpel from the same island; while copious flowering and fruiting specimens were, about the same time, received from Perak. In all its parts the plant is essentially a *Cyathostemma*.

Plate 40. Cyathostemma Hookeri, *King*. 1, Flowering branch; 2, ripe carpels; 3, section of carpel to show the single row of seeds—*of natural size;* 4, flower dissected; 5, anthers; 6, ovaries—*enlarged*.

5. Cyathostemma acuminatum, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 10. A climber; branches pale brownish, the youngest slender, dark-coloured, rufous-puberulous. *Leaves* membranous, oblanceolate-oblong, caudate-acuminate, the base acute; both surfaces glabrous, shining and minutely reticulate; the midrib depressed above and puberulous, beneath prominent and minutely muriculate; main nerves 10 to 11 pairs, spreading, curved, sub-ascending, prominent beneath, depressed above; length 8 to 9 in., breadth 2·2 to 2·5 in.; petiole ·15 in., tomentose. *Cymes of hermaphrodite flowers* rufous-pubescent, 4 to 6 in. long; pedicel about as long as the branches, the latter with numerous distichous, oblong, nervose bracts. *Flowers* ·4 to ·5 in. in diam., on short pedicels

Sepals triangular, blunt, spreading. *Petals* as in *C. Scortechinii;* connective of stamens forming at the apex a thick incurving point. *Ovaries* as in *C. Scortechinii*, but with conical stigmas. *Cymes of female flowers* much shorter than those of the hermaphrodite, dichotomous, few-flowered, about 1·5 in. long (of which the peduncle is 1 in.), slightly rufous-pubescent; bracts few, lanceolate. *Flowers* about ·4 in. in diam. when open; buds conical. *Sepals* broadly triangular, cordate, acute, spreading, pubescent. *Petals* coriaceous, granular-pubescent, concave; the outer broadly ovate-triangular, the apex sub-acute, incurved in bud; the inner row smaller, narrower, erect, connivent. *Stamens* absent. *Ovaries* as in the hermaphrodite, but the stigma larger, and not conical.

Upper Perak,—*Wray* No. 3468.

A remarkable species, of which I have seen only Wray's incomplete specimens. These specimens are accompanied by some loose young carpels, ovate-globular, oblique, with persistent recurved styles, and a single or at most two seeds. If these carpels really belong to the specimen, the definition of the genus will have to be modified. The structure of both the hermaphrodite and pistillate flowers agrees perfectly with that of the other species above described.

Plate 41. Cyathostemma acuminatum, *King*. 1, Leaf-twig; 2, hermaphrodite inflorescence; 3, female inflorescence; 4, ripe carpels—*of natural size;* 5, hermaphrodite flower from below; 6, the same from above; 7, male flower dissected; 8, anthers from hermaphrodite flower; 9, abortive ovaries from the same; 10, female flower dissected; 11, abortive anthers from female flower; 12, perfect ovaries from female flower—*enlarged*.

5. Uvaria, *Linn.*

Scandent or sarmentose shrubs, usually stellately pubescent. *Flowers* terminal or leaf-opposed, rarely axillary, cymose, fascicled or solitary, yellow, purple or brown. *Sepals* 3, often connate below, valvate. *Petals* 6, orbicular, oval or oblong, imbricate in 2 rows, sometimes connate at the base. *Stamens* indefinite; top of connective ovoid-oblong, truncate or sub-foliaceous. *Torus* depressed, pubescent or tomentose. *Ovaries* indefinite, linear-oblong; style short, thick; ovules many, 2-seriate, rarely few or 1-seriate. *Ripe carpels* many, dry or berried, few- or many-seeded.

Distrib.—About 110 species: many tropical Asiatic, a few African species, and some Australian.

A genus characterised by the usually large showy flowers with imbricate rosaceous corolla; allied to the American genus *Guatteria*, Ruiz and Pavon (*Cananga*, Aubl.), and distinguished from it chiefly by its multi-ovulate ovaries.

Flowers more than ·5 in. in diam.

Connective of anthers slightly produced at the apex, compressed, oblique.

Carpels stalked, oblong, rugulose . . . . . 1. *U. Larep.*

Carpels sessile, cuneate-obovate, the apex broad and tuberculate . . 2. *U. sphenocarpa.*

Carpels ovoid to sub-globular.

Carpels 1·5 to 2·25 in. long, not tuberculate, pulpy.

Carpels tomentose . . . . . 3. *U. Hamiltoni.*

Carpels glabrous . . . . . 4. *U. bracteata.*

Carpels not more than 1 in. long, tubercular, with little pulp.
Carpels ovoid, oblique; leaves wooly-tomentose beneath even when old . . . . . 5. *U. dulcis.*
Carpels globular or globular-ovoid; leaves glabrous when adult . . . . . 6. *U. Lobbiana.*
Connective produced beyond the apex to about half the length of the anther, flattened, obliquely truncate; flower 1·5 in. in diam. . . . 7. *U. macrophylla.*

Connective produced; that of the inner anthers truncate; that of the outer flattened and oblique.
Apex of inner anthers rounded; flowers 1 to 1·5 in. in diam.; leaves minutely stellate-tomentose beneath . . . . . 8. *U. semecarpifolia.*
Apex of inner anthers obliquely rhomboid; flower 2 to 3 in. in diam.; leaves conspicuously stellate-tomentose beneath . . . . . 9. *U. purpurea.*
Apex of inner anthers quadrate or rhomboid; flower 1 to 1·35 in. in diam.; leaves glabrous beneath . . . . . 10. *U. ovalifolia.*

Connective of anthers slightly or not at all produced at the truncate apex.
Whole plant rigidly hairy . . . . . 11. *U. hirsuta.*
Whole plant softly hairy . . . . . 12. *U. Curtisii.*
Connective of anthers produced into a broad, flattened, sub-quadrate process; the outer anthers changed into staminodes . . . . . 13. *U. Ridleyi.*

Anthers oblong-cuneate, connective produced at the apex and always truncate.
Leaves tomentose beneath; flowers usually solitary, terminal or leaf-opposed . . . . . 14. *U. ferruginea.*

Leaves pubescent beneath.
Flowers in terminal umbellate racemes . . . . . 15. *U. pauciovulata.*
Flowers in terminal umbels or in many-flowered, lateral, narrow panicles . . . . . 16. *U. Scortechinii.*
Leaves glabrous except the midrib, 2·5 to 5 in. long; flowers less than ·5 in. in diam. . . . . 17. *U. micrantha.*

Leaves quite glabrous.
Leaves 2·25 to 3 in. long; flowers ·65 to ·8 in. in diam. . . 18. *U. Zeylanica.*
Leaves 3 to 9 in. long.
Carpels granular . . . . . 19. *U. macropoda.*

Carpels smooth.
Carpels oval, blunt at each end, ·4 to ·6 in. long; peduncles slender; seeds in a single row . . . . 20. *U. Narum.*
Carpels oval, tapering to each end; peduncles thick; seeds in a double row . . . . . 21. *U. Hookeri.*
Carpels cylindric or sub-oblique, the apex blunt and slightly mammillate, 1·25 to 1·5 in. long; seeds in a single row . . . . . 22. *U. lurida.*

Flowers small (less than ·5 in. in diam.)
Leaves glabrous except the midrib . . . . . 17. *micrantha.*

Leaves pubescent.

Leaves on under-surface stellate, rufous-pubescent; young branches and flowers outside with scurfy rufous tomentum . . . . . 23. *U. andamanica.*
Leaves on under-surface and young branches minutely tawny-tomentose . . . . . 24. *U. excelsa.*

Species of doubtful position.

Probably near *U. Lobbiana* . . . . . 25. *U. astrostricta.*
Probably near *U. macrophylla* . . . . . 26. *U. ptychocalyx.*
With axillary flowers . . . . . 27. *U. sub-repanda.*

1. Uvaria Larep, *Miq. Fl. Ind. Bat. Suppl.* 370. A climber 20 to 40 feet long; youngest branches and petioles sparsely covered with minute scaly stellate hairs; the older cinereous, lenticellate, glabrescent. *Leaves* membranous, elliptic or sub-obovate-elliptic, shortly acuminate, slightly narrowed in the lower fourth to the rounded sub-emarginate (not cordate) base; upper surface glabrous, shining, the midrib minutely tomentose; lower surface with a few short spreading hairs on the midrib and some of the nerves, otherwise almost glabrous; main nerves 10 to 12 pairs, spreading, inter-arching within the edge, bold in the lower, impressed on the upper, surface; length of blade 5 to 8 in., breadth 2 to 3 in.; petiole ·2 to ·3 in. *Peduncles* from half-way between the leaves, ·1 in. long, 1- to 2-flowered (one of the flowers often abortive), warted and yellowish-pubescent; pedicels ·75 in. long with 1 or 2 reniform bracts; flowers 1·5 to 1·75 in. in diam. *Sepals* small (·2 in. long), reniform, united at the base, reflexed, pubescent. *Petals* oblong-oblanceolate, sub-acute, about ·75 in. long, sub-coriaceous, puberulous. *Anthers* sessile, in very few rows, flattened; the connective slightly produced, flattened, oblique. *Ovaries* numerous, angled, puberulous, with a few long projecting hairs near the apex. *Torus* of the fruit small, sub-globular, pubescent. *Ripe carpels* numerous, stalked, cylindric-oblong, oblique, curved, slightly apiculate, rugulose, minutely rufous-pubescent, 1·25 to 1·5 in. long and ·5 in. in diam. *Seeds* about 10, in two rows, compressed, shining. *Stalks* 1·25 to 1·5 in. long, rufous-tomentose. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 13.

Perak,—*King's Collector* No. 4011, *Wray* No. 1826.

Plate 4. Uvaria Larep, *Miq.* 1, Flowering branch; 2, ripe fruit; 3, vertical section of a carpel; 4, seed—*of natural size;* 5, flower dissected; 6, stamens—*enlarged.*

2. Uvaria sphenocarpa, *H. f. & Th. Fl. Ind.* 99. A large scandent shrub; young branches slender, softly pale, cinereous-tomentose, the older dark-coloured and glabrous. *Leaves* lanceolate or oblong-lanceolate, sometimes oblanceolate, acuminate, the base rounded, not cordate; upper surface glabrescent to glabrous, the midrib pubescent; lower surface covered with minute, rather loose, stellate tomentum; length of blade 3 to 5 in., breadth 1·25 to 2 in.; petiole ·15 to ·2 in. *Peduncles* ·5 in. long, lateral, not axillary, 1-flowered; flower ·6 in. in diam.; bract orbicular, scaly; buds ovoid-globose. *Sepals* broadly ovate, acuminate. *Petals* broadly ovate, acute, slightly reflexed, much larger than the sepals, tomentose. *Anthers* sub-sessile, their apices slightly oblique, the

connective very slightly produced. *Ovaries* compressed, tomentose. *Carpels* sessile, cuneate-obovate, the broad convex apex boldly tuberculate and ferruginous-tomentose; the sides not tuberculate and less tomentose, nearly 1 in. long and ·75 in. broad at the apex. *Thwaites' Enum. Pl. Ceyl.* 6; *Beddome Ic. Pl. Ind. Or., t.* 80.

Ceylon; in hill forests ascending to 1,500 feet.

Plate 5. Uvaria sphenocarpa, *H. f. & Th.* 1, Branch with unripe fruit; 2, broader eaf from another specimen; 3 & 4, flowers; 11, ripe carpels—*of natural size;* 5 & 6, flowers; 7 & 8, stamens; 9 & 10, ovaries—*enlarged.* (*Nos.* 1 *and* 11 *are drawn from Thwaites' C. P. No.* 1045. *Nos.* 2 *to* 10 *are copied from Beddome's Fl. Sylvatica.*)

3. Uvaria Hamiltoni, *Hook. fil. & Thoms. Fl. Ind.* 96. A powerful climber; young branches slender, softly rufous-tomentose, becoming glabrous. *Leaves* membranous, elliptic-oblong to elliptic, sometimes slightly obovate, acuminate; the base narrowed or rounded, sometimes slightly unequal, never cordate; upper surface adpressed-pubescent, almost glabrous when old, the midrib minutely rufous-tomentose; lower surface softly stellate-tomentose; main nerves 14 to 17 pairs, spreading, rather prominent beneath; length of blade 4 to 8 in., breadth 2·25 to 3·5 in.; petiole ·15 to ·2 in. *Peduncles* solitary or 2 to 3 together, ·75 to 1·75 in. long, extra-axillary, 1-flowered; flowers 1·5 to 2·5 in. in diam.; bract single, sub-orbicular, rufous-tomentose outside, shortly hispid inside; buds turbinate, tomentose. *Sepals* broadly triangular, ultimately reflexed, membranous. *Petals* much longer than the sepals, coriaceous, obovate, the apices obtuse and incurved, minutely tomentose on both surfaces, brick-red. *Anthers* sub-sessile, equal, obliquely truncate at the apex, ·15 to ·2 in. long. *Ovaries* slightly shorter than the stamens, compressed, pubescent. *Torus* hemispheric, tomentose, pitted when adult. *Ripe carpels* on long slender stalks, ovoid to sub-globular, about 1·5 in. long and 1 in. in diam. when fresh, tomentose, scarlet; when dry slightly constricted between the seeds; stalks slender, tomentose, to 1 to 1·5 in. long. *Seeds* about 6, flat, shining. *Hook. fil. Fl. Br. Ind.* i. 48; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 13.—U. grandiflora, *Wall. Cat.* 6485E.

In the forests at the base of the Eastern Himalaya; Madhopore Forest in Eastern Bengal; Assam; Khasia; Shan Hills (Prazer).

Var. Kurzii, *King.* Leaves with broader bases, often minutely cordate; fewer nerves (12 to 14 pairs); smaller flowers (1·3 in. in diam.) on shorter pedicels (1 to 1·25 in.); petals yellowish, ovate-oblong.

South Andaman;—*Kurz, King's Collector.*

This was referred by Kurz, who first collected it, to *U. macrophylla*, Roxb., then to *U. purpurea*, Bl.; but was finally considered by him as "altogether doubtful." The fuller materials recently received show it to be, in my opinion, a very distinct variety of *U. Hamiltoni*, allied no doubt to *U. purpurea*, Bl., but a much larger plant with smaller flowers and more globular fruit.

Plate 6. Uvaria Hamiltoni, *Hook. fil. & Thoms.* 1, Flowering branch; 2, flower; 3, peduncle and bud with bract; 4, bud seen from above; 5, ripe fruit; 6, vertical section of a ripe carpel; 7, seed; 8, mass of stamens seen from the side—*all of natural size;* 9, stamen—*slightly enlarged.*

4. Uvaria bracteata, *Roxb. Fl. Ind.* ii. 660. A powerful climber; young branches tomentose. *Leaves* thinly coriaceous, oblong or obovate-oblong, acute or shortly and abruptly acuminate, narrowed to the rounded or minutely cordate base; when young pubescent, when adult glabrous, except the tomentose midrib and nerves; the reticulations minute, prominent beneath; main nerves 10 to 12 pairs, rather straight, ascending; length of blade 5 to 7·5 in., breadth 2 to 3 in.; petiole ·15 to ·3 in. *Peduncles* extra-axillary, under 1 in. long, bifid, 2- to 3-flowered; bracts about 3, unequal, one rather large, pubescent; buds sub-globose, pubescent; flowers ·65 in. in diam. *Sepals* sub-orbicular, pubescent. *Petals* much larger than the sepals, broadly ovate, rather blunt, connivent, yellowish-white. *Anthers* sub-sessile; connective very slightly produced at their apices, broad, notched. *Ovaries* linear, pubescent. *Carpels* few, ovoid to oblong, obtuse at both ends, glabrous, yellow when ripe, 1·75 to 2·25 in. long and about 1·3 in. in diam. *Seeds* few, discoid, smooth. *Wall. Cat.* 6468; *Hook. fil. & Thoms. Fl. Ind.* 100; *Hook. fil. Fl. Br. Ind.* i. 49; *Kurz Flora Burm.* i. 28.

Sylhet; Burmah.

Plate 7. Uvaria bracteata, *Roxb.* 1, Flowering branch; 2, carpels; 3, flower—*of natural size;* 4, stamen; 5, ovary; 6, section of the same—*enlarged.*

5. Uvaria dulcis, *Dunal Anon.* 90, *t.* 13. A powerful creeper, often 80 to 100 feet long; youngest branches softly cinereous-tomentose; the older sub-glabrous or glabrous, dark-coloured, rather rough. *Leaves* coriaceous, elliptic or oval, sometimes unequal-sided, acute or sub-acute; the base broad, rounded, or sub-truncate, minutely cordate; upper surface sparsely adpressed-stellate-pubescent; the midrib ferruginous-tomentose; lower surface densely sub-ferruginous or cinereous woolly-tomentose; main nerves 8 to 10 pairs, spreading, slightly curving, prominent beneath; length of blade 4·5 to 7 in., breadth 2·5 to 3·5 in.; petiole ·2 in., stout. *Peduncles* ·5 in. long, lateral, not axillary, 1-flowered, solitary or 2 to 3 together, each bearing a small ovate deciduous bract; buds ovoid-globose, tomentose; flowers 1·25 to 1·5 in. in diam. *Sepals* broadly triangular, sub-acute, slightly reflexed, fleshy, tomentose on both surfaces. *Petals* much longer than the sepals, sub-coriaceous, broadly ovate, sub-acute, sub-reflexed, minutely tomentose on the outer surface; pubescent on the inner. *Stamens* and *pistils* forming a compact hemispheric mass; anthers sub-sessile, ·1 in. long; the connective much produced at the apex, compressed, oblique. *Ovaries* numerous, densely crowded, slightly shorter than the stamens, tomentose. *Torus* depressed-hemispheric, stellate-tomentose, pitted when adult. *Ripe carpels* numerous, stalked, ovoid, oblique, blunt, much and unequally tuberculate, densely and loosely ferruginous stellate-tomentose as are the 1 in. long stalks. *DC. Prod.* i. 88; *Hook. fil. & Th. Fl. Ind.* 98; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 24; *Ann. Mus. Lugd. Bat.* ii. 8; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 14.—U. javana, *Dunal Anon.* 91, *t.* 14; *Blume Bijdr.* 12; *Fl. Javæ, t.* 3 *and* 13 *B.; DC. Prod.* i. 88?—U. aurita, *Blume Fl. Javæ, t.* 3.

Malacca,—*Griffith, Maingay* (*Kew Distrib.*) No. 25. Perak,—*King's Collector.* Penang,—*Curtis* No. 1414.

As regards the size of its leaves and the colour of its flowers (which appear to vary from green through yellow to purple) this is rather a variable species. One of its forms, barely distinguishable from the type, was named *U. javana* by Dunal, who also gave a figure of it. Blume, who again figured *U. javana*, distinguished it

from *U. dulcis* by the stellate (not simple) hairs on the upper surface of its leaves. But, as Hook. fil. and Th. point out (*Fl. Ind.* 98), both kinds of hairs occur on the same leaf. In all the specimens named *U. javana*, received from the Dutch botanists, the leaves are much smaller and less densely woolly on the lower surface than those collected in the Malay Peninsula. Miquel suggests that *U. aurita*, Bl., is only a form of this. By neither figuring nor describing the fruit of what he understood as *U. dulcis*, *aurita* and *javana*, Blume neglected one of the best characters in this rather perplexing genus; and it may be that when fruit of the small-leaved Java species issued from the Herbarium of Buitenzorg shall be forthcoming, the reductions above made will have to be cancelled.

PLATE 8. Uvaria dulcis, *Dunal.* 1, Flowering branch; 2, flower-bud; 3, unripe fruit; 4, a ripe carpel; 5, vertical section of carpel; 6, seed—*all of natural size.*

6. UVARIA LOBBIANA, *H. f. & T. Fl. Ind.* 100. A powerful climber, often reaching 100 to 150 feet in length; young branches pubescent, ultimately glabrous and dark-coloured. *Leaves* sub-coriaceous, oblong or oblong-oblanceolate, acute or very shortly acuminate, rarely obtuse, narrowed to the rounded or sub-cordate base; both surfaces when very young stellate-furfuraceous, speedily becoming glabrous except the puberulous midrib; the upper (when dry) pale green, the lower brown; main nerves 13 to 16 pairs, curving slightly, spreading below, sub-erect above, thin but prominent beneath; length of blade 4 to 7 in., breadth 1·5 to 2·25 in.; petiole ·25 in. *Peduncles* only ·25 in. long or even less, terminal or leaf-opposed, 2- or 3-flowered, tomentose, each flower with a large, rotund, amplexicaul bract; buds depressed-globose, tomentose; flower 1 to 1·2 in. in diam. *Sepals* conjoined into a wavy cup, tomentose outside, minutely pubescent inside. *Petals* coriaceous, often 7 or 8, slightly unequal, broadly oval, obovate, blunt; slightly warted on both surfaces, minutely tomentose on the outer, pubescent on the inner. *Anthers* sessile, flattened, ·1 in. long, the connectives produced at the apices, compressed, obliquely truncate, the outer row sterile. *Ovaries* 4-angled, pubescent except the truncate lobulate stigma. *Ripe carpels* numerous, stalked, globular or globular-ovoid, slightly oblique, boldly tubercled, pubescent, ·5 to ·75 in. in diam., and sometimes 1 in. long; pericarp thin; stalks slender, 1·5 to 2 in. long, glabrescent. *Seeds* 4 to 10, large, plano-convex, smooth. *Miq. Fl. Ind. Bat.* i. *pt.* 2, 34; *Hook. fil. Fl. Br. Ind.* i. 49; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 15.

Malacca,—*Griffith* Nos. 434 and 435, *Maingay* (*Kew Distrib.*) Nos. 27 and 30. Singapore and Perak,—*King's Collector.* Penang,—*Curtis.* Sumatra,—*Forbes* No. 3059.

PLATE 9. Uvaria Lobbiana, *H. f. & T.* 1, Flowering branch; 2, flower (seen from below); 3, flower-bud; 4, unripe carpels; 5, ripe carpel; 6, vertical section of ripe carpel; 7, seed—*of natural size;* 8, stamens; 9, dissected flower—*enlarged.*

7. UVARIA MACROPHYLLA, *Roxb. Fl. Ind.* ii. 663. Scandent usually to the extent of 15 to 20 feet, but sometimes reaching 50 or 60 feet; young branches and petioles rusty-tomentose. *Leaves* coriaceous, elliptic-oblong, rarely elliptic-rotund, sometimes slightly obovate, obtuse or shortly and abruptly acuminate, very slightly narrowed to the rounded or minutely cordate base; upper surface (when adult) glabrescent or glabrous except the tomentose midrib and nerves; lower with lax, sometimes

stellate, rusty tomentum, especially along the midrib and 11 to 18 pairs of prominent spreading or oblique nerves; length of blade 4·5 to 10 in., breadth 2·5 to 4 or (in some Burmese specimens) even 6 in.; petiole ·25 in. *Peduncles* extra-axillary or terminal, densely rusty-tomentose, 3- to 5-flowered, each pedicel with an oval or rounded bract; buds globose; flowers 1·5 in. in diam. *Sepals* connate into a cup with wavy obscurely 3-toothed edge. *Petals* much larger than the calyx, sub-rotund, blunt, coriaceous, purple, tomentose outside, pubescent inside; anthers sessile, ·3 in. long; the connective produced at the apex to nearly half the length of the anther, compressed, obliquely truncate. *Ovaries* narrow, compressed, tomentose; the stigmas truncate. *Torus* of fruit woody, hemispheric, 1 in. in diam., sparsely pubescent, pitted. *Ripe carpels* stalked, oblong, blunt at each end, glabrous, ·75 to 1·25 in. long, pericarp thin; stalks ·5 to 1 in. long; seeds numerous, oval, compressed, shining. *Wall. Pl. As. Rar., t.* 122; *Cat.* 6487 (*excl. F. in fruit*); *H. f. & Th. Fl. Ind.* 97; *Hook. fil. Fl. Br. Ind.* i. 49; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 23; *Thwaites' Enum. Pl. Ceyl.* 6; *Kurz Fl. Burm.* i. 28; *Beddome Ic. Pl. Ind. Or., t.* 81; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 16.—U. rufescens, *DC. Mem. Anon.* 26.—U. cordata, *Wall. Cat.* 6486.—Guatteria cordata, *Dunal Anon.* 129, *t.* 30; *DC. Prod.* i. 93.

Sylhet, Chittagong, Burmah, Malayan Peninsula, Java, Ceylon.

One of the most widely distributed species of the genus and closely allied to *U. ovalifolia*, Bl. I reduce to this species the *Uvaria cordata* of Wall. Cat. No. 6486; but not without some hesitation, as both Miquel and Kurz referred it to *U. ovalifolia*, Bl.

Plate 10. Uvaria macrophylla, *Roxb.* 1, Flowering branch; 2, raceme of buds and flowers; 3, fruit; 4, section of carpel; 5, seed—*of natural size*; 6, stamens—*enlarged.*

8. Uvaria semecarpifolia, *H. f. & Th. Fl. Ind.* 97. A climber; young branches and petioles densely rufous-tomentose. *Leaves* coriaceous, elliptic or elliptic-oblong, obtuse or mucronate, slightly narrowed in the lower fourth to the rounded, sometimes minutely cordate, base; upper surface glabrous, except the tomentose midrib; lower minutely stellate-tomentose especially on the midrib and nerves; nerves 20 to 24 pairs, spreading, prominent on the lower, depressed on the upper, surface when dry; length of blade 7 to 12 in., breadth 2·75 to 4 in.; petiole ·25 in. *Peduncles* leaf-opposed, less than ·5 in. long, rufous-tomentose (as are the pedicels), 3- to 5-flowered; bracts rounded, tomentose like the calyx; buds globose, yellowish-tomentose; flowers 1 to 1·5 in. in diam., greenish-brown. *Sepals* united into an obscurely 3-toothed or sub-entire rather shallow cup. *Petals* broadly oval, sub-acute. *Anthers* sub-sessile, their apices truncate; the connectives not produced, the outer flattened. *Ovaries* striate, hairy. *Ripe carpels* oval to sub-globose, fulvo-tomentose, nearly 1 in. long, their stalks ·5 in. long. *Seeds* (*fide H. f. & Th.*) 8 to 10, smooth, shining. *Thwaites' Enum. Pl. Ceyl.* 6; *Beddome Ic. Pl. Ind. Or., t.* 82; *Hook. fil. Fl. Br. Ind.* i. 49.

Ceylon, central and south-eastern parts, at elevations of 1,000 to 3,000 feet.

In foliage very like *U. macrophylla*, Roxb.

Plate 11. Uvaria semecarpifolia, *H. f. & Th.* 1, Branch with flowers; 2, flower from above; 3, flower from the side; 4, unripe carpels; 5, ripe carpels; 6, section of ripe carpel—*of natural size;* 7, andro-gynœcium—*slightly enlarged;* 8 & 9, anthers; 10, ovary; 11, the same in section—*much enlarged.*

9. Uvaria purpurea, *Blume Bijdr.* 11; *Fl. Jav.* 13, *t.* 1 & 13*A*. A sarmentose shrub, often climbing to 20 or 30 feet; young parts softly stellate-rufous-pubescent or tomentose. *Leaves* thickly membranous, oblong-lanceolate to elliptic-oblong, sometimes slightly obovate, acute or acuminate, the base rounded or slightly cordate, shortly petiolate; upper surface, when adult, shining, glabrous or glabrescent, the midrib and sometimes the nerves tomentose; under-surface rather sparsely but softly stellate-tomentose; main nerves 14 to 17 pairs, rather straight, prominent beneath, the lower spreading, the upper sub-erect; length 4·5 to 9 or even 11 in., breadth 2·5 to 3·75 in.; petiole ·15 to ·25 in. *Peduncles* 1 to 1·5 in. long, extra-axillary or terminal, usually 1- sometimes 2-flowered; flowers 2 to 3 in. in diam.; bracts 2, large, unequal, leafy; buds turbinate. *Sepals* broadly triangular, sub-concave, membranous, fulvous-tomentose on the outer, glabrescent on the inner, surface. *Petals* longer than the sepals, coriaceous, oblong to obovate, obtuse, coriaceous, dark purple; the inner 3 slightly smaller. *Anthers* sub-sessile, very numerous, equal, about ·3 in. long; the connective much produced at the apex, rhomboid in the inner, compressed and oblique in the outer, anthers. *Ovaries* numerous, densely crowded, slightly shorter than the stamens, tomentose; ovules numerous. *Torus* depressed-hemispheric, pubescent, pitted when ripe. *Ripe carpels* numerous, stalked, oblong-cylindric, blunt at each end, with 2 more or less obscure ridges and grooves, minutely rufous-tomentose, sub-tuberculate, 1·5 to 2 in. long and about ·5 in. in diam.; stalks ·5 to 1 in. long, rufous-tomentose. *Seeds* numerous, flat. *Hook. fil. & Thoms. Fl. Ind.* 95; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 22; *Ann. Mus. Lugd. Bat.* ii. 6; *Hook. fil. Fl. Br. Ind.* i. 47; *Benth. Fl. Hong-Kong*, 9; *Vidal y Soler, Revis. Fl. Filipinas*, 39; *Scheffer Obs. Phyt.* i. 4, 26, 65; *Ann. Jard. Bot. Buitenz.* ii. 1; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 17.—U. grandiflora, *Roxb. Fl. Ind.* ii. 665; *Wall. Pl. As. Rar.* ii. *t.* 121; *Wall. Cat.* 6485, *A. to D. and H.; Wight and Arn. Prod.* 9.—U. platypetala, *Champ. in Kew Journ. Bot.* iii. 257.—U. rodantha, *Hance in Walp. Ann.* ii. 19.—Unona grandiflora, *DC. Prod.* i. 90.

In all the Malayan provinces. Distrib.—Malayan Archipelago, S. China, Phillipines.

Var. *tuberculata;* fruits prominently tuberculate.

Perak,—*King's Collector* Nos. 960 and 4786.

A plant collected in the island of Bangka, closely resembling this in leaves, but with larger flowers and with yellow petals, has been described by Messrs. Teysmann and Binnendyk under the name of *U. flava* (Nat. Tijds. Ned. Ind. xxix. 419). It has also been figured by Miquel (*Ann. Mus. Lugd. Bat.* ii. 6, *t.* 1). I fear it is merely a form of *U. purpurea;* but not having seen fruiting specimens, I hesitate to reduce it here.

Plate 12. Uvaria purpurea, *Blume*. 1, Flowering branch; 2, flower-bud; 3, unripe carpels; 4, section of unripe carpel; 5, ripe carpels—*all of natural size.*

10. Uvaria ovalifolia, *Blume Fl. Javæ Anon.* 27, *t.* 8 & 14A. A strong climber; young branches and petioles rufous-pubescent but speedily glabrous. *Leaves* coriaceous, elliptic, the apex mucronate or shortly and abruptly acuminate, base broad, rounded, or emarginate; upper surface rigid, shining, glabrous except the pubescent midrib; lower at first puberulous but speedily becoming glabrous; main

nerves 10 to 16 pairs, thin, spreading, slightly prominent on the lower, sub-impressed on the upper, surface; length of blade 5 to 9 in., breadth 2·5 to 4 in.; petiole ·3 to ·5 in., stout. *Peduncles* terminal or extra-axillary, ·5 in. long, 3- or 4-flowered; the pedicels much longer, slender, all scaly-tomentose as are the 3 or 4 ovate to rotund bracts; buds globose or depressed-globose; flowers 1 to 1·35 in. in diam. *Sepals* rotund, reniform, united into an obscurely 3-toothed shallow cup, warted and scaly-pubescent outside, minutely pubescent inside. *Petals* coriaceous, much larger than the calyx, broadly oval or oval-oblong, sub-obtuse, minutely but densely pubescent on both surfaces; the outer warted. *Stamens* sessile, the projecting connective at the apex quadrate or rhomboid in the inner, flattened and oblique in the outer, anthers. *Ovaries* longer than the anthers, truncate, pubescent. *Carpels* numerous, stalked, oval, smooth, glabrous, very blunt at the apex, less so at the base, when ripe about 1 in. long and ·65 in. in diam.; stalks thin, ·75 to 1 in. long. *Seeds* about 8 in two rows, compressed, smooth. *Miq. Ann. Mus. Lugd. Bat.* ii. 7; *Scheff. Obs. Phyt.* iii. 26, 65; *Ann. Jard. Bot. Buitenzorg* ii. 2.

Mergui,—*J. Anderson.* Distrib.—Java; Bangka; Borneo,—*Korthals, Beccari* Nos. 1760 and 3758, *Frazer;* Phillipines.

This, in my opinion, might very well be treated as merely a glabrous form of *U. macrophylla*, Roxb. It is not a common plant in British India, the only unmistakable specimens of it which I have seen having been collected in Tenasserim (at Mergui) by Dr. J. Anderson, F.R.S., whose zoological researches in that Archipelago have yielded such rich results. *U. Rosenbergiana*, Scheffer, from New Guinea [Scheff. Ann. Jard. Bot. Buitenzorg i. 2 (Beccari Pl. Papuanæ No. 370 *bis*)] appears to me to be undistinguishable from this. I have not seen authentic specimens of *U. littoralis*, Bl. [Fl. Javæ Anon. 26, t. 7 (*Unona littoralis*, Bl. Bijdr. 16)]. But, judging from Blume's descriptions and figure, that species cannot be very different from this. In the case of their identity, *U. littoralis* being the older as a described species, its specific name would stand, I presume, as that of the plant. Miquel, in Ann. Mus. Lugd. Bat. ii. 6, reduces his own species *U. acrantha* (Fl. Ind. Bat. Suppl. 368) and his *U. macrophylla*, var. *glabrior l.c.*, to a variety of *ovalifolia*, and I think he is quite right in making these reductions. I am inclined to believe that Miquel's species *U. Bornensis* should also be reduced to *U. ovalifolia*.

PLATE 13. Uvaria ovalifolia, *Bl.* 1, Flowering branch; 2, fruit; 3, vertical section of carpel; 4, seed—*all of natural size.*

11. UVARIA HIRSUTA, *Jack Mal. Misc.* (*Hook. Bot. Misc.* ii. 87). A sarmentose shrub, but often climbing to the length of from 15 to 50 feet; young branches and petioles with numerous, rather stiff, reddish-brown hairs. *Leaves* thinly coriaceous, narrowly elliptic to elliptic-oblong, rarely obovate-oblong, acute or sub-acute, the base rounded or minutely cordate; upper surface with scattered sub-adpressed, stiff, mostly simple hairs, the midrib tomentose; lower surface with more numerous stellate and simple hairs; main nerves 9 to 14 pairs, spreading, depressed on the upper surface (when dry) but prominent on the lower; length 4 to 7 in., breadth 2·25 to 3 25 in.; petiole ·2 in. *Peduncles* 1 to 2 in. long, lateral or terminal, not axillary, 1- rarely 2-flowered; flowers 1·25 to 1·5 in. in diam.; bract solitary (rarely 2 or 3), lanceolate,

deciduous; buds ovoid-globose, stiffly hairy. *Sepals* membranous, broadly ovate, acute connate, pilose outside, reflexed. *Petals* red, larger than the sepals, broadly ovate, acute; outside tomentose with stiff hairs intermixed, inside sub-glabrous; anthers ·15 in. long, sub-sessile, the connective at the apex often slightly produced and obtuse. *Ovaries* 4-angled, truncate, rufous-tomentose, shorter than the anthers. *Ripe carpels* numerous, stalked, cylindric, blunt, 1·5 to 2 in. long, covered (as are the stalks and torus) with dense darkly ferruginous tomentum mixed with stiff hairs; stalks 1 to 1·25 in. long; torus hemispheric. *Seeds* numerous, ovoid, plano-convex. *Blume Fl. Javæ, Anon.* 22, *t.* 5; *Wall. Cat.* 6458 (*excl. C.*); *Hook. fil. & Thoms. Fl. Ind.* 99; *Hook. fil. Fl. Br. Ind.* i. 48; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 24; *Ann. Mus. Lugd. Bat.* ii. 8; *Scheff. in Nat. Tijdsch.* xxxi. 2; *Zoll. in Linnæa* xxix. 304; *Kurz Flora Burm.* i. 28; *Scheff. Observ. Phyt.* i. 2; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 18.—U. trichomalla, *Bl. Fl. Jav. Anon.* 42, *t.* 18.—U. velutina, *Blume* (*not of Roxb.*) *Bijdr.* 13.—U. pilosa, *Roxb. Fl. Ind.* ii. 665.

In all the provinces. Distrib.—Malayan Archipelago and Burmah.

There is some difference amongst individuals as to the breadth of the leaves, and on one of the forms with comparatively short but broad leaves Blume founded his species *U. trichomalla.*

PLATE 14. Uvaria hirsuta, *Jack.* 1, Flowering branch; 7, ripe carpels; 8, seeds—*of natural size;* 2 & 3, flowers; 4, flower (dissected to show the parts); 5, anthers; 6, ovary—*enlarged.*

12. UVARIA CURTISII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 19. A large climber; young branches densely rusty-tomentose, slender. *Leaves* oblong-lanceolate, sometimes slightly oblanceolate, acuminate, slightly narrowed to the rounded base; upper surface glabrous except the strong rusty-tomentose midrib and the nerves; under-surface stellate-rufous-tomentose, especially on the midrib, reticulations, and 7 to 12 pairs of ascending, curving, bold, main nerves; length 4 to 9 in., breadth 1·7 to 3·25 in.; petiole ·15 to ·2 in., stout. *Flowers* 1 to 1·25 in. in diam., solitary or in pairs, axillary; pedicels 1 to 1·75 in., densely tomentose like the outer surface of the sepals, and with an ovate supra-median bracteole. *Sepals* broadly ovate, concave, spreading, puberulous within, ·35 in. long. *Petals* thinly leathery, white, sub-equal, ovate-oblong, obtuse; the outer rather broader than the inner, ·5 in. long, puberulous on both surfaces, but especially on the outer. *Stamens* numerous, all perfect; connective truncate at the apex, not prolonged into a process; the anthers linear, lateral. *Ovaries* numerous, crowded, elongate, 3-angled, tomentose, with 12 ovules in two rows; stigma sessile, large, sub-capitate, corrugated, glabrous. *Ripe carpels* unknown.

Perak; on Ulu Bubong,—*King's Collector* No. 8543. Penang; elev. of 2,000 feet,—*Curtis* No. 1415.

PLATE 24A. Uvaria Curtisii, *King.* 1, Flowering branch—*of natural size;* 2, androgynœcium and sepals; 3 & 4, petals; 5, anthers; 6, pistil—*enlarged.*

13. UVARIA RIDLEYI, *King in Journ. As. Soc. Beng.* 61, *pt.* 2, 19. A strong climber; young branches slender, stellate-rufous-tomentose, ultimately dark-coloured, striate, sparsely lenticellate. *Leaves* sub-coriaceous, elliptic-oblong, acuminate, slightly

narrowed to the rounded base; both surfaces with short, stellate, rather pale hairs, scabrid on the upper, soft on the lower, surface; the midrib and 10 to 15 pairs of spreading curving slightly prominent main nerves softly rufous-stellate-tomentose on both surfaces; length 3 to 5 in., breadth 1·3 to 2 in.; petiole ·15 in., stellate-tomentose. *Flowers* ·75 to 1·2 in. in diam., 2 or 3 together in short supra-axillary cymes; pedicels stellate-tomentose like the outer surface of the calyx, ·3 or ·4 in. long, with a large, orbicular, amplexicaul bracteole. *Sepals* orbicular, connate into an obscurely 3-toothed spreading cup ·4 in. in diam., glabrescent inside. *Petals* spreading, sub-orbicular to broadly oblong, very blunt, sub-equal, rather thin, minutely pubescent on both surfaces but especially on the outer, dark reddish-brown. *Stamens* numerous (the outer row converted into sub-quadrate staminodes), compressed, broad, without filaments; the apical process of the connective broad and flat; anther-cells on the edges of the connective, linear. *Ovaries* numerous, crowded, elongate, narrow, compressed, ridged, minutely stellate-tomentose; the ovules numerous; stigma sessile, short and broad, fleshy, obliquely truncate. *Ripe carpels* ovoid or obovoid, blunt at both ends, minutely pubescent, 1·2 to 1·5 in. long; stalks nearly 1 in., stellate-tomentose. *Seeds* numerous in two rows, horizontal, oval, compressed, pale brown, shining.

Pahang,—*Ridley*. Perak,—*Scortechini*.

Plate 24B. Uvaria Ridleyi, *King*. 1, Flowering branch; 2, flowers; 3, young carpels; 4, ripe carpels—*of natural size;* 5, flower; 6, andro-gynœcium and calyx; 7, calyx, pedicel and bracteole; 8 & 9, staminodes; 10 & 11, anthers; 12 & 13, ovaries—*enlarged.*

14. Uvaria ferruginea, *Ham. mss. ex H. f. & Th. Fl. Ind.* 96. An erect low shrub; young branches softly rufous-tomentose. *Leaves* thickly membranous, oblong or elliptic-oblong, sometimes slightly obovate, sub-acute or rather obtuse, the base sub-cuneate; upper surface densely adpressed-pubescent, the hairs short and silvery, glabrescent when old; under-surface softly stellate-tomentose; main nerves 9 to 12 pairs, oblique, inter-arching close to the edge, prominent beneath as are the transverse veins; length of blade 3·5 to 5·5 in., breadth 1·5 to 2·5 in.; petiole ·25 in., tomentose. *Flowers* 1 in. to 1·25 in. in diam., terminal or leaf-opposed, usually solitary, sometimes in pairs; pedicel ·35 to ·5 in. long, its bracts oblong or lanceolate, deciduous. *Sepals* coriaceous, broadly ovate, sub-acute, spreading, conjoined at the very base, softly tomentose outside, glabrescent inside. *Petals* coriaceous, slightly unequal, broadly ovate; the outer and inner row sub-similar, densely covered with pale grey tomentum. *Anthers* short, cuneate; the connective prolonged above their apices, much thickened, rounded or quadrate-truncate. *Carpels* about 10, shortly stalked, oblong-cylindric, tapering to the apex, smooth, shining, ·4 to ·5 in. long and ·2 to ·25 in. in diam. *Seeds* about 2, ovoid, often compressed at one end, shining. *Kurz For. Fl. Burm.* i. 29.—Ellipeia ferruginea, *Hook. fil. Fl. Br. Ind.* i. 52.

Burmah: in the Provinces of Pegu and Martaban,—*Hamilton, Eyre, Kurz, Brandis.* Eastern Bengal,—*C. B. Clarke.*

A species badly represented in collections. Mr. Clarke's fruiting specimens (collected since the order *Anonaceæ* was treated of in the *Flora of Brit. India*) show that this is a true *Uvaria* and not an *Ellipeia*, there being more seeds than one.

PLATE 15. Uvaria ferruginea, *Ham.* 1, Flowering branch (from a Burmese specimen); 2, fruiting branch (from Mr. C. B. Clarke's Eastern Bengal specimen); 3, the two seeds of a carpel—*of natural size;* 4, flower dissected; 5, anthers—*enlarged.*

15. UVARIA PAUCIOVULATA, *H. f. & T. in Hook. fil. Fl. Br. Ind.* i. 51. A sub-scandent shrub; young branches densely stellate-rufous-tomentose. *Leaves* coriaceous, rigid, narrowly elliptic or elliptic-oblong, obtuse or obtusely acuminate the base rounded or cordate; upper surface (in adult leaves) shining, quite glabrous; the lower dull, sparsely pubescent; main nerves 10 to 14 pairs, sub-ascending, curving, prominent beneath and impressed above; length of blade 2·5 to 6 in., breadth 1·25 to 3 in.; petiole ·2 in. *Racemes* terminal, umbellate, few-flowered, 1·5 to 2·5 in. long, scurfily rufous-tomentose; bracts numerous and imbricate towards the apex, rotund to ovate, tomentose; buds ovoid-globose; flowers 1·5 in. in diam. *Sepals* small (·3 in. long), orbicular, sub-acute, connate to the middle and densely tomentose outside, densely and minutely puberulous inside. *Petals* very much larger than the sepals, sub-connivent, coriaceous, ovate-rotund, obtuse, the inner 3 narrower; all scaly-tomentose externally, densely and minutely pubescent and veined internally; anthers sub-sessile, cuneate; connective slightly produced at the apex, truncate; ovaries longer than the stamens, flattened, stellate-hairy; stigma truncate; ovules 1 to 3. *Ripe carpels* numerous, stalked, sub-globose, mucronate, densely and minutely fulvous-tomentose, ·35 to ·5 in. in diam., 1- to 2-seeded; stalk ·5 to ·75 in., rather slender. *Seeds* compressed, shining. *King in Journ. As. Soc. Beng.* 61, *pt.* 2, 20.

Malacca,—*Maingay* (*Kew Distrib.*) No. 104. Penang,—*Curtis* No. 825: at elevations of 500 to 600 feet.

PLATE 16. Uvaria pauciovulata, *H. f. & Th.* 1, Flowering branch with young leaves; 2, fruiting branch with adult leaves; 3, flower, dissected; 4, vertical section of carpel; 5, seed—*all of natural size.*

16. UVARIA SCORTECHINII, *King in Journ. As. Soc. Beng.* 61, *pt.* 2, 20. A sarmentose flexuose shrub; young branches and petioles densely covered with rusty, floccose, rufous tomentum. *Leaves* coriaceous, elliptic to elliptic-rotund, obtuse, very slightly or not at all narrowed to the rounded or minutely cordate base; upper surface shining, glabrescent or glabrous, the deeply impressed midrib and nerves tomentose, transverse veins depressed when dry; under-surface minutely and softly rufous-pubescent especially on the midrib nerves and reticulations which are all bold and prominent; main nerves 10 to 12 pairs, spreading below, sub-ascending above, forming double arches within the edge; length of blade 4 to 7 in., breadth 2·5 to 4 in.; petiole ·2 to ·4 in. *Flowers* 1·5 in. in diam., either in terminal umbels of 2 or 3, or in many-flowered lateral panicles 4 in. in length; peduncles ·5 to ·75 in. long; bracts numerous, but chiefly towards the apices of the peduncles, ovate-orbicular, covered with short, rufous, flocculent tomentum as are the branches and axes of the panicles. *Sepals* fleshy, triangular, sub-acute, connate in the lower third, concave, spreading, minutely pubescent. *Petals* fleshy, about 1 in. long, connivent; the outer 3 ovate-rotund, very obtuse, tomentose-pubescent on both surfaces; the outer surface with some small superficial scales, the inner with a round glabrous spot at the base; inner 3 petals obovate, clawed, pubescent outside, glabrous inside, except a broad pubescent band near

the apex. *Anthers* sessile, angled; the connective projecting beyond the apex, broadly truncate, almost peltate. *Ovaries* (*fide* Scortechini) "several, with few stellate hairs. 2—3-ovuled; style cylindric, curved, glabrous." *Fruit* unknown.

Perak,—*Scortechini* No. 1990.

Scortechini's are the only specimens I have seen, and they have flowers only.

PLATE 17. Uvaria Scortechinii, *King*. 1, Branch with terminal flowers; 2, panicle; 3 & 4, buds; 5, flower dissected—*of natural size;* 6, anthers—*enlarged*.

17. UVARIA MICRANTHA, *H. f. & Th. Fl. Ind.* 103. A large climber; young branches slender, at first softly rufous-tomentose, afterwards glabrous, striate, and dark-coloured with pale warts. *Leaves* thinly coriaceous, oblong-lanceolate, acuminate, the base rounded or slightly cuneate; both surfaces glabrous except the rufous-pubescent midrib; main nerves scarcely visible (even when dry), 12 to 15 pairs, spreading; length of blade 2·5 to 5·5 in., breadth ·8 to 1·4 in.; petiole ·15 in. *Peduncles* terminal or extra-axillary, very short, 2- to 4- flowered, softly rufous-tomentose; bracts more or less orbicular; buds globose, slightly pointed, ·15 in. in diam.; flowers ·4 in. in diam. *Sepals* sub-rotund, densely pubescent outside, sub-glabrous inside. *Petals* broadly ovate, sub-obtuse, granular and minutely tomentose outside, pubescent inside. *Ripe carpels* numerous, stalked, ovoid-globose, rounded at each end, glabrous, 2- to 4-seeded. *Seeds* plano-convex, smooth. *Hook. fil. Fl. Br. Ind.* i. 51; *Kurz Fl. Burm.* i. 22; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 26; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 21.—? Uvaria sumatrana, *Kurz Andam. Report* 29; *Hook. fil. Fl. Br. Ind.* i. 51.—? Uvaria elegans, *Wall. Cat.* 6474 B.—Guatteria micrantha, *A. DC. Mem. Anon.* 42; *Wall. Cat.* 6449.—Polyalthia fruticans, *A. DC. l. c.* 42; *Wall. Cat.* 6430.—Anaxagorea sumatrana, *Miq. Fl. Ind. Bat. Suppl.* 382.

Burmah, Malacca, Penang. Distrib.—Sumatra.

As regards leaves, this closely resembles *Popowia nilida*, King—a plant of the Andaman and Nicobar Islands; and there is reason to believe that some specimens of that *Popowia* from those islands have been issued from the Calcutta Herbarium as *Uvaria micrantha*. I am also of opinion that *Uvaria sumatrana*, Kurz *Andaman Report*, 29, and of *Hook. fil. & Thoms. Fl. Br. Ind.* i. 51, is possibly *Popowia nitida*, King.

PLATE 18. Uvaria micrantha, *H. f & Th.* 1, Branch with flowers; 2, ripe carpels (from *Wall. Cat.* 6474*B.*)—*of natural size;* 3, flower dissected—*enlarged*; 4 & 5, anthers; 6 & 7, pistils—*much enlarged*.

18. UVARIA ZEYLANICA, *Linn.* 756. A large climber; young branches very slender, rufous-tomentose; speedily becoming glabrous, cinereous and striate. *Leaves* coriaceous, small, lanceolate or oblong-lanceolate, rather bluntly acuminate or acute, the base cuneate, rarely rounded; both surfaces quite glabrous; the upper shining, the lower dull and dark-coloured, the midrib prominent on the lower surface; the 8 to 10 pairs of spreading, slender nerves almost invisible on either, even when dry; length 2·25 to 3 in., breadth ·75 to 1·1 in.; petiole ·1 in. *Peduncles* terminal or extra-axillary, ·3 to ·4 in. long, rufous-tomentose, 1- or 2-flowered; bracts 1 or 2, small, oblong, scaly or glabrous; buds ovoid-globose or globose, ·15 in. in diam.; flowers ·65 to ·8 in. in diam. *Sepals* membranous, rotund-ovate, sub-obtuse, spreading, minutely scaly. *Petals* much

longer than the sepals, thinly coriaceous, ovate-oblong or oblong, acute, pubescent outside, glabrous inside. *Anthers* sessile, ·05 in. long, broadly oblong-cuneate ; connective produced at the apex, obliquely and broadly truncate ; torus small. *Carpels* 4 to 12, almost sessile, ovoid with obtuse ends ; the apex slightly mucronate, pubescent, ·5 in. long. *Seeds* 3 to 6, apparently in a single row, compressed. *Dunal Anon.* 88 ; *DC. Prodr.* i. 88 ; *H. f. & T. Fl. Ind.* 102 ; *Thwaites' Enum.* 6 ; *Hook. fil. Fl. Br. Ind.* i. 51 ; *Beddome Ic. Pl. Ind. Or., t.* 78.—U. coriacea, *Vahl Symb.* iii. 72.—U. lutea, *Wall. Cat.* 6462 (*not of Roxb.*).—U. Heyneana, *W. & A. Prodr.* 8 (*not of Wall.*)—Guatteria Malabarica, *Dunal Anon.* 134.—G. montana, *DC. Prodr.* i. 94.

Malabar, Travancore and Ceylon ; at low elevations.

PLATE 19. Uvaria Zeylanica, *Linn.* 1, Flowering branch ; 2, carpels—*of natural size ;* 3 & 4, flowers ; 5, anther ; 6, ovary—*enlarged.* (*Nos.* 3 *to* 6 *are copied from Beddome's Icones, t.* 78.)

19. UVARIA MACROPODA, *H. f. & Th. Fl. Ind.* 101. A powerful, nearly glabrous climber ; young branches slender and (like the petioles) sparsely stellate-pubescent, speedily becoming glabrous and dark-coloured. *Leaves* thinly coriaceous, oblong-lanceolate or oblanceolate, shortly rather abruptly and obtusely acuminate, the base rounded or slightly cuneate ; both surfaces glabrous ; main nerves 10 to 12 pairs, spreading, rather faint ; length 3 to 6 in., breadth 1·5 to 2 in. *Peduncles* extra-axillary or terminal, very short, about 2-flowered, densely covered with rusty scurfy tomentum as are the 1 to 3 rounded bracts ; buds sub-globose, beaked ; flowers 1 to 1·75 in. in diam. *Sepals* sub-orbicular, mucronate, tomentose inside, granular outside, connate in the lower third. *Petals* longer than the sepals, oval-oblong, sub-obtuse, their apices sub-inflexed, sometimes united at the base, rather fleshy, tomentose outside, pubescent inside. *Anthers* sub-sessile ; the connective at the apex truncate. *Ovaries* longer than the anthers, pubescent. *Torus* sub-globose. *Carpels* numerous, on thin clavate stalks 3 to 6 in. long, oblong, mucronate, glabrous, 3-ribbed, granular, reddish when ripe, 1 to 2 in. long. *Seeds* oblong, compressed, smooth. *Thwaites' Enum. Pl. Ceyl.* 6 ; *Hook. fil. Fl. Br. Ind.* i. 50 ; *Beddome Ic. Pl. Ind. Or., t.* 79.—? Uvaria eucincta, *Bedd. MSS.*

Forests in Central and Eastern Ceylon. S. India ; hills west of Russelkonda,—*Beddome.*

PLATE 20. Uvaria macropoda, *H. f. & Th.* 1, Flowering branch—*of natural size ;* 2, calyx, stamens and pistils ; 3 & 4, anthers ; 5 & 6, ovaries—*enlarged.* (*Nos.* 2 *to* 6 *are copied from Beddome l. c., t.* 79.)

PLATE 20 BIS. Uvaria macropoda, *H. f. & Th.* 7, Ripe fruit ; 8, seed—*of natural size ;* 9, section of seed ; 10 & 11, embryo—*enlarged.* (*Nos.* 7 *to* 11 *are copied from a drawing made in the Herbarium of the Royal Botanic Garden, Peradeniya, Ceylon, and kindly lent to me by my friend Dr. H. Trimen,* F.R.S.)

20. UVARIA NARUM, *Wall. Cat.* 6473 (*in part*). A large climber; young branches slender, dark-coloured ; all parts, except the inflorescence, glabrous. *Leaves* oblong-lanceolate, rarely slightly oblanceolate, acute, or shortly acuminate, the base sub-cuneate ; both surfaces glabrous, the lower darker ; main nerves 8 to 10 pairs, spreading, very faint, reticulations minute, distinct ; length 3 to 6 in., breadth 1 to 1·6 in. ; petiole

·15 to ·25 in. *Peduncles* terminal, 1·75 to 2 in. long, slender, sparsely scaly, smooth, ebracteolate, 1-flowered; buds depressed-globose, minutely velvety-tomentose; flowers 1 in. in diam. *Sepals* rotund-ovate, conjoined in their lower third, reflexed, minutely tomentose. *Petals* much larger than the sepals, ovate-rotund, connate at the base, minutely tomentose. *Anthers* with the connective produced at the apex, broad, truncate. *Torus* depressed-globose. *Carpels* very numerous, on long slender stalks, oval, blunt at each end, slightly torulose, glabrous, scarlet, ·4 to ·9 in. long and ·3 to ·4 in. in diam. *Seeds* in a single row, 4 or 5, oval, smooth, compressed, sometimes only 1 or 2 and plano-convex. *W. & A. Prod.* 9; *Hook. fil. & Thoms. Fl. Ind.* 102 (*in part*); *Dalz. and Gibs. Fl. Bomb.* 3; *Hook. fil. Fl. Br. Ind.* i. 50 (*excl. var.* 2); *Thwaites' Enum. Pl. Ceyl.* 6.—Uvaria lurida, *Dalz. & Gibs.* (*not of H. f. & Th.*) *Fl. Bomb.* 3.—Unona Narum, *Dunal Anon.* 99; *DC. Prod.* i. 89 (*both in part*).—U. Zeylanica, *Lam.* (*not of Linn.*)

Ceylon: Central Province up to 4,000 feet: common. Malabar.

Plate 21. Uvaria Narum, *H. f. & Th.* 1, Flowering branch; 2, bud; 3, carpels; 4, vertical section of carpel; 5, seed—*all of natural size.*

21. Uvaria Hookeri, *King.* A climber; all parts except the inflorescence glabrous. *Leaves* as in *U. Narum*, but longer (6 to 9 in.) *Flowers* as in *U. Narum*, but larger (1 to 1·5 in. in diam.) *Carpels* ovoid, tapering to each end, their peduncles thick, 1·5 to 2 in. long. *Seeds* in two rows, otherwise as in *U. Narum.* U. Narum, *Wall Cat.* 6473 (*in part*); *Wight Ill.* 19, *t.* 6; *Hook. fil. & Thoms. Fl. Ind.* 102 (*in part*); *Hook. fil. Fl. Ind., var.* 2 *macrophylla; Dalz. & Gibs. Fl. Bomb.* 3.—Unona Narum, *Dunal Anon.* 99, *and DC. Prod.* i. 89, *both* (*in part*).—? U. Zeylanica, *Lam.* (*not of Linn.*)

Forests of the Western Ghats in the Presidencies both of Bombay and Madras.

In their *Flora Indica* (p. 102) Hook. fil. & Th. suggested that two species might be mixed up under *U. Narum*, the one with only a single row of seeds in its carpels, the other with (as is usual in the genus) a double row of seeds. In the *Flora of British India* two varieties of *U. Narum* are recognised, the second of which (*macrophylla*) is characterised by the thick stalks of its carpels. The thick stalk is so invariably associated with ovoid carpels tapering to each end and having a double row of seeds that I think this variety is worthy of specific rank, and I therefore venture to treat it as a species.

Plate 22. Uvaria Hookeri, *King.* 1, Flowering branch; 2, young fruit; 3, two carpels not quite ripe—*of natural size;* 4, 5, & 6, flowers; 7, anthers—*enlarged.*

22. Uvaria lurida, *H. f. & Th. Fl. Ind.* 101 (*excl. var.* β). A large climber; young parts with minute stellate rusty scales; the older branchlets dark-coloured, striate. *Leaves* thinly coriaceous, oblong or oblong-lanceolate, sometimes oblanceolate, acute or acuminate, the base rounded or cuneate; both surfaces glabrous when adult and finely reticulate; the lower puberulous when young; main nerves 8 to 10 pairs, spreading, faint; length 4 to 8 in., breadth 1·5 to 2·5 in.; petiole ·2 to ·3 in. *Peduncles* terminal or extra-axillary, about 1 in. long (longer in fruit), roughly stellate, scaly and tomentose, ebracteolate; buds depressed-globose. *Flowers* 2·25 in. in diam. *Sepals* 3, broadly-ovate, acute, spreading, connate at the base into a flattish cup 1·3 in. in diam., rough,

stellate-scaly-tomentose and warted on the outer, pubescent on the inner, surface. *Petals* broadly obovate, obtuse; the apices inflexed, densely and minutely tawny-pubescent externally, minutely pubescent internally, lurid purple. *Anthers* nearly ·15 in. long with truncate apices. *Ovaries* about ·1 in. long, pubescent, truncate. *Torus* woody, turbinate. *Carpels* numerous, on very long stalks, cylindric, slightly oblique; the apex blunt and slightly mucronate; the base slightly narrowed and 3-ridged, glabrous, 1·25 to 1·5 in. long and ·6 in. in diam.; stalks rather stout, glabrous, triquetrous, 4 to 6 in. long. *Seeds* 3 to 6 in a single row, compressed (those at the end sub-globular), smooth. *Hook. fil. Fl. Br. Ind.* i. 51.

Khasia Hills, on the northern slopes,—*Hook. fil. & Thoms.* E. Himalaya on Mungpoo Peak, elev. 3,000 ft.,—*G. King.* S. Andaman,—*King's Collector.*

The fruit of this is now described for the first time. The species approaches *U. Narum*, Wall., and *macropoda*, H. f. & Th.

VAR. *Sikkimensis*, King. Flowers smaller (under 2 in. in diam.); calyx smaller and less tubercled.

PLATE 23. Uvaria lurida, *H. f. & Th., var. Sikkimensis.* 1, Flowering branch; 2 & 3, flower-buds; 4, ovaries; 5, ripe carpels; 6, vertical section of carpel; 7, seed—*of natural size;* 8, anthers—*enlarged;* 9, flower of typical *U. lurida* from Assam; 10, flower-bud of the same—*both of natural size.*

23. UVARIA ANDAMANICA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 21. Scandent; young branches rather stout, scurfily stellate-tomentose. *Leaves* oblong-oblanceolate, shortly acuminate, much narrowed to the rounded, unequal or minutely cordate, base; upper surface glabrous, the midrib and sometimes the nerves coarsely puberulous; under-surface reticulate, stellate-rufous-pubescent on the midrib and 18 to 22 pairs of spreading, curving nerves; length 5·5 to 9 in., breadth 1·75 to 4 in.; petiole ·3 in., tubercular. *Flowers* small, in short terminal or axillary cymes, rarely solitary; pedicels ·3 in. long, densely covered like the outside of the sepals with sub-deciduous, coarse, rusty, stellate tomentum; bracteole solitary, orbicular, ovate, close to the flower. *Sepals* valvate, orbicular, partly connate, glabrous inside. *Petals* imbricate, orbicular, fleshy, more or less puberulous outside, glabrous within; the inner rather smaller than the outer, but both under (in the young state) ·25 in. in diam. *Stamens* numerous, narrowly elongate, the apex truncate more or less obliquely; anther-cells lateral. *Ovaries* absent in the staminiferous flower. *Ripe carpels* oblong, blunt (almost truncate) at each end, slightly tuberculate and densely covered with loose, sub-deciduous, rusty-stellate tomentum; pericarp rather thick. *Seeds* about 8, in two rows, plano-convex.

South Andaman,—*King's Collector.*

This has been collected only on two occasions, once with undeveloped male flowers and once with immature fruit. The full size attained by the flowers is not known, and the measurements of sepals and petals above given are taken from buds. By its leaves and peculiar deciduous rusty-stellate tomentum the species is, however, readily recognisable.

PLATE 25. Uvaria andamanica, *King.* 1, Flowering branch; 2, ripe carpels; 3, section of ripe carpel; 4, flower dissected—*of natural size.*

24. Uvaria excelsa, *Wall. Cat.* 6477. A creeper 30 to 100 feet long; young parts stellate-pubescent; the branchlets tawny-tomentose, speedily becoming glabrous, dark-coloured and furrowed. *Leaves* coriaceous, oblanceolate, obovate-oblong to elliptic, the apex acuminate (sometimes very shortly), acute, rarely obtuse, slightly narrowed to the minutely cordate base; upper surface shining, glabrous except the puberulous depressed midrib; lower surface minutely tawny-tomentose; main nerves 10 to 12 pairs, spreading, slender; length 3·5 to 7·5 in., breadth 1·5 to 4 in.; petiole ·3 to ·5 in., pubescent. *Flowers* white, ·35 to ·4 in. in diam., in contracted cymes from the branches below the leaves, or axillary; pedicels only about ·2 in. long, rufous-tomentose with a large bract close to the flower. *Sepals* semi-orbicular, sub-acute, valvate, concave, spreading, tomentose outside, glabrous within. *Petals* in bud imbricate only at their apices, sub-equal, thick, concave, densely and minutely pubescent on both surfaces; the outer broadly ovate, acute, a little larger than the sepals; inner petals ovate, about as large as the sepals. *Anthers* numerous, narrow, the cells linear, lateral; the apical process of the connective thick, sub-quadrate, obliquely truncate, minutely pubescent. *Ovaries* narrow, elongate, grooved, pubescent; the stigma thick, sub-capitate, sub-truncate; ovules numerous, in two rows. *Ripe carpels* sub-globular, slightly obovoid, blunt at each end, densely and minutely tomentose, 1·1 in. long and ·9 in. in diam. *Seeds* about 14, in two rows, horizontal, half-oval, flat, smooth, brown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 22.—Mitrephora excelsa, *H. f. & T. Fl. Ind.* 114; *Hook. fil. Fl. Br. Ind.* i, 77; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 31.

Penang,—*Wallich, Curtis.* Perak,—*King's Collector, Scortechini.* Malacca,—*Maingay* (*Kew Distrib.*) No. 36 (*in part*).

This plant was originally issued as a *Uvaria* by Wallich. His specimens of it, however, bore no mature flowers; and Sir Joseph Hooker and Dr. Thomson referred them doubtfully to *Mitrephora*. The excellent specimens recently collected by Mr. Curtis and by the Calcutta Garden Collector show the petals to be sub-equal and concave, imbricate at the apex only, the sepals being quite valvate. This of course is not the typical flower of a *Uvaria*, in which the petals are *much* imbricate. But the stamens, ovaries and ripe fruit are more those of *Uvaria* than of any other genus.

Plate 26. Uvaria excelsa, *Wall.* 1, Flowering branch; 2, single flower with its bracteole; 5, young carpels; 6, ripe carpels; 7, section of ripe carpel to show the seeds—*of natural size;* 3, sepals; 4, petals—*enlarged;* 8, stamens; 9, ovaries; 10, section of ovary—*much enlarged.*

Doubtful Species.

25. Uvaria astrosticta, *Miq. Fl. Ind. Bat. Suppl.* 370. A climber? Young branches deciduously rufous-stellate-tomentose with simple hairs intermixed; ultimately glabrous, striate and dark-coloured. *Leaves* coriaceous, oblong-lanceolate, sometimes slightly oblanceolate, acuminate, the base rounded or minutely cordate; upper surface minutely scaberulous, the midrib and sometimes the nerves softly rufous-pubescent; lower surface at first densely and softly tomentose, ultimately sparsely stellate-pubescent, sub-scaberulous; main nerves 12 to 16 pairs, spreading, rather prominent on the lower surface; length of blade 4 to 6 in., breadth 1·5 to 1·8 in.; petiole ·2 in. *Peduncles* extra-axillary, very short (only ·3 in.), 2- to 3-flowered, rufous-stellate-tomentose as are the 2 or 3 sub-rotund bracts; buds sub-globular; flowers ·6 in. in diam. *Sepals* reniform,

sub-acute, united half-way. *Petals* nearly three times as long as the sepals, sub-coriaceous, broadly oval, slightly obovate, sub-acute, minutely pubescent. *Anthers* sub-sessile; the connective produced beyond the apices, flattened and truncate, 3 outer anthers barren. *Torus* hispidulous. *Ripe carpels* smooth, globular when 1-seeded and about ·25 in. in diam., sub-moniliform and ·4 to ·65 in. long when several-seeded, always apiculate. *Seeds* globular, slightly excavated at the base. *Miq. Ann. Mus. Lugd. Bat.* ii. 8; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 23.

Perak,—*Scortechini* No. 121. Distrib.—E. Sumatra.

The Perak specimens of this plant agree perfectly with those from Sumatra on which the species was founded. It is allied to *U. heterocarpa*, Bl., to *U. rufa*, Bl., and also to *U. timorensis*.

PLATE 27A. Uvaria astrosticta, *Miq.* 1, Branch with buds and flowers; 3, ripe fruit; 4, seed—*of natural size*; 2, flower dissected and slightly enlarged; 5 & 6, outer stamens; 7 & 8, inner stamens—*much enlarged.*

26. UVARIA PTYCHOCALYX, *Miq. Ann. Mus. Lugd. Bat.* ii. 4. A powerful climber; young branches and petioles covered with minute, loose, rufous, stellate tomentum. *Leaves* thinly coriaceous, oblong, usually slightly obovate, shortly sharply and rather abruptly acuminate, narrowed in the lower half to the rounded, rarely cordate, base; upper surface (when adult) nearly glabrous, except the tomentose midrib and main nerves; lower glabrescent, except the stellate-pubescent midrib and 13 to 16 sub-ascending, rather straight, thin but prominent nerves; length of blade 7 to 9 in., breadth 2·75 to 4 in.; petiole ·2 to ·3 in. *Peduncles* ·35 to ·5 in. long, extra-axillary, 2- to 3-flowered, "with a large leaf-like tomentose bract at the base of each pedicel and a bracteole under the calyx" (H. f.); flower 1·25 in. in diam. *Sepals* connate half-way up into a densely tomentose cup with sub-plicate margins. *Petals* oval or obovate-oblong, obtuse, fleshy, dull reddish-purple, sub-tubercular, pubescent. *Carpels* on long stalks, ovoid-globose, tubercled, minutely rusty-tomentose, ·75 in. long and a little less in. diam.; stalks 1 to 1·25 in. long, tomentose. *Seeds* 6 to 8, oval, flat, shining, blackish. *Hook. fil. Fl. Br. Ind.* i. 49; *Kurz Fl. Burm.* i. 28.

Burmah (Province Pegu),—*Kurz.* Distrib.—Sumatra, Borneo.

I have seen only the fruiting specimens of this collected in Pegu by Kurz and to which he gave the MSS. name *U. tuberculata*. But for the globose tubercled carpels, these specimens might be referred to *U. macrophylla*, Roxb. These Burmese specimens have been accepted at Kew as identical with the type specimens of *U. ptychocalyx* collected in Borneo and Sumatra.

PLATE 28. Uvaria ptychocalyx, *Miq.* 1, Flowering branch; 2, flower seen from below; 3, ripe carpels; 4, section of ripe carpel—*of natural size;* 5, flower dissected; 6, anther; 7, pistil—*enlarged.*

27. UVARIA SUB-REPANDA, *Wall. Cat.* 6483. A climber; young branches very slender, rather sparsely scurfy-pubescent. *Leaves* membranous, oblong or obovate-oblong, acute, the base rounded; upper surface shining, glabrous except the pubescent midrib; under-surface pale, yellowish-brown when dry, dull, at first puberulous, ultimately quite glabrous, including the midrib; the reticulations distinct; main nerves 10 to 14 pairs,

spreading, thin but rather prominent beneath; length of blade 5 to 7·5 in., breadth 2 to 2·25 in.; petiole ·15 to ·25 in., densely scaly-pubescent. *Peduncles* axillary, rufous-stellate-tomentose, 1-flowered; bracts cucullate, sub-orbicular. *Petals* narrowly oblong. *Ripe carpels* unknown. *Hook. fil. & Thoms. Fl. Ind.* 101; *Hook. fil. Fl. Br. Ind.* i. 50; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 23.

Singapore,—*Wallich.*

A very imperfectly known species, the only specimens being Wallich's, which are not good and which are in flower only. The only other specimen seen by me which agrees with Wallich's specimens as to leaves and branches is from Penang (Curtis No. 1408); but this has a short, 2-flowered, extra-axillary peduncle, and I hesitate to identify it with *U. sub-repanda.*

PLATE 117. Uvaria sub-repanda, *Wall.* 1, Flowering branch—*of natural size;* 2, flower; 3, calyx and andro-gynœcium; 4, outer petal; 5, inner petal—*enlarged;* 6 & 7, stamens, front and back view; 8, pistil; 9, section of pistil; 10, stellate hairs from petals—*much enlarged.* (*Drawn from Wallich's specimen, Cat.* 6483.)

6. Ellipeia, *H. f. & T.*

Characters of *Uvaria*, but with solitary, ventral or sub-basal ovule and 1-seeded carpels, the style sometimes elongate.

Distrib.—Malaya; species 10 or 11.

Flowers all hermaphrodite.

Flowers in groups.

Leaves oblong or narrowly obovate-oblong, acuminate, pubescent, puberulous or glaberulous beneath; flowers in short panicles .	1. *E. cuneifolia.*
Leaves obovate-oblong, obtuse, softly tomentose beneath; peduncles 3- or 4-flowered	2. *E. leptopoda.*
Leaves oblong or elliptic-oblong, acute, glabrous; cymes 3- to 5-flowered	3. *E. glabra.*

Flowers solitary.

Leaves oblong-lanceolate to ovate-lanceolate, acuminate, minutely granular above when dry	4. *E. costata.*

Flowers unisexual or polygamous, solitary or in pairs.

Leaves shortly acuminate, both surfaces minutely granular when dry, not reticulate; stalks of carpels ·15 in. long	5. *E. pumila.*
Leaves acute, rarely acuminate, not granular, reticulations transverse and very distinct; stalks of carpels ·75 to 1 in. long . . .	6. *E. nervosa.*

1. ELLIPEIA CUNEIFOLIA, *H. f. & T. Fl. Ind.* 104. A climber 20 to 100 feet long; young branches at first shortly and densely rufous-tomentose, ultimately sub-glabrous. *Leaves* thinly coriaceous, oblong or narrowly obovate-oblong, the apex broadly abruptly and shortly acuminate, the base rounded or sub-cordate; upper surface glabrous, shining; the midrib and often the main nerves tomentose; lower minutely rufous-tomentose to pubescent, very often glaberulous; main nerves 16 to 19 pairs, spreading to sub-ascending,

prominent beneath; length of blade 4 to 7 in., breadth 1·5 to 3 in.; petiole ·15 to ·2 in., tomentose. *Flowers* ·75 to 1 in. in diam., in short, few-flowered, pedunculate, rufous-tomentose panicles; bracts at the bases of the pedicels ovate, that at the base of the flower rotund; pedicels ·25 to ·4 in. long; buds ovoid-conic. *Sepals* small, fleshy, sub-orbicular, slightly united below, spreading, coriaceous, tomentose. *Petals* fleshy, connivent; outer 3 much larger than the sepals, rotund, densely pubescent on both surfaces; inner 3 not much larger than the sepals, rotund, pubescent externally, glabrous internally. *Anthers* sessile, short, the cells on the outer surface; the apex with a broad, round, oblique, truncate appendage from the connective; pistils oblong, tapering to each end, pubescent. *Torus* small, sub-globose. *Ripe carpels* numerous, on long stalks, ovoid, oblique, blunt, with a faint partial ridge and a short, lateral, conical process, minutely yellowish-tomentose. *Seed* smooth, ovoid. *Hook. Ic. Plant., t.* 1025; *Hook. fil. Fl. Br. Ind.* i. 52; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 25.

Malacca,—*Griffith, Maingay* (*Kew Distrib.*) No. 31. Perak, very common.

In the Perak specimens the tomentum on the under-surface of the leaves is usually less dense than in specimens from Malacca; moreover, the flowers are smaller in the Perak specimens, and the floral bract is not close to the calyx, but a little way under it. In other respects, however, they agree.

PLATE 29. Ellipeia cuneifolia, *H. f. & T.* 1, Flowering branch; 2, ripe fruit; 3, flower dissected—*of natural size;* 4, calyx, stamens and pistils; 5 & 6, stamens; 7 & 8, pistils; 9, section of ripe fruit—*enlarged.* (*Nos.* 4 *to* 9 *are copied from Hooker's Ic. Plant., t.* 1025.)

2. ELLIPEIA LEPTOPODA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 25. A climber 50 to 70 feet long; young branches and petioles densely covered with scurfy cinereous tomentum. *Leaves* coriaceous, obovate-oblong, rarely elliptic, obtuse, or with a very short blunt apiculus, narrowed in the lower half to the minutely cordate, rarely entire, base; upper surface pale green when dry, sparsely and minutely stellate-pubescent when young, afterwards glabrous, except the pubescent midrib; lower surface densely covered with soft, short, dense, pale brown tomentum; main nerves 10 to 12 pairs, spreading, obsolete on the upper, slightly prominent on the lower, surface; length of blade 3·5 to 5 in., breadth 2·25 to 2·5 in.; petiole ·2 to ·25 in. *Peduncles* extra-axillary, about ·5 in. long; the flowers 3 or 4 on short pedicels, each subtended by a rotund-obovate cucullate bract; the whole inflorescence and calyx rather sparsely stellate-tomentose; buds depressed-globose; flower ·75 in. in diam. *Sepals* often 4 in number, semi-orbicular, very obtuse, slightly united below, spreading. *Petals* coriaceous, three times as long as the sepals, ovate-rotund, obtuse, recurved, minutely pubescent on both surfaces, dark crimson. *Anthers* sessile, very small; the connective produced beyond the apex, flattened, oblique. *Ovaries* about as long as the anthers; the stigmas truncate, hairy. *Torus* hemispheric. *Ripe carpels* numerous, on long slender stalks, ovate-rotund, ·5 in. long, slightly oblique with a slight lateral beak, minutely cinereous-pubescent. *Stalks* slightly thickened and ridged towards the apex, 1·5 to 2·5 in. long. *Seed* ovoid, flattened on one side, smooth.

Perak; at low elevations,—*King's Collector.* Singapore,—*Ridley.*

A species in its leaves resembling *Uvaria heterocarpa*, Bl., but with different fruit: also like *U. timorensis*, Miq., but with much more obovate leaves.

PLATE 30. Ellipeia leptopoda, *King*. 1, Branch with flowers and buds; 2, leaf from another specimen; 3, ripe carpels; 4, section of seed—*of natural size;* 5, flower dissected; 6, anthers—*enlarged.*

3. ELLIPEIA GLABRA, *H. f. & T. Fl. Br. Ind.* i. 52. A tree; young branches and inflorescence brown-pubescent. *Leaves* coriaceous, oblong or elliptic-oblong, acute, the base rounded or acute; both surfaces glabrous, not shining; the upper rigid, the lower paler and reticulate; main nerves about 9 pairs, curved, sub-ascending, prominent beneath; length 4 to 5·5 in., breadth 1·5 to 2 in.; petiole ·25 in. *Cymes* shortly pedunculate, axillary, 3- to 5-flowered, 1 to 1·5 in. long. *Flowers* 1·3 in. in diam.; bracteole oblong, sub-amplexicaul, recurved. *Sepals* ovate-lanceolate, acute, recurved, ·25 in. long. *Outer petals* obovate-lanceolate, sub-acute, flat, without claws, ·7 in long; the inner shorter, obovate, obtuse. *Ovaries* strigose; ovule 1, erect (Maingay). *Ripe carpels* sub-globose, ·65 in. long; pedicels slender, ·75 to 1·25 in. long; pericarp thin. *Seed* oblong, pale, with a deep longitudinal furrow. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 26.

Malacca,—*Maingay* (*Kew Distrib.*) No. 66.

Except Maingay's, I have seen no specimens of this.

PLATE 27B. Ellipeia glabra, *H. f. & Th.* 1, Fruiting branch; 2, inflorescence—*of natural size;* 3, pedicel, bracteole, and flower with petals removed; 4 & 5, stamens; 6, ovary; 7, section of ovary—*enlarged;* 8, seed—*of natural size.*

4. ELLIPEIA COSTATA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 26. A shrub about 10 feet high; young branches pale, rusty-tomentose. *Leaves* coriaceous, oblong-lanceolate to ovate-lanceolate, acuminate, the base cuneate; upper surface glabrous but rather rough; lower pale, softly and laxly pubescent, sub-glabrescent when old; main nerves 8 to 9 pairs, bold, sub-ascending, rather straight; length 4 to 6·5 in., breadth 2 to 3 in.; petiole ·25 in., tomentose. *Flowers* solitary, extra-axillary, ·65 to 1 in. in diam.; pedicels woody, tomentose, ·15 in. long, with 3 ovate acute bracts at their bases. *Sepals* ovate, obtuse, half as long as the petals and, like them, sericeous externally and glabrous or sub-glabrous internally. *Petals* sub-equal, oblong, acute, ·35 to ·45 in. long. *Ripe carpels* ovoid-cylindric, slightly apiculate and shortly stalked, glabrous, ·8 in. long and ·35 in. in diam.; pericarp thin. Uvaria costata, *Wall. Cat.* 6480.—Guatteria costata, *H. f. & Th. Fl. Ind.* 143.—Polyalthia costata, *H. f. & Th. Fl. Br. Ind.* i. 67.

Burmah,—*Wallich;* on Moolyet at 5,000 feet,—*Gallatly.*

I have seen no entire fruit of this species, but only some loose carpels. When ripe these are said by Mr. Gallatly to be red.

PLATE 31. Ellipeia costata, *King*. 1, Flowering branch; 2, flower—*of natural size;* 3, flower—*enlarged;* 4, outer petal; 5 & 6, stamens; 7, pistil; 8, section of same—*much enlarged.* (*Drawn from Wallich's specimen Cat.* 6480.)

5. ELLIPEIA PUMILA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 27. A shrub 2 to 8 feet high; young branches with minute pale rufous tomentum; when older, dark-coloured, glabrous and furrowed. *Leaves* coriaceous, oblong-lanceolate to elliptic-lanceolate, tapering from the middle to the shortly acuminate apex and acute base; both

surfaces minutely granular when dry; the upper glabrous, the lower sparsely adpressed-pubescent; the midrib rufous-pubescent; main nerves about 9 pairs, oblique, rather straight, faint on the lower surface, obsolete on the upper; length 4·5 to 7 in., breadth 1·5 to 2·25 in.; petiole ·25 to ·35 in., pubescent. *Flowers* solitary or in pairs, extra-axillary, sub-sessile, ·75 in. in diam. when expanded; the buds globose; pedicels ·1 in. long, coarsely hirsute, bracteate. *Sepals* much shorter than the petals, broadly ovate, sub-acute, strigose-pubescent outside and sub-glabrous inside as are the petals. *Petals* imbricate, spreading, lanceolate or oblanceolate-oblong; the outer at first much shorter than, but ultimately sub-equal to, the inner. *Male flower:* stamens numerous, with transversely elongate, truncate heads; pistils 0. *Female flower* like the male, but with fewer stamens; pistils about 10, pubescent, 1-ovuled; stigma short, flat, pubescent. *Ripe carpels* 4 to 5, sub-cylindric, tapering to each end, ·75 in. long and ·25 in. in diam., minutely granular and strigose; stalks tomentose, ·15 in. long. Torus very small. *Seed* solitary, oblong, pale.

In leaves and in general *facies* this is very like *Popowia nervifolia*, Maing., but its petals are distinctly imbricate.

Perak; on Ulu Bubong,—*King's Collector, Scortechini.*

PLATE 32. Ellipeia pumila, *King*. 1, Flowering branch; 2, ripe fruit—*of natural size;* 3, flower from below; 4, petals and androecium; 5, stamens; 6, ovary—*enlarged.*

6. ELLIPEIA NERVOSA, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 52. A tree 40 feet high; young branches glabrous, dark-coloured, slightly ridged. *Leaves* coriaceous, with pellucid dots, elliptic-oblong or lanceolate-oblong, acute or (rarely) shortly acuminate, the base acute; upper surface glabrous; the lower sparsely strigose, the reticulations transverse and very distinct; main nerves 10 or 11 pairs, oblique, rather straight; length 8 to 11 in., breadth 2 to 3·5; petiole ·35 to ·5 in., glabrous. *Flowers* polygamous, solitary, extra-axillary, rarely in pairs, ·75 in. in diam., globose; pedicels stout, ·1 to ·2 in. long, rufous-pilose, bracteate. *Sepals* broadly ovate, acute, pubescent, much smaller than the petals. *Petals* white, spreading, imbricate; the outer broadly ovate-oblong, obtuse; the inner rather shorter and narrower, oblong; all pubescent, especially externally. *Stamens* in the male flowers numerous, with roundish flat heads. *Ovaries* in the female flower many, curved. *Ripe carpels* rather numerous, ovoid, slightly apiculate, narrowed into the stalk, rose-red when ripe (Wray), about 1 in. long and ·5 in. in diam., glabrous; their stalks ·75 to 1 in. long. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 27.

Malacca,—*Maingay* (*Kew Distrib.*) No. 47. Perak; common at low elevations. Penang,—*Curtis.*

In the texture and nervation of its leaves this species has a strong resemblance to *Popowia nervifolia*, Maing., and other species in its neighbourhood. But the petals are not those of a *Popowia*, both rows being distinctly imbricate. The fruit, moreover, is larger than that of *Popowia*, and the albumen is much more cellular in structure, being in this respect, like that of *Ellipeia cuneifolia*, H. f. & Th.

PLATE 33. Ellipeia nervosa, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, section of ripe carpel and of its single seed—*of natural size;* 4, flower dissected; 5, anthers—*enlarged.*

7. Cyathocalyx, *Champion.*

Trees. *Leaves* glabrous. *Flowers* fascicled, terminal or leaf-opposed. *Sepals* free or united into a 3-lobed cup. *Petals* 6, 2-seriate, valvate in bud, sub-equal; bases concave, conniving; blade flat, spreading. *Stamens* indefinite, elongate, cuneate, truncate; anther-cells linear, dorsal. *Ovaries* solitary or 2—6, on a concave torus; stigma large, grooved; ovules many. *Ripe carpels* berried. Distrib.—Tropical India and Malaya; species 8.

In its petals this genus resembles *Artabotrys* to some extent, but *Polyalthia* still more. The ovaries in the first two species are usually solitary; in the third they are three in number: the ripe carpels of all three being large, succulent and many-seeded. Baillon admits the genus as it was established by Champion and accepted by Hooker filius and Thomson. In the above diagnosis I have, however, modified the definition so as to provide for the species with more than one ovary.

Ripe carpels ovoid.
  Ovaries solitary.
    Calyx remotely 3-toothed; carpels not grooved . . 1. *C. zeylanicus.*
    Calyx acutely and deeply 3-lobed; carpels transversely grooved . . . . . 2. *C. martabanicus.*
  Ovaries 4 to 6 . . . . . 3. *C. virgatus.*
Ripe carpels globular . . . . . 4. *C. Maingayi.*

1. Cyathocalyx zeylanicus, *Champ.; H. f. & T. Fl. Ind.* 127. A tree; young parts deciduously golden rufous-pubescent; the branches becoming glabrous and dark-coloured. *Leaves* coriaceous, narrowly elliptic-oblong or oblong-lanceolate, shortly acuminate, the base cuneate; the under-surface at first minutely pubescent on the midrib and nerves; ultimately both surfaces glabrous, shining, minutely reticulate; main nerves 9 to 12 pairs, thin, slightly prominent on the lower surface, oblique, inter-arching close to the edge; length of blade 7 to 11 in., breadth 2·5 to 3·75 in.; petiole ·4 in. *Peduncles* ·5 to ·75 in. long, extra-axillary, 1- or 2-flowered, ebracteolate. *Calyx* forming an obscurely 3-toothed truncate cup ·2 in. deep, minutely rufous-pubescent externally. *Petals* thinly fleshy, oblong-lanceolate, sub-acute, yellowish-pubescent on both surfaces, 1·25 to 1·5 in. long; torus of flower flat or concave. *Pistil* oblong, cylindric, with short style and broad discoid stigma. *Fruit* solitary, broadly oval, obtuse, glabrous, aromatic when fresh, nearly 3 in. long and about 1·75 in. in diam. *Seeds* 8 to 10, in two rows, compressed, smooth, but rugose at the sides. *Thwaites' Enum.* 9; *Bedd. Ic. Pl. Ind. Or., t.* 47; *Hook. fil. Fl. Br. Ind.* i. 53; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 38.

Ceylon: in the Central and Southern Province. S. India; in Malabar and S. Canara: also in the Anamalli Range: in moist forests at elevations up to 3,000 feet.

Plate 42. Cyathocalyx zeylanicus, *H. f. & T.* 1, Flowering branch; 2, ripe carpel—*of natural size;* 3, stamens and ovary—*slightly enlarged;* 4 & 5, stamens—*much enlarged;* 6 & 7, pistils—*much enlarged.* (*Nos.* 4 *to* 6 *are copied from Beddome's Ic. Pl., t.* 47.)

2. Cyathocalyx martabanicus, *H. f. & T. in Hook. fil. Fl. Br. Ind.* i. 53. A tree 30 to 40 feet high; young parts deciduously hoary, very soon all parts glabrous except

the inflorescence. *Leaves* coriaceous, elliptic (rarely elliptic-oblong), abruptly and shortly acuminate, the base cuneate, rarely rounded; both surfaces shining, glabrous, the midrib and some of the nerves puberulous on the under-surface when very young; the reticulations minute, distinct; main nerves 9 to 12 pairs, oblique, inter-arching close to the edge, prominent on the under, slightly impressed on the upper, surface; length of blade 6 to 9 in., breadth 3 to 4·5 in.; petiole ·4 in. *Flowers* pedicellate, usually solitary, sometimes 2 or 3 together, extra-axillary; pedicels about ·5 in. long, ebracteolate, densely and minutely yellowish-pubescent. *Calyx* ·5 to ·6 in. long, densely pubescent like the pedicels and petals, deeply divided into 3 oblong-lanceolate reflexed lobes. *Petals* as in *C. zeylanicus;* the 3 inner rather shorter and narrower. *Fruit* solitary, elliptic-oblong, blunt, torulose, transversely grooved, glabrous, 2·5 in. long; pericarp thick, fleshy. *Seeds* about 10, in two rows, large, oval, flat, shining, ·9 in. long and ·7 in. broad. *Kurz For. Fl. Burm.* i. 30.

Burmah: from Martaban to Tenasserim.

This differs from *C. zeylanicus* chiefly by its deeply 3-cleft calyx and rather differently shaped fruit. Its leaves, too, are rather broader. But the two species come very near together.

PLATE 43. Cyathocalyx martabanicus, *H. f. & T.* 1, Flowering branch; 2, flower-bud; 3, flower dissected; 4, ripe carpel; 5, section of carpel; 6, seed—*of natural size;* 7, stamens—*enlarged.*

3. CYATHOCALYX VIRGATUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 28. A tree 40 to 60 feet high; young branches slender, pale, glabrous, the tips alone pubescent. *Leaves* membranous, elliptic-oblong to oblong-lanceolate, shortly and obtusely acuminate, the base cuneate or sometimes rounded; both surfaces shining, the lower rather darker when dry; the upper glabrous, the lower pubescent on the 8 or 9 pairs of sub-ascending, rather prominent, nerves; length 4 to 6·5 in., breadth 1·25 to 2·75 in.; petiole ·25 to ·35 in., pubescent. *Flowers* in axillary sub-sessile fascicles of 2 or 3, about ·75 in. long. *Sepals* united at the base, ovate to ovate-lanceolate, spreading, tomentose, shorter than the inner petals. *Petals* tomentose-sericeous; the outer row much longer than the inner, lanceolate, much acuminate, about ·75 in. long; inner row with orbicular concave base and much acuminate apex, ·5 in. long. Connective of *stamens* slightly produced at apex, and obliquely truncate. *Ovaries* 4 to 6, hirsute; ovules many, 2-seriate; stigma thick, discoid, sessile. *Torus* conic, truncate, pubescent. *Ripe carpels* solitary or in pairs and divergent, oblong-ovoid, blunt at each end, minutely tomentose, 2 to 3 in. long and 1 to 1·5 in. in diam.; pericarp thick. *Seeds* 8 to 10, compressed, elongate and narrowly sub-reniform, transversely sub-striate. Unona virgata, *Blume Bijdr.* 14; *Fl. Javæ Anon.* 43, *t.* 19 and 25*B.*; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 42.—Meiogyne virgata, *Miq. Ann. Mus. Lugd. Bat.* ii. 12,—Cananga virgata, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 57.

Malacca,—*Maingay* (*Kew Distrib.*) Nos. 92 and 95. Perak,—*King's Collector.* Distrib. —Java.

Blume describes the carpels as from 3 to 5; but I have never found more than two, and it is difficult to understand how more can come to perfection on the comparatively small torus. In Java this is said often to be a bush from 6 to 8 feet high: in Perak it is a tall tree.

PLATE 44. Cyathocalyx virgatus, *King*. 1, Flowering branch; 2, flower; 3, unripe carpels; 4, ripe carpel; 5, section of the same; 6, flower dissected; 7 & 8, seeds; 9, the same in section—*of natural size;* 10, anther; 11, section of ovary—*enlarged.*

4. CYATHOCALYX MAINGAYI, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 53. A tree 50 or 60 feet high; young branches rather stout, puberulous, speedily glabrous and dark-coloured. *Leaves* elliptic to oblong, thinly coriaceous, slightly obovate, shortly caudate-acuminate, the base rounded or slightly cuneate; upper surface shining, quite glabrous; the lower puberulous when young, ultimately glabrous; the main nerves 13 to 15 pairs, bold and prominent, spreading, inter-arching near the edge; length 5·8 to 8·8 in., breadth 2·75 to 3·75 in.; petiole ·3 in. *Flowers* 2 to 3 in. in diam., solitary or in short 2- to 3-flowered racemes, axillary or extra-axillary; pedicels ·5 to ·75 in. long with a large stem-clasping bracteole near the apex. *Sepals* spreading or sub-reflexed, ovate, sub-acute, slightly connate at the base, puberulous on both surfaces, ·4 in. long. *Petals* thinly coriaceous, sub-equal, puberulous, obovate or broadly obovate-lanceolate, blunt, the base with a short claw, pale greenish with a blotch of reddish-yellow at the base, all (but especially the inner row) more or less convex; the inner row slightly concave and glabrous at the base inside. *Stamens* numerous, cuneate, short; the connective produced into a broad, flat, orbicular, oblique expansion which overhangs the dorsal linear anthers. *Ovaries* 3 to 5, narrowly ovoid, pubescent; ovules about 10, in two rows; style short, lateral; stigma large, lobed, villous. *Ripe carpels* 1 or 2, globular, 1·5 to 1·75 in. in diam., slightly tubercular when dry and minutely pubescent. *Seeds* 10, in two rows, elongated, compressed. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 29.

Malacca,—*Maingay* (*Kew Distrib.*) No. 94. Singapore,—*Ridley*. Perak,—*King's Collector*. Penang,—*Curtis*.

This species is doubtfully referred to *Cyathocalyx* by its authors, and chiefly on the ground that the petals, although valvate at the base, are slightly imbricate above. An examination of the large number of specimens sent from Perak by the Calcutta Botanic Garden Collector enables me to state that in bud the petals are truly valvate, but that as they develope they undoubtedly overlap. The anthers, ovaries and ripe fruit appear to me to be those of *Cyathocalyx;* and, in habit, as well as in the general appearance of its leaves, this plant agrees with the other species of this genus. In addition to the species above described there are, in the Calcutta Herbarium, fruiting specimens from Perak of a small tree which is apparently a fourth species of *Cyathocalyx*. The leaves of this are oblong-lanceolate to oblong-ovate, 8- to 10-nerved, glabrous above and puberulous beneath; and the ripe carpels are in pairs, ovoid, puberulous, about 1·5 in. long. None of the specimens has any trace of flower.

PLATE 45. Cyathocalyx Maingayi, *H. f. & Th.* 1, Flowering branch; 2, flower, dissected; 3, ripe carpels; 4, section of ripe carpel showing one of the rows of seeds —*of natural size;* 5, anthers; 6, ovaries—*enlarged.*

8. Artabotrys, *R. Brown.*

Sarmentose or scandent shrubs. *Leaves* shining. *Flowers* solitary or fascicled, generally on woody, usually hooked, recurved branches (peduncles). *Sepals* 3, valvate. *Petals* 6, 2-seriate, bases concave and connivent; limb spreading, flat, sub-terete or clavate.

Stamens oblong or cuneate; connective truncate or produced; anther-cells dorsal. *Torus* flat or convex. *Ovaries* few or many; style oblong or columnar; ovules 2, erect, collateral. *Ripe carpels* berried. Distrib.—Tropical Africa and Eastern Asia; described species about 32.

This genus is at once distinguished by the curiously hooked flower-peduncles. The petals are thick and mostly narrow, concave and closely connivent at the base, while the limb is spreading. The habit of most of the species is scandent. Besides those described below, there are, in the Calcutta Herbarium, imperfect materials of five undescribed species from Perak, and of one from the Andaman Islands.

Petals lanceolate to elliptic.

Flowers less than 1 in. long.

Petals very fleshy, broadly elliptic, blunt	1. *A. grandifolia.*
Petals coriaceous, oblong-oblanceolate, blunt	2. *A. Kurzii.*
Petals coriaceous, broadly lanceolate, acuminate	3. *A. Scortechinii.*

Flowers about 1 in. long.

Petals slightly fleshy, all elliptic-oblong, obtuse	4. *A. pleurocarpus.*
Petals coriaceous, the outer ovate-lanceolate, the inner lanceolate or linear	5. *A. venustus.*

Flowers more than 1 in. long.

Leaves elliptic to oblong, obtuse, or shortly and bluntly mucronate, coriaceous	6. *A. crassifolius.*
Leaves oblong, acuminate, coriaceous	7. *A. oblongus.*
Leaves broadly lanceolate or oblanceolate, sub-acute or obtusely acuminate; carpels harshly tomentose, rugulose	8. *A. Zeylanicus.*

Leaves oblong-lanceolate.

Leaves shortly caudate-acuminate; flower nearly 2 in. long	9. *A. Lowianus.*
Leaves shortly acuminate; flower 1·25 to 1·5 in. long; carpels obovoid	10. *A. odoratissimus.*
Leaves shortly acuminate; flower 1·5 to 1·75 in. long; ripe carpels narrowly elliptic, tapering to both ends, glabrous	11. *A. oxycarpus.*

Limb of petals linear, sub-triquetrous, cylindric or sub-clavate.

Petals thickly coriaceous, linear, blunt, adpressed-pubescent	12. *A. speciosus.*
Petals linear-oblong, obtuse (glabrous?)	13. *A. Maingayi.*
Petals narrowly linear, tomentose	14. *A. caudatus.*
Petals fleshy, the outer 3 flattened, the inner 3 obtusely triquetrous	15. *A. gracilis.*
Petals fleshy, the limb cylindric to clavate	16. *A. suaveolens.*
Petals fleshy, the limb subulate, sub-triquetrous	17. *A. burmanicus.*
Imperfectly known species	18. *A. costatus.* 19. *A. Wrayi.*

1. ARTABOTRYS GRANDIFOLIUS, *King in Journ. As. Soc. Bengal*, 61, *pt.* 2, 31. A powerful creeper 60 to 80 feet long; young branches stout, pale, striate, glabrous. *Leaves* thinly coriaceous, large, minutely pellucid-punctate, pale yellowish-green when dry, elliptic-oblong to elliptic-obovate; the apex broad, obtuse or abruptly sub-acute; the base cuneate; both surfaces glabrous, distinctly reticulate; the upper shining, the

lower duller; main nerves 10 to 12 pairs, oblique, inter-arching boldly ·25 in. from the edge; length of blade 8 to 14 in., breadth 3 to 5 in.; petiole ·4 in., stout. *Petals* very fleshy, densely and minutely tomentose, unequal; the outer 3 broadly elliptic, sub-acute or blunt, slightly concave, ·75 in. long and ·4 in. broad; inner 3 obovoid, spreading, but with incurved apices, slightly shorter than the outer. *Peduncles* (in fruit) nearly 3 in. long, stout. *Torus* hemispheric, 1 in. in diam. *Ripe carpels* numerous, glabrous, lenticellate, elliptic-obovoid; the apex mammillate, narrowed at the base into a short stout pseudo-stalk nearly ·5 in. long; length of ripe carpel about 1·5 in., diam. 1 in.; pericarp hard, about ·1 in. thick. *Seed* solitary, narrowly ellipsoid, blunt, 1·1 in. long and ·6 in. in diam.; the testa pale, rugulose. A. macrophyllus, *King* MSS. (*not of Hook. fil.*)

Perak, at Goping, elevation 500 to 800 feet,—*King's Collector* No. 4477, *Scortechini* No. 1068.

Some specimens of this were unfortunately distributed from the Calcutta Herbarium under the MSS. name of *A. macrophyllus*,—a name pre-occupied by an African species described by Sir J. D. Hooker (*Niger Flora*, 207).

PLATE 46. Artabotrys grandifolius, *King*. 1, Leaf; 2, fruiting branch; 3, section of ripe carpel; 4, seed; 5, dissected flower—*of natural size*.

2. ARTABOTRYS KURZII, *H. f. & T. in Hook. fil. Fl. Br. Ind.* i. 54. A low, bushy, erect shrub; young shoots adpressed-rufous-pubescent, slender, but thickened and flattened near the flowering peduncles. *Leaves* membranous, obovate or oblanceolate-oblong, sub-acute or obtuse, the base acute; both surfaces glabrous, finely reticulate, the lower paler, and the nerves and midrib sparsely puberulous; main nerves 5 to 9 pairs, slender, spreading; length of blade 4 to 5·5 in., breadth 1·4 to 2·2 in.; petiole ·15 in. *Peduncles* flat, puberulous, much hooked; pedicels 2 or 3 from each, slender, pubescent, ·6 in. long, and with several small rounded bracteoles near the base. *Flowers* about ·75 in. long, drooping, yellowish. *Sepals* connate below the apices, acute, reflexed, rufous-pubescent. *Petals* coriaceous, oblong, oblanceolate above the basal sac, obtuse; the margins revolute, densely adpressed-pilose. *Anthers* few, broad, slightly apiculate. *Ovaries* numerous, oblong. *Young carpels* narrowly obovoid, tapering much to the base, densely but minutely pubescent. *Ripe carpels* unknown. *Kurz For. Fl. Burm.* i. 31.

Burmah: along the Irrawaddy and up to nearly 5,000 feet,—*Kurz, Gallatly*.

PLATE 47. Artabotrys Kurzii, *H. f. & T.* 1, Flowering branch; 3 & 2, flowering peduncles with young carpels; 4, peduncle with slightly older carpels—*of natural size*; 5 & 6, flower dissected; 7, stamens—*enlarged*.

3. ARTABOTRYS SCORTECHINII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 32. A climber; all parts, except the flower and possibly the fruit, glabrous; young branches slender, dark-coloured. *Leaves* thinly coriaceous, ovate-lanceolate, shortly acuminate, the base cuneate; upper surface shining; the lower dull when young, very minutely scaly, afterwards glabrous; main nerves 9 to 11 pairs, spreading, inter-arching ·1 in. from the edge, slender but rather prominent beneath; length of blade 2·25 to 3·25 in., breadth ·9 to 1·3 in.; petiole ·2 in. *Peduncle* rather slender, 3- to 4-flowered; pedicels ·5 in. long, thickened upwards, puberulous, with a small ovate bracteole at the very

base. *Flowers* ·6 to ·8 in. long. *Sepals* very coriaceous, triangular, acuminate; the apices slightly reflexed, conjoined at the base only, rugulose and adpressed-pubescent externally, ·25 in long. *Petals* coriaceous, broadly-lanceolate, acuminate, tomentose on both surfaces; the inner 3 smaller than the outer 3. *Anthers* with broad, apical, connectival appendages. *Torus* rather flat, sericeous. *Ovaries* glabrous. *Fruit* unknown.

Perak,—*Scortechini.*

A species near *A. polygynus*, Miq., but with glabrous leaves and somewhat different flowers.

PLATE 48. Artabotrys Scortechinii, *King.* 1, Flowering branch—*of natural size;* 2, sepals and andro-gynœcium; 3, outer and inner petals; 4, stamens; 5, ovaries—*enlarged.*

4. ARTABOTRYS PLEUROCARPUS, *Maingay in Hook. fil. Fl. Br. Ind.* i. 54. A large climber; all parts, except the flowers, glabrous; young branches lenticellate, striate, dark-coloured. *Leaves* coriaceous, lanceolate-oblong; the apex rather abruptly and shortly acuminate, the base much narrowed; both surfaces shining and reticulate, the upper paler; main nerves 8 to 10 pairs, spreading, slender; length of blade 4 to 6·5 in., breadth 1·5 to 2·25 in.; petiole ·25 in., thick. *Peduncles* flat, stout, much hooked, bearing several ebracteolate pedicels, ·5 in. long, densely pubescent. *Flowers* about 1 in. long. *Sepals* broadly ovate, obtuse. *Petals* flat, elliptic-oblong, obtuse, pubescent on both surfaces; the outer 1 in. long, the inner smaller. *Anthers* with apiculate connectives. *Ovaries* many, slender. *Ripe carpels* broadly ovoid, mammillate, obscurely grooved, narrowed into the short stout stalk, 1 in. long. *Seeds* 2, with hard testa. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 32.

Malacca,—*Maingay* (*Kew Distrib.*) No. 34. Perak,—*Scortechini* No. 331.

PLATE 49. Artabotrys pleurocarpus, *H. f. & Th.* 1, Flowering branch; 2, ripe fruit—*of natural size;* 3, outer petal; 4, inner petal; 5 & 6, stamens; 7, ovary; 8, section of ovary—*enlarged.*

5. ARTABOTRYS VENUSTUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 32. A large climber 30 to 80 feet long; young branches at first puberulous, afterwards glabrous, dark-coloured, striate. *Leaves* coriaceous, elliptic to elliptic-oblong, abruptly and shortly acuminate; the base rounded or very slightly narrowed; both surfaces glabrous; the upper shining, the lower dull; adult leaves pale brown (when dry); main nerves 7 to 10 pairs, spreading or sub-ascending, curved, inter-arching freely ·1 to ·2 in. from the edge, prominent on the lower, less so on the upper, surface; length of blade 3·5 to 6 in., breadth 2 to 3 in.; petiole ·2 to ·25 in. *Peduncles* extra-axillary, rather slender in flower (stout in fruit), minutely tomentose, bearing 3 or 4 flowers, ·75 to 1 in. long.; pedicels slender, pubescent or glabrescent, from ·5 to 1 in. long, ebracteate. *Sepals* coriaceous, broadly triangular, sub-acute, slightly conjoined at the base, sub-reflexed, puberulous externally, glabrous within, ·15 in. long. *Petals* coriaceous, minutely tomentose, sub-equal; the outer 3 with small claws, glabrous inside, ovate-lanceolate, sub-acute; the inner 3 shorter than the outer, lanceolate or linear. *Anthers* short, slightly compressed; the apex orbicular, flat. *Ovaries* about 10, oblong, granular. *Ripe carpels* about 6, sessile, narrowly obovoid, apiculate, slightly narrowed to the base, at first puberulous, ultimately

glabrous, 1·5 in. long and ·8 in. in diam.; pericarp thin. *Seeds* 2, oblong, plano-convex, about 1 in. long and ·6 in. broad, smooth.

Perak, at elevations up to 1,000 feet,—*King's Collector* Nos. 3725, 4392, 6499, 6968.

PLATE 50. Artabotrys venustus, *King*. 1, Flowering branch; 2, flower, dissected; 3, linear inner petals (from another specimen); 4, ripe carpels; 5, section of carpel; 6, seeds—*of natural size;* 7, flower with the petals removed; 8, anthers; 9, ovaries—*enlarged.*

6. ARTABOTRYS CRASSIFOLIUS, *H. f. & T. in Hook. fil. Fl. Br. Ind.* i. 54. A large climber; young branches minutely rusty-tomentose. *Leaves* very coriaceous when adult, elliptic to oblong, obtuse or shortly and bluntly mucronate, the base acute or rounded; upper surface glabrous, shining; the lower dull, paler in colour when young, sparsely adpressed-pilose, afterwards glabrous; main nerves 9 or 10 pairs, oblique, when dry, faintly impressed on the upper, and slightly prominent on the lower, surface; length of blade 6 to 6·5 in., breadth 1·75 to 2·75 in.; petiole ·3 to ·4 in., stout. *Peduncles* flat, much hooked, stout: each with several stout rusty-tomentose pedicels ·3 to ·4 in. long; bracts few, ovate. *Flowers* 1·5 in. long. *Sepals* ovate-lanceolate, acute, softly rusty-pubescent outside, pubescent within. *Petals* coriaceous, oblong-lanceolate, densely tomentose on both surfaces; the inner 3 smaller than the outer 3. *Stamens* with slightly convex apical connectives. *Ovaries* numerous, narrowly ovoid, pubescent; stigmas clavate or sub-cylindric. *Fruiting pedicel* very stout. *Torus* sub-globose. *Ripe carpels* about 8, sessile, sub-obovoid to ovoid, glabrous, 1 in. to 1·65 in. long and ·75 to 1·15 in. in diam.; pericarp thick, pulpy. *Seeds* 2, collateral, oblong, compressed, grooved along the edge, ·9 in. long and ·6 in. broad. *Kurz For. Flora Burm.* i. 30; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 33.

Burma,—*Griffith* No. 426. Martaban,—*King, Brandis.* Perak,—*King's Collector* No. 8384. Singapore and Malacca,—*Maingay* (*Kew Distrib.*) No. 32.

PLATE 51. Artabotrys crassifolius, *H. f. & Th.* 1, Branch with nearly ripe carpels; 2, flowering branch; 3, inner petals; 4, section of nearly ripe carpel; 5, seed—*of natural size;* 6 & 7, front and back views of an anther; 8, pistils *in situ;* 9, single pistil; 10, section of ovary—*enlarged.*

7. ARTABOTRYS OBLONGUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 33. A climber 50 to 70 feet long, ultimately all parts, except the inflorescence, glabrous; young branches slender, rufous-pubescent; the bark dark-coloured when very young, afterwards rather pale, striate. *Leaves* when adult coriaceous, oblong, shortly acuminate, the base acute; both surfaces glabrous, the upper shining, the lower dull, but when young sparsely pubescent along the midrib; main nerves 10 to 12 pairs, inconspicuous on the upper, slightly prominent on the lower, surface, spreading, forming two or three series of arches within the margin; length of blade 6·5 to 9 in., breadth 2·5 to 3 in.; petiole ·4 in. *Peduncles* stout, pubescent when young, bearing 3 or 4 pedicels. *Flowers* 1·35 in. long; pedicels about 1 in., pubescent, slightly thickened upwards. *Sepals* coriaceous, triangular, acute, concave, spreading, rufous-pilose on both surfaces, slightly conjoined at the base, ·25 in. long. *Petals* coriaceous; the portion above the saccate base lanceolate, sub-acute, strigosely tomentose on both surfaces; the claw partly

glabrous and partly covered with minute white hair. *Anthers* compressed, with oblong, obliquely truncate, flattened heads. *Ovaries* few, oblong, glabrous; the stigmas broad, oblique. *Fruit* unknown.

Perak,—*King's Collector* No. 6524.

PLATE 52. Artabotrys oblongus, *King*. 1, Flowering branch; 2, flower; 3, flower, dissected; 4, petals turned with apex downwards—*of natural size;* 5, flower, with petals removed; 6, anthers; 7, ovaries—*enlarged.*

8. ARTABOTRYS ZEYLANICUS, *H. f. & T. Fl. Ind.* 128. A strong climber; young branches rather stout, at first puberulous, speedily becoming glabrous and dark-coloured. *Leaves* coriaceous, rather broadly lanceolate or oblanceolate, rarely sub-obovate, elliptic, sub-acute or obtusely acuminate, the base acute; both surfaces quite glabrous; the upper shining, pale green (when dry), the lower dull and brown; main nerves 8 to 11 pairs, oblique, rather straight, faint on both surfaces; length of blade 3·5 to 5 in., breadth 1·4 to 2, rarely 2·25 in. *Peduncles* flattened, much hooked, each bearing 1 to 4 (usually 1-flowered) pedicels. Flowers 1·25 to 1·75 in. long; pedicels densely rusty-tomentose with numerous small rounded or ovate rusty bracts near the base. *Sepals* broadly ovate-triangular, acute, spreading, conjoined below, rufous-tomentose externally. *Petals* coriaceous (above the basal sac), oblong-lanceolate, acute; the inner 3 rather smaller, brownish, densely tomentose. *Anthers* sessile, broad, truncate. *Ovaries* glabrous or villous (*fide* Beddome). *Ripe carpels* broadly ovoid, mucronate, harshly tomentose, rugulose. *Thwaites' Enum. Pl. Ceyl.* 9; *Hook. fil. Fl. Br. Ind.* i. 54.

Forests of Malabar and Canara; Central and Southern Ceylon.

PLATE 53. Artabotrys Zeylanicus, *H. f. & Th.* 1, Flowering and fruiting branch; 2, 3, & 4, flowers from different points of view; 5 & 6, petals; 7, calyx and androgynœcium; 8, ripe carpel; 9, seeds—*of natural size;* 10, anther; 11 & 12, ovaries; 13, section of ovary—*enlarged.* (*Copied from a drawing in the Herbarium of the Royal Botanical Garden, Peradeniya, and printed by permission of the Director, Dr. H. Trimen,* F.R.S.)

9. ARTABOTRYS LOWIANUS, *n. sp., Scortechini* MSS. A stout climber; all parts, except the flowers glabrous; young branches slender, dark-coloured. *Leaves* thinly coriaceous, oblong-lanceolate, shortly caudate-acuminate, the base cuneate; both surfaces shining, minutely reticulate; main nerves 8 to 10 pairs, spreading, inter-arching ·2 in. from the margin, faint; length of blade 3·5 to 6 in., breadth 1·25 to 1·75 in.; petiole ·25 in. *Peduncles* extra-axillary, 2- to 3-flowered, glabrous; pedicels thickened upwards, ·5 to ·75 in. long, glabrous. *Sepals* triangular, acute, glabrous, ·25 in. long, enlarging a little with the fruit. *Petals* fleshy, adpressed-puberulous, elliptic-lanceolate above the concave base, obtuse; the outer three 1·75 in. long, the inner three smaller. *Anthers* with a rounded apical process from the connective. *Ovaries* many, glabrous. *Carpels* (quite young) sessile, ovoid, apiculate; ripe carpels unknown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 34.

Perak,—*Scortechini* No. 2012.

This species is near *A. pleurogynus*, Miq., but is perfectly glabrous, not sub-strigose; its ripe fruit is unknown.

PLATE 54. Artabotrys Lowianus, *Scort.* 1, Flowering branch; 2, flower, dissected; 3, young carpels—*of natural size.*

10. Artabotrys odoratissimus, *R. Br. in Bot. Reg.* 423. A shrub, often scandent; young branches puberulous, slender, dark-coloured. *Leaves* thinly coriaceous, oblong-lanceolate, shortly acuminate, the base acute; both surfaces glabrous, shining, reticulate, pale when dry; main nerves 8 to 10 pairs, slender, spreading; length of blade 4 to 6 in., breadth 1·25 to 2 in.; petiole ·1 to ·25 in. *Flowers* yellow, solitary or in pairs, drooping, 1·25 to 1·5 in. long; pedicels about ·5 in. long, ebracteolate. *Sepals* connate below, acute, their apices reflexed. *Petals* lanceolate above the saccate base, minutely adpressed-sericeous. *Ovaries* few, glabrous. *Ripe carpels* 6 to 10, narrowly obovoid, glabrous, 1·25 to 1·5 in. long, ·9 in. in diam., yellow. *Seeds* oblong, slightly flattened, deeply grooved on one side, ·75 in. long. *Wall. Cat.* 6415; *W. & A. Prod.* 10; *H. f. & T. Fl. Ind.* 128; *Hook. fil. Fl. Br. Ind.* i. 54; *Kurz For. Fl. Burm.* i. 31; *Benth. Fl. Hong-Kong* 10.—Unona uncinata, *Dunal Anon.* 105, *t.* 12 *&* 12*a*; *D.C. Prod.* i. 90.—Uvaria odoratissima and uncata, *Roxb. Fl. Ind.* ii. 666.

Peninsular India: in the southern parts and in Ceylon; much cultivated in India on account of the odour of its flowers and fruit.

This species is, in my opinion, truly wild only in Southern Peninsular India and in Ceylon.

Sir Joseph Hooker has pointed out that the *A. odoratissimus* of Blume (*Fl. Jav. Anon.* 59, *t.* 28 & 31B) is not the plant so named by R. Brown. Unona hamata, *Dunal Anon.* 106, *t.* 27 (= Artabotrys hamatus, *Bl. Fl. Jav. Anon.* 60, *t.* 29 & 31), ought not, in my opinion, to be reduced to this.

Plate 55. Artabotrys odoratissimus, *R. Br.* 1, Flowering branch; 2, flower seen from above; 3, ripe carpels; 4, sections of ripe carpels; 5, seeds—*of natural size;* 6, stamens; 7, ovary—*enlarged.* (*Copied from Roxburgh's original drawing in Calcutta Herbarium.*)

11. Artabotrys oxycarpus, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 34. A stout. climber 60 to 80 feet long; all parts, except the flowers, glabrous; young branches slender, black when dry. *Leaves* oblong-lanceolate, shortly acuminate, the base cuneate; both surfaces shining, reticulate; main nerves 6 to 8 pairs, spreading, slender; length of blade 3 to 5·5 in., breadth 1·25 to 1·5 in. *Peduncles* short (·75 in. long), glabrous, bearing about 2 minutely bracteolate pedicels, ·75 in. long. *Flowers* 1·5 to 1·75 in. long *Sepals* coriaceous, small, broadly ovate, acute, ·2 in. long, conjoined at the base, spreading. *Petals* coriaceous, very much longer than the sepals, lanceolate, obtuse; the inner 3 smaller; all adpressed-pubescent, and the saccate base small in all. *Torus* small, sericeous. *Ovaries* glabrous. *Ripe carpels* numerous, sessile, glabrous, narrowly elliptic, tapering to each end; the apex caudate, 1 to 1·2 in. long and ·4 in. in diam.; pericarp thin. *Seeds* 2, plano-convex, compressed, blunt, ·25 in. long.

Perak,—*King's Collector* Nos. 5150 and 5605, *Wray* No. 3286.

This species comes near the Bornean *A. polygynus*, Miq. (*Ann. Mus. Lugd. Bat.* ii. 4). But this species has more pointed and perfectly smooth ripe carpels; while those of *A. polygynus* are more ovoid, with shorter terminal point and have many vertical ridges. *A. polygynus*, moreover, is sub-strigosely pubescent: this is glabrous.

Plate 56. Artabotrys oxycarpus, *King.* 1, Flowering branch; 2, flower, dissected; 3, ripe fruit; 4, seeds—*of natural size.*

12. Artabotrys speciosus, *Kurz in Hook. fil. Fl. Br. Ind.* i. 55. A large climber; young branches slender, dark-coloured, sparsely adpressed-pilose, afterwards glabrous. *Leaves* coriaceous, oblong or oblong-lanceolate, rarely oblanceolate, shortly and obtusely acuminate, the base acute; both surfaces glabrous, shining; main nerves 7 to 10 pairs, spreading, inter-arching at some distance from the edge, slender; length of blade 6 to 8 in., breadth 2 to 2·5 in.; petiole ·25 in. *Peduncles* extra-axillary, flattened, short and not much hooked, puberulous, each bearing several short, puberulous, 1-flowered, ebracteolate flower-pedicels. *Flowers* from 1·25 to nearly 2 in. long, yellow. *Sepals* ·2 in. long, broadly ovate, acute, pubescent outside, glabrous inside. *Petals* thickly coriaceous, adpressed-pubescent, linear above the concave base, rather blunt; the inner smaller than the outer. *Torus* pilose. *Fruit* unknown.—*Kurz For. Flor. Burm.* i. 32; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 35.

Andaman Islands, along the Middle Straits,—*Kurz*. S. Andaman: at Caddellgunge,—*King's Collector*.

Plate 57. Artabotrys speciosus, *Kurz*. 1, Flowering branch (from Kurz's specimen); 2, flowering branch (from King's Collector's specimen); 3, flower of No. 1 dissected; 4, flower of No. 2 dissected—*of natural size*.

13. Artabotrys Maingayi, *H. f. & T. in Hook. fil. Fl. Br. Ind.* i. 55. A powerful creeper 40 to 80 feet long; all parts glabrous except the flowers; the young branches slender, dark-coloured. *Leaves* thin, elliptic, acuminate at base and apex; both surfaces shining, finely reticulate; main nerves 7 to 9 pairs, spreading, faint; length of blade 3·5 to 6 in., breadth 1·35 to 2 in.; petiole ·25 to ·5 in. *Peduncles* flat, much curved, glabrous. *Flowers* 1 in. in diam., fascicled, peduncle ·5 to 1·5 in., hoary-pubescent. *Sepals* small, obtuse, ·2 in. long. *Petals:* the outer linear-oblong, obtuse, concave, the saccate base small and sub-orbicular, 1 to 1·25 in. long and ·25 to ·35 broad; the inner smaller and narrower and much curved. *Ovaries* 3 or 4, ovoid, glabrous. *Ripe carpels* sessile, elliptic-globose, mammillate, yellow, glabrous, when ripe 2·5 in. long and 1·5 in. in diam. *Seeds* 2, plano-convex; testa stony. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 35.

Malacca,—*Maingay* (*Kew Distrib.*) No. 34.

Plate 58. Artabotrys Maingayi, *H. f. & T.* 1, Flowering branch; 4, ripe carpel; 5, section of the same; 6, seed—*of natural size;* 2, flower with outer petals removed; 3, outer petal; 7, andro-gynœcium; 8 & 9, anthers; 10, pistils—*enlarged*.

14. Artabotrys caudatus, *Wall Cat.* 6417. A woody climber; young branches pubescent, the older glabrous. *Leaves* coriaceous, oblong-lanceolate, obtusely and shortly caudate-acuminate, the base acute; both surfaces glabrous, reticulate; main nerves 10 to 12 pairs, spreading, faint; length of blade 3·5 to 5 in., breadth 1·25 to 1·75 in.; petiole ·2 to ·3 in. *Peduncles* short, recurved, many-flowered. *Sepals* short, acute. *Petals* narrowly linear, not contracted above the square saccate base; the inner 3 smaller, all tomentose. *Fruit* unknown. *H. f. & T. Fl. Ind.* 129; *Hook fil. Fl. Br. Ind.* i. 55.

Khasia Hills,—*Wallich*.

This has not been collected since the time of Wallich, whose specimens were very incomplete.

PLATE 59. Artabotrys caudatus, *Wall.* 1, Flowering branch—*of natural size;* 2, calyx and andro-gynœcium; 3, petal; 4 & 5, stamens, front and back view; 6, pistil; 7, section of ovary—*enlarged.* (*The drawings of the flower and its parts were made by Miss Smith from Wallich's specimen—Cat. No.* 6417.)

15. ARTABOTRYS GRACILIS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 35. A slender woody climber, 60 to 80 feet long; young branches dark-coloured; all parts except the petals quite glabrous. *Leaves* thinly coriaceous, ovate-lanceolate, shortly acuminate, the base cuneate; both surfaces glabrous and shining, the upper when dry tinged with green; main nerves 7 or 8 pairs, spreading, inter-arching inside the edge, very faint on both surfaces, reticulations rather distinct; length of blade 2·5 to 3 in., breadth 1 to 1·75 in.; petiole ·15 to ·2 in. *Peduncles* extra-axillary, short, much hooked, glabrous, usually 4- to 6-flowered; pedicels ·35 in. long, thickened upwards, ebracteolate, glabrous; flower ·3 to ·4 in. long. *Sepals* very coriaceous, semi-orbicular, slightly pointed at the apex, very little conjoined at the base, concave, spreading. *Petals* fleshy, sub-equal, curved, spreading, densely tomentose, the outer 3 flattened; the inner obtusely 3-angled, tumid at the base, smaller than the 3 outer. *Anthers* with broad apical connectival processes. *Ovaries* 3 or 4, oblong, with large discoid lobed stigmas. *Torus* villous. *Ripe carpels* 3 or 4, sessile, obovoid, with several vertical ridges; the base contracted, glabrous, ·8 in. long and ·7 in. in diam. *Seeds* 2, compressed-ovoid, obtuse at each end, shining.

Perak: at low elevations,—*King's Collector* Nos. 3746, 4987 and 7543.

Allied to *A. suaveolens*, Bl.; but with differently shaped petals, pistils, and carpels.

PLATE 60. Artabotrys gracilis, *King.* 1, Flowering branch; 2, unripe fruit; 3, ripe carpel; 4, seeds; 5, flower, dissected—*of natural size;* 6, flower without the petals; 7, anthers; 8, ovaries and torus—*enlarged.*

16. ARTABOTRYS SUAVEOLENS, *Blume Fl. Javæ Anon.* 62, *t.* 30, 31*D.* A climber 20 to 30 feet long; the petals always tomentose, the other parts mostly glabrous, but sometimes the young branches, peduncles, and under-surfaces of the midribs of the leaves adpressed-puberulous. *Leaves* thinly coriaceous, oblong-lanceolate to ovate-lanceolate, acute or shortly acuminate, the base acute; both surfaces shining, the reticulations rather distinct; the upper often deeply tinged with green when dry. *Peduncles* extra-axillary, thin at first, but becoming stout and flat with age, glabrous or puberulous, bearing from 5 to 15 flowers; pedicels ·3 to 4·5 in. long, thickened upwards, sparsely adpressed-pubescent, with a small narrowly ovate bract at the base. *Flowers* about ·4 in. long. *Sepals* broadly ovate; the apex pointed, thinly coriaceous, sparsely adpressed-pubescent externally, very slightly conjoined at the base, spreading, ·1 in. long. *Petals* fleshy, adpressed-tomentose, dilated and thin at the base; the limb cylindric to clavate, sub-erect, slightly spreading, sometimes with the apex incurved. *Anthers* short, with a very broad, oblique, flattened, apical appendage from the connective. *Torus* slightly pubescent. *Ovaries* broadly ovoid, sub-compressed; the stigma small. *Ripe carpels* few, ellipsoid; the apex blunt; the base slightly contracted, smooth, glabrous, ·4 to ·5 in. long and ·25 in. in diam.; pericarp thin, fleshy. *Seed* single, ellipsoid, blunt at each end; the testa granular. *Wall. Cat.* 6416; *H. f. & T. Fl. Ind.* 129; *Hook. fil. Fl. Br. Ind.* i. 55; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 39; *Ann. Mus. Lugd. Bat.* ii. 43; *Kurz For. Fl. Burm.* i. 32; *King in*

Journ. As. Soc. Bengal 61, *pt.* 2, 36.—Artabotrys parviflora, *Miq. Fl. Ind. Bat. Supp.* 375.—Unona suaveolens, *Blume Bijdr.* 17.

In all the Malayan Provinces at low elevations: common. Sylhet to Burmah.

This species varies somewhat as to size of flowers and texture of leaf. The form named *A. parviflora* by Miquel in his Sumatra Supplement was, by himself, subsequently reduced to a variety of this species (*Ann. Mus. Lugd. Bat.* ii. 38).

PLATE 61. Artabotrys suaveolens, *Blume.* 1, Flowering branch; 2, ripe fruit; 3, seed—*of natural size;* 4, flower; 5, the same dissected; 6, anthers—*enlarged.*

17. ARTABOTRYS BURMANICUS, *A. DC. Mem. Anon.* 36. A large climber; young parts densely rufous-tomentose; branchlets slender, glabrous except in the youngest stage. *Leaves* membranous, oblong-lanceolate, abruptly and shortly acuminate, the base sub-acute or rounded; upper surface shining, glabrous except (when young) the pubescent midrib; under-surface softly sparsely and minutely pubescent, densely pubescent on the midrib and nerves; when very old almost glabrescent; main nerves 10 or 11 pairs, spreading, inter-arching twice within the edge; reticulations minute, distinct on both surfaces; length of blade 3·5 to 6·5 in., breadth 1·35 to 2 in.; petiole ·2 in. *Peduncles* almost opposite the leaves, rather short, flattened, hooked and often 2-cleft at the apex, usually 1-flowered, pubescent. *Flowers* about 1 in. long. *Petals* narrowly linear, slightly expanded, concave and connivent at the base. *Anthers* with broad, flat, apical processes. *Pistils* oblong, pubescent, with conical glabrous stigma. *Fruit* unknown. *H. f. & T. Fl. Ind.* 129; *Hook. fil. Fl. Br. Ind.* i. 55; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 39; *Wall. Cat.* 6428; *Kurz For. Fl. Burm.* i. 32.—Ropalopetalum uniflorum, *Griff. Not.* iv. 717.

Burmah; from Ava to Tenasserim and Mergui,—*Wallich, Griffith, Proudlock.* Manipur, *Calcutta Bot. Gard. Collector.*

PLATE 62. Artabotrys burmanicus, *A. DC.* 1, Flowering branch—*of natural size;* 2, flower, dissected; 3 & 4, anthers; 5, pistil—*enlarged.*

18. ARTABOTRYS COSTATUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 37. A climber from 15 to 80 feet long; young branches slender, dark-coloured, scantily tawny-puberulous when young, afterwards glabrous. *Leaves* thinly coriaceous, elliptic-oblong, slightly oblanceolate, abruptly and shortly acuminate, the base cuneate; upper surface shining, glabrous, except the lower part of the midrib which is tomentose; lower surface paler, dull, sparsely puberulous towards the base when young, afterwards glabrous; main nerves 12 to 14 pairs, spreading, forming one series of very bold arches ·3 in. from the margin, with a series of smaller arches outside it, very stout and prominent on the lower, slightly so on the upper, surface, reticulations distinct on both; length of blade 7 to 9 in., breadth 2·5 to 3·25 in.; petiole ·2 in. *Peduncles* rather small, much hooked. *Flowers* unknown. *Carpels* 2 to 5, sessile, ellipsoid, blunt at each end, about 1 in. long and ·6 in. in diam. (unripe), glabrous; pericarp thin. *Seeds* 2, elliptic.

Perak; on Ulu Bubong at elevations of from 500 to 800 feet, *King's Collector* Nos. 4291 and 10184.

I have ventured to describe this, although its flowers are unknown, and the only fruit collected is unripe. By its oblong costate leaves it differs from every other described *Artabotrys*, except *A. macrophyllus*, mihi.

PLATE 63. Artabotrys costatus, *King.* 1, Branch with fruit—*of natural size.*

19. Artabotrys Wrayi, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 37. A climber; young branches rather stout, softly pale rusty-tomentose; ultimately glabrous, pale and furrowed. *Leaves* thinly coriaceous, large, oblong-elliptic to elliptic, shortly acuminate, the base rounded; both surfaces boldly reticulate; the upper glabrous and shining, sub-bullate when dry; the lower shortly and rather softly cinereous-pubescent; main nerves 10 to 12 pairs, oblique, curving, inter-arching freely within the edge, depressed above and bold and prominent beneath as is the midrib; length 8 to 11 in., breadth 2·75 to 5 in.; petiole ·35 in., stout, tomentose when young, glabrescent when old. *Peduncles* extra-axillary, rather short, very thick in fruit, sometimes straight when young and curving only when in fruit, few-flowered, glabrous; pedicels 1 in. long, stout, softly tawny-tomentose, with several bracteoles at the base. *Flowers* 1 in. long. *Sepals* broadly ovate at the base, tapering rapidly upwards, acuminate, about ·5 in. long, densely sericeous-tomentose outside, sub-glabrous inside, especially at the base. *Petals* thick, sub-equal, ovate-oblong, sub-acute, slightly contracted above the claw, softly adpressed-sericeous, except on the glabrous concavity of the claw inside. *Ovaries* numerous. *Ripe carpels* obovoid, tapering much to the base; the apex mucronate, densely tawny-tomentose, sessile, nearly 1 in. long.

Perak,—*Wray* Nos. 2663 and 4006, *King's Collector* No. 3615.

Next to *A. grandifolius*, this has the largest leaves of any Asiatic species of the genus, but from that species it differs in having them pubescent beneath.

Plate 64. Artabotrys Wrayi, *King*. 1, Branch with nearly ripe fruit; 2, flower—*of natural size;* 3, flower dissected and slightly enlarged; 4, anthers; 5, ovaries—*much enlarged.*

9. Drepananthus, *Maingay* mss.

Trees. *Leaves* large, pubescent beneath. *Racemes* very short, fascicled on woody truncal tubercles. *Sepals* 3, nearly free. *Petals* 6, valvate, 2-seriate, sub-equal; bases concave, connivent; limb erect or spreading, broad or narrow. *Stamens* many, cuneate, truncate; anthers linear, cells lateral; connective very slightly produced. *Ovaries* 4—12; stigma sub-sessile; ovules 4 or more, 2-seriate. *Ripe carpels* globose, several-seeded. Two species.

This genus differs from *Artabotrys* in its members being trees, not climbers, in the absence of hooked peduncles, and in having 4 or more ovules in their ovaries. Dr. Scheffer (*Ann. Jard. Bot. Buitenzorg* ii. 6) proposed to make it a section of *Cyathocalyx*.

Petals of both rows with more or less ovate limb . . . . . 1. *D. pruniferus.*
Petals of both rows with narrowly cylindric limb . . . . . 2. *D. ramuliflorus.*

1. Drepananthus pruniferus, *Maing. in Hook. fil. Fl. Br. Ind.* i. 56. A tree 40 to 50 feet high; branches stout, rufous-pubescent at first, finally glabrescent. *Leaves* coriaceous, elliptic to elliptic-oblong, acute or obtuse, the base rounded or sub-cordate, often unequal; upper surface glabrous, except the depressed tomentose midrib and main nerves; lower surface shortly rufous-pubescent when young, glabrescent when adult; main nerves 14 to 16 pairs, prominent beneath; intermediate nerves stout, parallel, oblique; length 7·5 to 14 in., breadth 3 to 6·5 in.; petiole ·5 to 1·5 in., stout, channelled. *Racemes* 6- to 8-flowered, crowded. *Flowers* ·75 in. long, their pedicels rufous-tomentose,

·5 to ·75 in. long, each with a large oblanceolate bract. *Sepals* and *petals* sub-equal, very coriaceous, densely covered (except the inside of the claws of the petals) with a layer of minute whitish tomentum; sepals united by their bases, ovate-oblong, spreading; petals of outer row broadly ovate, sub-acute, slightly constricted above the claw; those of the inner row closely connivent, much constricted above the claw; their apices broad and emarginate. *Ovaries* oblong, sericeous-tomentose. *Ripe carpels* 6 to 8, sessile, sub-globose, minutely pubescent to glabrescent, 1 to 1·25 in. in diam. *Seeds* numerous, oblong, flat, shining. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 38.

Malacca,—*Maingay* (*Kew Distrib.*) No. 90. Perak,—*King's Collector*, *Scortechini*. Penang,—*Curtis* No. 1417.

PLATE 65. Drepananthus pruniferus, *Maing.* 1, Leaf; 2 & 3, racemes of flowers; 4, flower dissected to show the calyx and two rows of petals; 5, young carpels; 6 & 7, ripe carpels; 8, section of carpel; 9, seed—*of natural size;* 10, stamens—*enlarged.*

2. DREPANANTHUS RAMULIFLORUS, *Maing. in Hook. fil. Fl. Br. Ind.* i. 56. A tall tree; the young branches as in *D. pruniferus*. *Leaves* as in *D. pruniferus*, but slightly broader at the apex and narrowed at the base. *Flowers* ·4 to ·5 in. long, much crowded, in very short fascicles from tubercles on the branches below the leaves; pedicels about ·3 in. long, stout, rufous-tomentose, as is the single sub-orbicular bracteole. *Sepals* much shorter than the petals, broadly triangular, acuminate, spreading, rufous-tomentose especially outside. *Petals* with concave, connivent, tomentose claw and fleshy, sub-cylindric, spreading, much curved, adpressed-pubescent limbs. *Ovaries* about 5, sessile, oblong. *Ripe carpels* (young) ovoid, slightly oblique, densely rufous-tomentose; walls of pericarp very thick. *Seeds* few. *Ripe fruit* unknown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 39.

Malacca,—*Maingay* (*Kew Distrib.*) No. 91. Distrib.—Sumatra,—*Forbes* No. 2913.

PLATE 66. Drepananthus ramuliflorus, *Maing.* 1, Leaf-twig; 2, branch with inflorescences; 4, very young carpel; 5, carpel a little older; 6, section of the same—*of natural size;* 3, flower dissected—*enlarged.*

10. Canangium, *Baill.* (*Cananga*, Rumph.)

Tall trees. *Leaves* large. *Flowers* large, yellow, solitary or fascicled on short axillary peduncles. *Sepals* 3, ovate or triangular, valvate. *Petals* 6, 2-seriate, sub-equal or inner smaller, long, flat, valvate. *Stamens* linear; anther-cells approximate, extrorse; connective produced into a lanceolate acute process. *Ovaries* many; style oblong (or 0 ?); stigma sub-capitate; ovules numerous, 2-seriate. *Ripe carpels* many, berried, stalked or sessile. *Seeds* many; testa crustaceous, pitted, sending spinous processes into the albumen.—Two species.

The tree known as *Cananga odorata*, H. f. & T., was by Rumphius (who wrote an account of it in *Herb. Amb.* ii. 195, published in 1750) named *Cananga* (Latinice) and *Bonga Cananga* (Malaice). Rumphius' description is of the usual pre-Linnæan sort, there being no differentiation of generic and specific characters, and his name of course is not binomial. In the chapter of his book following that in which *Cananga* proper is treated of (*l. c.* p. 197), Rumphius proceeds to describe the wild *Canangas* as distinguished from the *Cananga* proper, which was in his time (as it is still) much cultivated by the

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Malays on account of the fragrance of its flowers. These wild *Canangas* Rumphius calls *Canangæ sylvestres*, and of them he distinguishes three sorts:—

1. *Cananga sylvestris prima sive trifoliata* (Malaice *Oetan*).
2. *Cananga sylvestris secunda sive angustifolia.*
3. *Cananga sylvestris tertia sive latifolia.*

Of the first two Rumphius gives figures on t. 66 of the same volume; and, judging from these figures, the plants would fall into the modern genus *Polyalthia*.

Linnæus' *Species Plantarum* was published in 1753; therefore Rumphius' names are in point of time, as they are in point of form, pre-Linnæan. Linnæus does not accept *Cananga* as a genus, and he refers to the *Cananga* of Rumphius only in a note under *Uvaria Zeylanica*. And the first botanists to adopt the *Cananga* of Rumphius as a genus are Hook. fil. & Thomson (in *Fl. Ind.* 130). But in 1775 Aublet (in his *Histoire des Plantes de la Guiane Francaise*) published, in regular Linnæan fashion, the genus *Cananga* for the reception of a single species named *C. ouregow*, of which he gave a figure (t. 244). Nineteen years later (1794) Ruiz and Pavon (in their *Prodromus Florœ Peruvianæ et Chilensis*) published, under the name of *Guatteria*, a genus with exactly the same characters as Aublet's *Cananga*. Unless, therefore, Hook. f. & Thomson are right in making a special case in establishing, as a genus in the Linnæan sense, the *Cananga* of Rumphius, Aublet's genus *Cananga* must stand, and to it must be relegated all the American species referred to Ruiz and Pavon's genus *Guatteria*. Authorities vary in their treatment of the *Cananga* of Rumphius. Dunal (in his *Monographie de la famille des Anonacees*) pronounces for the suppression of Aublet's *Cananga* in favour of that of Rumphius, who, he incorrectly says, assigned *two* species to it; the fact being, as already shown, that Rumphius divided *Cananga* into (*a*) cultivated (with one sort) and (*b*) wild (*sylvestres*) with three sorts. Dunal (and I think wrongly) refers all the *Canangas* of Rumphius, to *Unona*. In their *Genera Plantarum*, Mr. Bentham and Sir J. D. Hooker retain the *Cananga* of Rumphius and reduce *Cananga* of Aublet to *Guatteria*. Baillon, on the other hand, retains the *Cananga* of Aublet as a genus, and to it refers all the South American species of *Guatteria*. He reduces *Cananga odorata*, H. f. & Th., to *Unona*, and, altering the termination of its generic name, he makes it a section of *Unona* under the sectional title of *Canangium*.

The grounds for separating *Cananga* from *Unona* as a genus are thus stated by the authors of the *Flora Indica*: "In habit and general appearance this genus closely resembles *Unona*; but the indefinite ovules prevent its being referred to that genus. The peculiar stamen (with a long conical apical point) and the seeds are themselves, we think, sufficient to justify us in distinguishing it as a genus." The simplest solution of the synonymic knot, and one for which there is some justification on the ground of structure, appears to lie in the acceptance of Baillon's suggested name and in giving up that of the authors of the *Flora Indica*.

The synonymy of *Guatteria* is further complicated by the fact that a large number of species with valvate æstivation were referred to it by Wallich and others. These, however, were separated by Hook fil. & Thomson, by whom the genus *Polyalthia* was formed for their reception. Sir Joseph Hooker refers to *Cananga*, not only the species *C. odorata*, but another named *C. virgata*. The latter plant appears to me, in the light of full material recently received, to be a typical *Cyathocalyx*, and to that genus I

have ventured to remove it. A third species, doubtfully referred to the genus *Cananga* under the specific name *monosperma*, appears to me from the description (I have seen no good specimens) to be so doubtful that I exclude it altogether. The seeds both of this species and of *C. odoratum* are peculiar. I quote the following excellent description of those of *C. odoratum* from Hooker fil. & Thomson's *Flora Indica*, page 130:—"The seeds are pitted like those of the section *Kentia*, of *Melodorum*, and of some *Cucurbitaceæ*; and the inner surface of the brownish-yellow, brittle testa is covered with sharp tubercles, which penetrate into the albumen, taking the place of the flat plates which are found in the rest of the order."

Flowers 2 or 3 in. long	1. *C. odoratum.*
Flowers 1 to 1·25 in. long	2. *C. Scortechinii.*

1. Canangium odoratum, *Baill. Hist. des Plantes* i. 213 (*in note*). A tree 30 to 60 feet high; young branches rather slender, sub-striate, at first puberulous, slightly lenticellate, dark ashy-coloured when dry. *Leaves* membranous, ovate-oblong or oblong-lanceolate, sometimes broadly elliptic, acute, shortly acuminate or sub-obtuse; the base rounded or sub-cuneate, unequal; quite glabrous, the midrib and nerves puberulous; main nerves about 8 pairs, ascending, rather straight and slender; length 3·5 to 8 in., breadth 1·75 to 3 in.; petiole ·5 in. *Flowers* 2 to 3 in. long, drooping, in 2- to 3-flowered shortly pedunculate racemes; pedicels slender, 1·5 to 2 in. long, recurved, puberulous, with one median and several basal, small, often deciduous bracts. *Sepals* free or joined at the base only, about ·35 in. long, triangular, tapering to a blunt point, reflexed. *Petals* linear-lanceolate, 3 to 3·25 in. long and ·3 in. wide, adpressed-sericeous when young. *Ovaries* sessile, narrowly oblong; stigma hemispheric. *Ripe carpels* from 10 to 12, pedicellate, oblong-obovoid, glabrous, blunt, ·65 to ·9 in. long, nearly black when ripe, pulpy; stalks from ·5 to ·75 in. long. *Seeds* 6 to 12, flattened, sub-ovate. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 41.—Cananga odorata, *H. f. & Th. Fl. Ind.* 130; *Fl. Br. Ind.* i. 56; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 40; *Kurz For. Fl. Burm.* i. 3.—Uvaria odorata, *Lamb. Ill.*, *t.* 495, *f.* 1; *Roxb. Fl. Ind.* ii. 661; *Wall. Cat.* 6457; *W. & A. Prodr.* 8; *Blume Bijdr.* 14; *Fl. Jav. Anon.*, *t.* 9; *Pierre For. Flore Coch.-Chine Anon.*, *t.* 18; *Griff. Notul.* iv. 712.—U. fracta, *Wall. Cat.* 6460.—U. axillaris, *Roxb. Fl. Ind.* ii. 667.—Unona odorata and U. leptopetala, *Dunal Anon.* 108 *and* 114; *DC. Prodr.* i. 90 *and* 91; *Deless. Ic. Sel.*, *t.* 88.

In all the provinces, planted. Indigenous in Tenasserim, Java, and the Philippines.

Plate 67. Canangium odoratum, *Baillon.* 1, Flowering branch; 2, ripe carpels; 3 & 4, sections of ripe carpels—*of natural size*; 5 & 6, sections of ovaries; 7, ripe seed—*enlarged.* (*No.* 1 *is copied from Blume Fl. Jav. Anon.*, *t.* 9.)

2. Canangium Scortechinii, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 42. A tree 30 to 40 feet high; young branches puberulous but speedily glabrous, dark-coloured and lenticellate. *Leaves* membranous, broadly ovate, acute; the base broad, rounded, slightly oblique; both surfaces pubescent when very young, ultimately glabrescent, glandular-dotted; the midrib and 6 or 7 pairs of nerves adpressed-pubescent; length 2·5 in.,

breadth 1·75 in. (*fide* Scortechini, length 3 to 7 in., breadth 2 to 3 in.) *Cymes* short from the axils of leaves or of fallen leaves, few-flowered, shortly pedunculate. *Flowers* 1 to 1·25 in. long; pedicels under 1 in., pale-pubescent with a narrow, ovate, obtuse, mesial bracteole ·25 in. long. *Sepals* united at the base, ovate, sub-acute, recurved, minutely yellowish-pubescent, ·35 in. long. *Petals* sub-equal, linear-obtuse, 1 to 1·25 in. long; the claw short, thickened, pubescent on both surfaces like the sepals. *Stamens* numerous; the connective with an apical process which is bulbous at the base and suddenly tapers into a sharp point. *Ovaries* numerous, cohering into a mass, oblong, glabrous except at the pubescent base, with 6 or 8 ovules in two rows; stigma sessile, truncate. *Ripe carpels* unknown.

Perak,—*Scortechini.*

Scortechini's specimens are in bud only and none of them has any fruit. The foregoing description has been prepared partly from his notes and partly from his specimens. The species differs from *C. odoratum* in having smaller leaves, a different inflorescence, with smaller and quite inodorous flowers. It is also a smaller tree.

Plate 68. Canangium Scortechinii, *King.* 1, Branch with flower-buds; 2, fully expanded flower, dissected—*of natural size;* 3 & 4, anthers; 5, pistils coherent by their viscid stigmas into a mass; 6, single pistil; 7, section of same—*enlarged.*

Doubtful Species.

Cananga? monosperma, *H. f. & Th. Fl. Br. Ind.* i. 57.

11. Unona, *Linn.*

Trees or shrubs, erect or climbing. *Flowers* often solitary, axillary, terminal or leaf-opposed. *Sepals* 3, valvate. *Petals* 6, valvate or open in æstivation, 2-seriate; 3 inner sometimes absent. *Torus* flat or slightly concave. *Stamens* cuneate; anther-cells linear, extrorse, apex of connective sub-globose or truncate. *Ovaries* numerous; style ovoid or oblong, recurved, grooved; ovules 2—8, 1-seriate (rarely sub-2-seriate). *Ripe carpels* many, elongate and constricted between the seeds, or baccate. *Seeds* few or many.

Distrib.—Tropical Asia and Africa; species about 50.

Sect. I.—Desmos, *H. f. & T.* Petals 6, in two rows; ripe carpels jointed.

Flowers solitary and always axillary.

Leaves narrowly oblong-lanceolate, glaucous.

Under-surface of leaves not dotted; carpels granular	1. *U. elegans.*
Under-surface with small black dots; carpels only slightly granular	2. *U. Zeylanica.*
Leaves elliptic-oblong to oblong-lanceolate	3. *U. Dunalii.*
Flowers solitary, axillary or terminal; leaves slightly pellucid-dotted, ovate-lanceolate	4. *U. pannosa.*

Flowers solitary and extra-axillary, terminal or leaf-opposed.

Flower-peduncles 4 to 6 in. long, slender	5. *U. Desmos.*

Flower-peduncles 1 to 2 in. long.

Lower surfaces of leaves glaucous; petals glabrous or at most sparsely adpressed-sericeous . . . . . 6. *U. discolor.*
Lower surfaces of leaves sub-glaucous; petals silky-pubescent . . 7. *U. viridiflora.*

Flower-peduncles from ·5 to 1 in. long.

Leaves more or less oblong or ovate or lanceolate, rufous-pubescent or tomentose beneath . . . . . 8. *U. dumosa.*
Leaves sub-glaucous, sparsely and minutely strigose beneath . . 9. *U. Lawii.*
Leaves ovate-oblong or sub-orbicular, obtuse or mucronate, cinereous-tomentose beneath . . . . . 10. *U. latifolia.*
Flowers solitary at the base of a leafy shoot . . . . . 11. *U. præcox.*

SECT. II.—DASYMASCHALON. Petals 3 or sometimes only 2; the inner row always absent; ripe carpels jointed.

Flowers 3·5 to 6 in. long; petals linear-lanceolate, caudate-acuminate, not constricted between claw and limb . . . . . 12. *U. longiflora.*
Flowers 1·5 to 3·5 in. long; petals from ovate to lanceolate, more or less constricted above the claw . . . . . 13. *U. Dasymaschala.*

SECT. III.—STENOPETALON. Petals 6, in two rows, usually very narrow; carpels baccate, not jointed.

Flowers solitary . . . . . 14. *U. Wrayi.*

Flowers in fascicles from the larger branches or stem.

Petals linear-oblong; 1 to 1·5 in. long; ripe carpels globose, glabrous, their stalks 1 to 1·5 in. long . . . . . 15. *U. desmantha.*
Petals narrowly linear, 3 to 5 in. long; ripe carpels globose, densely rufous-velvetty, shortly stalked . . . . . 16. *U. crinita.*
Petals narrowly linear, 1·25 to 3 in. long; ripe carpels sub-globular or bluntly ovate, softly tomentose, ultimately sub-glabrous, sub-sessile . . . . . 17. *U. stenopeatla.*

SECT. I.—DESMOS, *H. f. & T.* Petals 6; ripe carpels jointed.

1. UNONA ELEGANS, *Thwaites' Enum.* 398. A shrub or small tree; young branches slender with rather pale striate bark, the youngest golden pubescent. *Leaves* membranous, narrowly oblong-lanceolate, much acuminate, the base acute; upper surface glabrous, shining; the lower glaucous, puberulous and sparsely strigose; length 3 to 5 in., breadth ·6 to 1 in.; petiole ·15 to ·25 in., thin. *Flowers* solitary, axillary, 1·25 to 1·75 in. long; pedicels ·25 to ·35 in. long, with several minute bracts at the base, and one about half-way up. *Sepals* short (only ·2 to ·35 in. long), ovate, acute, glabrous. *Petals* thinly coriaceous, oblong-lanceolate, acuminate, pubescent when young, glabrous when old; the inner rather shorter than the outer. *Ripe carpels* stalked, granular, deeply constricted between the 2 or 3 seeds. *Beddome Ic. Pl. Ind. Or., t.* 50; *Hook. fil. Fl. Br. Ind.* i. 58; *Thwaites, C. P.* 3824.

Ceylon: Hinidoon Pattoo,—*Thwaites.*

This species and the next are very closely allied; and, working on Herbarium materials alone, I would have united them. My friend Dr. H. Trimen, the distinguished Director of the Botanic Garden at Peradeniya, who has had the advantage of seeing both plants growing, and who has worked with fresh material, on being appealed to by me remarked as follows:—"*Unona elegans* and *Zeylanica* are near enough as species, but they are, I think, distinct. *U. elegans* is a larger shrub, with larger flowers; its leaves are only 3 to 5 in. long, and the ripe carpels are markedly constricted between the seeds and finely hairy. *U. Zeylanica* has much larger leaves (7 to 9 in. long), and the ripe carpels are glabrous (slightly rough, however) and very little constricted between the seeds. But," he adds, "of course these characters are comparative, not contrasted."

PLATE 69. Unona elegans, *Thwaites*. 1, Flowering branch; 2, fruit nearly ripe; 3, flower dissected—*of natural size;* 4 & 5, anthers—*enlarged*.

2. UNONA ZEYLANICA, *Hook. fil. & Th. Fl. Ind.* 132. A small shrub 3 to 6 feet high; young branches slender and with pale brown, warted and much striate, glabrous bark. *Leaves* thickly membranous, oblong-lanceolate, acute, or shortly and rather obtusely acuminate, the base cuneate; upper surface shining, glabrous; the lower glaucous, with very small black dots and minute reticulations bearing extremely minute dark-coloured hairs; length 6·5 to 8·5 in., breadth 1·4 to 1·9 in.; petiole ·3 in., smooth. *Flowers* axillary, solitary, 1 to 1·25 in. long; pedicels slender, nearly ·5 in. long, and with 1 or 2 minute deciduous bracts near the base. *Sepals* small (·2 in. long), ovate-lanceolate, puberulous. *Petals* thinly coriaceous, oblong-lanceolate, rather obtuse, glabrous; the inner rather shorter. *Ripe carpels* stalked, glabrous, only slightly granular, about ·75 in. long, usually 2- but sometimes 3-seeded, slightly constricted. *Beddome Ic. Pl. Ind. Or., t.* 74; *Hook. fil. Fl. Br. Ind.* i. 58; *Thwaites' Enum.* 9; *C. P.* 1037.

Ceylon: in the Central Province, ascending to 3,000 feet.

PLATE 70. Unona Zeylanica, *Hook. fil. & Thoms.* 1, Flowering branch; 2, ripe fruit; 3, flower seen from above; 4, flower dissected—*of natural size;* 5, andro-gynœcium; 6, pistils after the stamens have been removed; 7 & 8, anthers; 9, pistil—*enlarged*. (*Nos. 5 to 9 are copied from a drawing kindly lent me from the Herbarium of the Royal Botanic Garden, Ceylon, by my friend Dr. H. Trimen,* F.R.S.)

3. UNONA DUNALII, *Wall. Cat.* 6425. A climber 60 to 100 feet long; young branches slender, rather pale, sub-rugose, lenticellate, glabrous. *Leaves* thickly membranous, pale when dry, elliptic-oblong to oblong-lanceolate, acute or shortly acuminate, the base rounded; the upper surface glabrous, shining; the lower slightly glaucous, sometimes with a few scattered hairs on the midrib; main nerves 10 to 12 pairs, spreading, not prominent; length 3 to 4 in., breadth 1·2 to 1·75 in.; petiole ·2 in. *Flowers* axillary, solitary, 1·25 to 1·4 in. long; pedicels ·35 to ·5 in. long, slender, pubescent, with a minute bracteole about the middle. *Sepals* broadly ovate, acute, puberulous, reflexed, ·25 to ·3 in. long. *Petals* narrowly oblong-lanceolate, sub-acute, puberulous to glabrous, 1 to 1·25 in long; the inner row smaller. *Ripe carpels* numerous, stalked, glabrous, constricted between the 3 to 5 ovoid joints, 1·25 to 1·75 in. long; the stalks about 1 inch. *Hook.*

fil. & Th. Fl. Ind. 131 (*excl. the Concan plant*); *Miq. Fl. Ind. Bat.* i. *pt.* 2, 41; *Hook. fil. Fl. Br. Ind.* i. 58; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 43.

Penang,—*Wallich.* Perak,—*King's Collector.* Malacca,—*Griffith* No. 451, *Maingay* (*Kew Distrib.*) No. 38. Penang,—*Curtis* No. 727.

PLATE 71. Unona Dunalii, *Wall.* 1 & 2, Flowering branches; 3, ripe carpels; 4, flower dissected; 5, seed—*of natural size;* 6, stamen—*enlarged.*

4. UNONA PANNOSA, *Dalz. in Hook. Kew Journ. Bot.* iii. 207. A tree; young branches slender, pubescent, the bark rugose. *Leaves* membranous, slightly pellucid-dotted, ovate-lanceolate, more or less acuminate, the base acute or rounded; upper surface glabrous, shining, the lower puberulous; main nerves 7 or 8 pairs, slender, slightly prominent beneath, sub-ascending; length 2·5 to 3·5 in., breadth ·9 to 1·75 in.; petiole ·15 in. *Flowers* solitary, axillary or terminal, 1·25 to 1·75 in. long.; pedicels ·25 to ·8 in.; bracts 1 or 2, minute, scaly. *Sepals* ovate, acute, very pubescent, about ·25 in. long. *Petals* oblong-lanceolate, sub-acute, clawed at the base, densely covered with adpressed, brown, silky tomentum; the inner smaller; the claw rugose and glabrous inside. *Ovaries* 10 to 12, densely strigose; ovules 2 to 6. *Ripe carpels* (*fide* Hook. fil.) "sub-sessile, obtuse at both ends, pubescent, ·65 in. long. *Seeds* 1 to 3, large, shining." *Dalz. & Gibs. Fl. Bomb.* 3; *H. f. & Th. Fl. Br. Ind.* 135; *Beddome Ic. Pl. Ind. Or., t.* 52; *Hook. fil. Fl. Br. Ind.* i. 58.—Uvaria mollis, *Wall. Cat.* 6475.

Western India. Concan,—*Dalziel.* Travancore,—*Wight.* Wynaad and Tinnivelly,—*Beddome.*

PLATE 72. Unona pannosa, *Dalz.* 1, Flowering branch; 2, flower seen from above; 3, the same from below; 4, flower dissected—*of natural size;* 5, flower with petals removed; 6 & 7, anthers; 8 & 9, pistils—*enlarged.*

5. UNONA DESMOS, *Dunal Anon.* 112. A spreading shrub, often climbing; young branches slender, striate, adpressed-rufous-pubescent, often lanceolate. *Leaves* thinly coriaceous, oblong, acute or acuminate, the base rounded; upper surface glabrous or nearly so, the midrib sparsely pubescent; under-surface paler in colour, puberulous or pubescent; main nerves 12 to 14 pairs, spreading, rather prominent beneath; length 4·8 to 8·8 in., breadth 1·65 to 3·25 in.; petiole ·35 in. *Flowers* solitary, extra-axillary, 1·35 to 1·75 in. long; peduncle slender, 4 to 6 in. long, glabrous; bracts few, lanceolate, minute, deciduous. *Sepals* ovate-acuminate, spreading, adpressed-pubescent, ·3 in. long. *Petals* coriaceous, ovate-lanceolate, adpressed-pubescent, nerved; the outer 2 in. long by about ·85 in. broad; the inner smaller. *Ripe carpels* numerous, stalked, ·5 to ·75 in. long, glabrous, constricted between the 2 to 3 oval joints. *H. f. & T. Fl. Ind.* 134; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 42; *Hook. fil. Fl. Br. Ind.* i. 59; *Kurz For. Fl. Burm.* i. 34; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 44.—U. cochin-chinensis, *A. DC. Prod.* i. 91.—U. pedunculosa, *A. DC. Mem. Anon.* 28.—U. pedunculosa, *Wall. Cat.* 6422.—U. fulva, *Wall. Cat.* 6427.—Desmos cochin-chinensis, *Lour. Fl. Coch. Ch.* i. 352.—U. discolor, *Wall.* (*not of Roxb.*) *Cat.* 6420 *D and E.*

From Assam to Singapore. Distrib.—Cochin-China.

PLATE 73. Unona Desmos, *Dunal.* 1, Flowering branch; 2, flower dissected—*of natural size;* 3 & 4, stamens; 5 & 6 pistils—*enlarged.*

6. UNONA DISCOLOR, *Vahl Symb.* ii. 63, *t.* 36. A spreading shrub, often also climbing; young branches slender, sub-rugose, pubescent towards the tips. *Leaves* membranous, oblong or oblong-lanceolate, acute, the base rounded; upper surface glabrous, shining; the lower glaucous, glabrous, or pubescent; main nerves 8 to 10 pairs, sub-ascending, slightly prominent beneath; length 3 to 7·5 in., breadth 1 to 2 in.; petiole about ·25 in. *Flowers* solitary, extra-axillary, 2 to 2·5 in. long; peduncles 1 to 2 in. long, rather slender, pubescent, with a minute linear bracteole below the middle, thickening when in fruit and lenticellate. *Sepals* ovate-lanceolate, spreading, nearly glabrous, ·4 to ·6 in. long. *Petals* coriaceous, narrowly lanceolate, 2 to 2·5 in. long, glabrous or sparsely adpressed-sericeous. *Ovaries* oblong, hairy. *Stigma* laterally grooved. *Ripe carpels* numerous, stalked, ·75 to 1·5 in. long, glabrous or pubescent, the constrictions between the 2 to 5 oval joints pubescent; stalks ·25 in long. *Dunal Anon.* 111; *DC. Prodr.* i. 91; *Wall. Cat.* 6420 (*partly*); *Roxb. Fl. Ind.* ii. 669; *W. & A. Prodr.* 9; *H. f. & T. Fl. Ind.* 133; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 41; *Beddome Ic. Pl. Ind. Or.*, *t.* 51; *Bl. Fl. Javæ Anon.* 53; *A. DC. Mem. Anon.* 28; *Thwaites' Enum.* 9; *Kurz For. Fl. Burm.* i. 34; *Hook. fil. Fl. Ind.* i. 59; *Scheff. Obs. Phyt. Anon.* 5; *Nat. Tijdsch. Ned. Ind.* xxxi. 5; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 44.—U. cordifolia, *Roxb. Fl. Ind.* ii. 602?—U. Dunalii, *H. f. & T. Fl. Ind.* 131 (the Concan plant); *Dalz. & Gibs. Fl. Bomb.* 3 (*not of Wallich*).—U. Amherstiana, *A. DC. Mem. Anon.* 28.—U. biglandulosa, *Bl. Bijdr.* 16.—U. Roxburghiana, *Wall. Cat.* 6423 *B.*—U. Lessertiana, *Dunal Anon.* 107, *t.* 26; *DC. Prod.* i. 90.—Desmos chinensis, *Lour. Fl. Coch. Ch.* i. 352.

Of this variable and abundant species, Sir Joseph Hooker distinguishes four varieties as follows:—

VAR. 1, *pubiflora.* Leaves 5–7 in., oblong, acute, base often cordate; flowers silky.

VAR. 2, *lævigata.* Leaves 3–4 in., oblong or lanceolate, acute, base rounded; flowers almost glabrous. U. chinensis, *DC. Prodr.* i. 90.—U. undulata, *Wall. Pl. As. Rar.* iii. 42, tab. 265.—U. discolor, *Dalz. & Gibs. Fl. Bomb.* 3, *t.* 265; *Wall. Cat.* 6428. Perhaps cultivated only in India; common in the Archipelago and China.

VAR. 3, *pubescens.* Leaves as in var. 1, but densely pubescent beneath.

VAR. 4, *latifolia.* Leaves 3–5 by 2–2·5 in., broadly oval, acute; flowers silky. U. discolor and VAR. b, *bracteata, Bl. Fl. Jav. Anon.* 53, *t.* 26 *and* 31*A.*

From the base of the Eastern Himalaya, through the Assam range, to Burmah and the Malayan Peninsula; in tropical forests. Distrib.—The Malayan Archipelago, Chinese Mountains.

PLATE 74. Unona discolor, *Vahl.* 1, Flowering branch; 2, branch with young fruit; 3, ripe fruit—*of natural size;* 4, anthers; 5, ripe fruit; 6, seed; 7, section of seed; 8, pistils—*enlarged.*

7. UNONA VIRIDIFLORA, *Bedd. Ic. Pl. Ind. Or.* 34, *t.* 158. A gigantic climber; young branches slender, softly rufous-tomentose, the older glabrous and very lenticellate. *Leaves* membranous, ovate-lanceolate, acuminate, the base rounded; upper surface

shining, sparsely adpressed-pubescent, ultimately glabrous, the reticulations minute, distinct; lower paler (sub-glaucous), adpressed-pubescent, especially on the midrib and nerves; main nerves 9 or 10 pairs, sub-ascending, curving, prominent beneath; length 3 to 5·5 in., breadth 1·2 to 1·9 in.; petiole ·15 to ·25 in., rufous-pubescent. *Flowers* solitary, extra-axillary, 1·5 to 2·5 in. long; pedicel slender, rufous-pubescent, 1 to 2 in. long, with a large, broadly ovate, acuminate bract below the middle. *Sepals* membranous, nerved, broadly ovate-lanceolate, free, sub-cordate at the base, ·5 to ·75 in. long. *Petals* membranous, bright green, narrowly lanceolate, acuminate, reticulate, silky-pubescent; the inner row smaller. *Fruit* unknown. *Hook. fil. Fl. Br. Ind.* i. 60.

Travancore: on the Attramallee Ghat, elevation 4,000 feet,—*Beddome.*

PLATE 75. Unona viridiflora, *Bedd.* 1, Flowering branch; 2, flower dissected—*of natural size.* (*Copied from Col. Beddome's Ic. Pl. Ind. Or., t.* 158.)

8. UNONA DUMOSA, *Roxb. Fl. Ind.* ii. 670. A large bushy climber; young branches slender, softly rufous-tomentose. *Leaves* membranous, broadly ovate to oblong-ovate, obovate to oblanceolate-oblong, obtuse, sub-acute or broadly mucronate; the base rounded or sub-cordate, or sub-cuneate; when young rufous-tomentose on both surfaces; the upper, except the midrib, glabrescent when old; main nerves 10 to 12 pairs, sub-ascending, rather straight; length 2 to 5·25 in., breadth 1·25 to 2·5 in.; petiole ·15 in. to 1·5 in., rufous-tomentose. *Flowers* solitary, leaf-opposed or extra-axillary, 2 to 2·5 in. long; pedicels ·5 to ·75 in. long, rufous-tomentose, with a single ovate bract near the base. *Sepals* coriaceous, cordate or ovate, sub-acute or acute, spreading, rufous-tomentose, ·4 in. long. *Petals* obovate-spathulate to broadly ovate-lanceolate, tapering to each end, vertically nerved, densely pubescent at first, less so when old; the inner row smaller. *Ripe carpels* numerous, stalked, glabrous, ·75 to 1·4 in. long, much constricted between the 2 to 3 ovoid joints. *Seeds* shining; the albumen with transverse fibres. *Wall. Cat.* 6429; *H. f. & Th. Fl. Ind.* 131; *Hook. fil. Fl. Br. Ind.* i. 59; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 45.

Malacca,—*Maingay* (*Kew Distrib.*) Nos. 42 and 43. Perak,—*King's Collector, Wray.* Sylhet,—*Roxburgh, Wallich.* Assam,—*Simons.*

The form which occurs in the Malayan Peninsula has narrower petals than that which is found in Assam and Sylhet, and its leaves are more oblong and less ovate.

PLATE 76. Unona dumosa, *Roxb.* 1, Branch with ripe carpels; 2, young flower; 3, fully developed flower (from Sylhet specimens); 4, flower (from a Perak specimen); 5, section of seed showing the albumen and embryo—*of natural size;* 6, anther; 7 & 8, pistils—*enlarged.*

9. UNONA LAWII, *H. f. & T. Fl. Ind.* 132. An erect shrub; young branches slender, dark-coloured, with pale warts, the youngest puberulous. *Leaves* ovate to ovate-lanceolate, acute, the base rounded or slightly cuneate; upper surface glabrous, shining; the lower sub-glaucous, sparsely and minutely strigose; main nerves 8 or 9 pairs, spreading, inconspicuous; length 2·5 to 3·5 in., breadth 1 to 1·2 in.; petiole ·1 to ·2 in., pubescent. *Flowers* solitary, extra axillary, 1·5 to 2·5 in. long; pedicels about 1 in., slender, sparsely strigose, with a single ovate bract below the middle. *Sepals* ovate-acuminate, spreading or reflexed, ·35 in. long. *Petals* with a narrowly linear pubescent limb, and a slightly expanded

granular villous claw; length from 1·25 to 2·35 in., breadth of limb only about ·2 in., the inner smaller. *Ripe carpels* "shortly stalked, with 1 to 3 ovoid joints." *Dalz. & Gibs. Fl. Bomb.* 3; *Beddome Ic. Pl. Ind Or., t.* 73; *Hook fil. Fl. Br. Ind* i. 59.

Travancore and Malabar,—*Wight.* The Concan,—*Law.* Bombay,—*Dalzell.*

Plate 77A. Unona Lawii, *Hook. fil. & Th.* 1, Flowering branch; 2, flower dissected —*of natural size;* 3 & 4, anthers; 5 & 6, pistils—*enlarged.* (*Nos.* 3 *to* 6 *are copied from Beddome's Ic. Pl. Ind. Or., t.* 73.)

10. Unona latifolia, *H. f. & T. in Fl. Br. Ind.* i. 60. A tree 30 to 50 feet high; young branches grey-tomentose, the older dark-coloured, striate. *Leaves* membranous, broadly ovate-oblong or sub-orbicular, obtuse or mucronate, the base truncate or sub-cordate; upper surface adpressed-pubescent, becoming glabrous, the midrib and nerves tomentose to pubescent; under-surface softly cinerous-tomentose; main nerves 7 to 9 pairs, broad, straight, ascending obliquely and, like the veins and reticulations, rather prominent, especially beneath; length of blade 2 to 5 in., breadth 1·65 to 3·5 in.; petiole ·4 in., tomentose. *Flowers* adpressed-tomentose, solitary or in pairs, extra-axillary, 2 to 2·25 in. long; peduncle ·5 to 1 in., thick, tomentose, with a lanceolate bract about the middle. *Sepals* oblong-ovate, acute, veined, spreading, ·35 in. long, connate at the base. *Petals* oblong-lanceolate, sub-acute, contracted above the base, boldly veined, 2 in. long; the inner somewhat shorter. *Ovules* 3 or 4. *Fruit* unknown. *Kurz For. Fl. Burm.* i. 35.—Unona Brandisiana, *Pierre Fl. Forest Coch.-Chine, t.* 19.

Burmah: south of the Karen country and near the Salween river,—*Brandis.* Langkani,—*Curtis.*

Plate 78. Unona latifolia, *H. f. & T.* 1, Branch with young flowers; 2, young flower dissected; 3, fully developed flower—*of natural size.*

11. Unona præcox, *H. f. & T. Fl. Ind.* 136. A tree; the young branches slender, with grey bark. *Leaves* (young) broadly lanceolate, acuminate, puberulous; length 2 to 3 in., breadth ·75 to 1·25 in.; petiole ·25 in. *Flowers* from the axils of fallen leaves, solitary, pendulous, 2·5 to 3 in. long; peduncles slender, ebracteate, about 1 in. long, rising from a pilose tubercle. *Sepals* membranous, linear-oblong, acute, ·7 in. long. *Petals* linear, membranous, glabrous, 2·25 to 2·75 in. long. *Stamens* truncate-capitate. *Ovaries* glabrous; style oblong, pilose; ovules 2 or 3. *Fruit* unknown. *Hook. fil. Fl. Br. Ind.* i. 60.

Mikir Hills, Assam,—*Simons.* A species collected only once in the little explored Mikir Hills. The leaves on all Simons' specimens are young, and may not have acquired their adult shape.

Plate 79. Unona præcox, *H. f. & T.* 1, Flowering branch—*of natural size;* 2, pistils agglutinated together; 3 & 4, stamens; 5 pistil; 6, section of same—*enlarged.*

Sect. II.—Dasymaschalon, Petals 3.

12. Unona longiflora, *Roxb. Fl. Ind.* ii. 668. A glabrous shrub or small tree, the leaf-buds silky; young branches slender. *Leaves* membranous, narrowly oblong or oblong-lanceolate, more or less acuminate, the base rounded or slightly cuneate; upper

surface shining, the lower glaucous; main nerves 12 to 16 pairs, oblique, rather prominent beneath; length 6·5 to 11 in., breadth 1·75 to 3·25 in.; petiole ·4 in. *Flowers* solitary, pedunculate, axillary, pendulous, 3·5 to 6 in. long; the peduncles minutely bracteolate and jointed near the base, slender, from 1·25 to 8 in. long, still longer in fruit. *Sepals* very small, broadly triangular, spreading, mucronate, rufous-pubescent externally. *Petals* linear-lanceolate, much acuminate, cohering by their margins; the base slightly expanded, no constriction between the limb and claw, adpressed-sericeous when young, but afterwards glabrous, yellowish; the inner row absent. *Stamens* with the connective produced and truncate at the apex. *Ovaries* 10 to 20, sessile, hairy; ovules few; stigmas large, recurved. *Ripe carpels* about 10, stalked, moniliform, 3- to 4-jointed; all the joints, except the lowest, often falling off; individual joints elongated-ovoid, ·5 in. long, glabrous. *Seeds* with thin smooth testa; the albumen intersected by numerous horizontal fibrous processes. *Wall. Cat.* 6419; *Hook. fil. & Th. Fl. Ind.* 134; *Hook. fil. Fl. Br. Ind.* i. 61; *Kurz For. Fl. Burm.* i. 35; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 46.

Perak; in forests under 3,000 feet. E. Himalaya; Assam; Khasia Hills; Chittagong.

Most of the specimens which I have seen from Assam, the Khasia Hills, and Chittagong have flower-pedicels under 2 inches long, and petals quite 6 inches long. Specimens from Perak, on the other hand, have shorter flowers (3 to 4 in. long) and much longer (5 or 6 in.) and more slender peduncles; otherwise the two sets agree. In many of the flowers from both sets of localities there are only two petals.

PLATE 80. Unona longiflora, *Roxb.* 1, Flowering branch; 2, ripe fruit—*of natural size;* 3, anther; 4 & 5, ovaries; 6 & 7, sections of seed—*enlarged.*

13. UNONA DASYMASCHALA, *Blume Fl. Jav. Anon.* 55, *t.* 27. An erect or sarmentose shrub; young branches sometimes glabrous from the beginning, but usually at first softly rufous-pubescent and sometimes permanently so. *Leaves* thinly coriaceous, elliptic-oblong, oblong, or oblong-lanceolate or oblanceolate, acute or shortly acuminate, the base rounded or narrowed; upper surface glabrous; the lower sub-glaucous, glabrous, or sometimes puberulous on the midrib and nerves; length 4·5 to 8·5 in., breadth 1·5 to 3 in., petiole about ·1 in. *Flowers* pedunculate, solitary, axillary, pendulous, 1·5 to 3 in. long; peduncles 1·25 to 1·75 in. (longer in fruit), minutely bracteolate at the very base. *Sepals* fleshy, very short, broadly triangular, pubescent, reflexed. *Petals* fleshy, varying from ovate-acute to lanceolate-acuminate, concave and (in the narrower forms) expanded at the base, with a constriction between the claw and limb; the edges united when young, adpressed-puberulous, but ultimately glabrous. *Anthers* with the connective expanded at the apex and oblique. *Ovaries* densely villous; the stigma narrow, glabrous. *Ripe carpels* numerous, shortly stalked, moniliform, pubescent to glabrous; the joints oval, about ·35 in. long. *Seeds* oval, smooth; the albumen with fibrous processes. *A. DC. Mem. Anon.* 28; *Wall. Cat.* 6421; *Hook fil. & Thoms. Fl. Ind.* 135; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 42; *Kurz For. Fl. Burm.* i. 36; *Hook. fil. Fl. Br. Ind.* i. 61; *Scheff. Obs. Phyt. Anon.* 6; *Nat. Tijdsch. Ned. Ind.* xxxi. 6; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 47.

From Burmah to Singapore; the Andaman Islands. Distrib.—Sumatra, Java.

VAR. Blumei, *Hook. fil.* Branches glabrous; leaves pale-yellowish or grey beneath, glabrous or nearly so. *Wall. Cat.* 6420 *B.* (*U. discolor.*)

Var. Wallichii, *Hook. fil.* Branches brown-tomentose; lower surfaces of leaves glaucous and tinged with purple.

This species, in the absence of the inner row of petals and in other respects, resembles *M. longiflora*, Roxb.; but the outer petals are neither so long nor so narrow, and there appear always to be three of them, and not often only two as in *M. longiflora*. The peduncles are, moreover, shorter. The two species, however, are closely allied. In open, exposed situations this is a non-scandent bush; but under the shade of trees it often developes into a climber,—a habit which it shares with many species of this family. Blume's figure of this plant (quoted above) is inaccurate as respects the flowers and fruit.

Plate 81. Unona Dasymaschala, *Blume*. 1, Flowering branch; 2, 3, & 4, flowers of different forms from other specimens; 5, ripe fruit; 6, flower from which the petals have been removed; 7, section of the same—*of natural size;* 8 & 9, stamens; 10, pistil; 11 & 12, sections of ovary—*enlarged*.

Sect. III.—Stenopetalon. Petals 6; ripe carpels baccate, not constricted.

14. Unona Wrayi, *Hemsl. in Hook. Ic. Plant., t.* 1553. A tree; young branches slender, tawny-tomentose. *Leaves* thickly membranous, elliptic-oblong, shortly acuminate, often obtuse (from the breaking off of the acumen), slightly narrowed to the rounded base; upper surface glabrous except the puberulous midrib; lower much reticulate, puberulous, the midrib pubescent; main nerves 8 to 10 pairs, rather prominent beneath, spreading, and forming two sets of intra-marginal arches; length 5·5 to 7·5 in., breadth 2 to 2·65 in.; petiole ·2 in., tomentose. *Flowers* 3 to 3·5 in. long, solitary, or in fascicles from tubercles on the larger branches; pedicels ·75 to ·9 in., slender. *Sepals* ovate-lanceolate, sub-acute, about ·3 in. long, puberulous. *Petals* white, changing to deep claret, sub-equal, rather coriaceous, linear-lanceolate, acuminate, about 3 in. long, sparsely puberulous outside; breadth about ·3 in. *Ovaries* numerous, pubescent, with about 4 ovules. *Ripe carpels* red when ripe, stalked, slightly pulpy, ovoid or oblong, obtuse, glabrous, 1 to 1·25 in. long; stalks ·5 to ·75 in. long. *Seeds* about 3, oval, compressed, rugulose, aromatic, ·6 in. long. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 47.

Singapore,—*Maingay* (*Kew Distrib.*) No. 51. Perak,—*Wray* (No. 560), *King's Collector*. Distrib.—Java.

Plate 82. Unona Wrayi, *Hemsl.* 1, Flowering branch; 2, flower opened up; 3, ripe carpels; 4, vertical section of carpel; 5, seed—*of natural size;* 6, andro-gynœcium; 7 & 8, anthers; 9 & 10, pistils—*enlarged*. (*Nos.* 6 *to* 10 *are copied from Hook. Ic. Plant., t.* 1553.)

15. Unona desmantha, *H. f. & Th. in Hook. fil. Fl. Br. Ind.* i. 61. A small tree; youngest branches with soft yellowish-brown pubescence; the older with smooth, shining, yellowish-brown bark. *Leaves* coriaceous, elliptic-oblong, or elliptic-lanceolate or oblanceolate, shortly and acutely or obtusely acuminate, the base acute; upper surface glabrous except the pubescent midrib; under-surface paler, puberulous especially on the midrib and nerves; main nerves 8 to 11 pairs, rather prominent beneath when dry, oblique. *Flowers* 2·5 in. in diam., pale red, densely crowded on 1 to 2 in. broad

flat tubercles on the older branches; peduncles ·75 in., puberulous, ebracteolate. *Sepals* ovate, acute, ·3 in. long. *Petals* unequal, linear-oblong, tapering to the apex; the base not dilated, sparsely pubescent, 1 to 1·5 in. long; the inner rather narrower. *Torus* and *ovaries* as in *U. pycnantha*, but ovules 3 to 5, superposed. *Ripe carpels* stalked, globose, dark-coloured, glabrous, nearly 1 in. in diam.; stalk 1 to 1·5 in. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 48.

Malacca,—*Maingay* (*Kew Distrib.*) No. 48. Perak,—*King's Collector* Nos. 3113 and 7617. Pangkore,—*Curtis*. Distrib.—Borneo,—*Hullett*.

Plate 83. Unona desmantha, *H. f. & Th.* 1, Leaf-twig; 2, stem with inflorescence; 3, flower dissected; 4, ripe carpels—*of natural size;* 5, anthers—*enlarged*.

16. Unona crinita, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 61. A tree? young branches slender; their bark pale, rugose; the youngest densely rufous-tomentose. *Leaves* membranous, oblong, elliptic-oblong or oblanceolate-oblong, acute or acuminate, the base rounded; upper surface quite glabrous; the lower pubescent, especially on the nerves and veins; the midrib tomentose on both surfaces; main nerves 10 to 12 pairs, slender, but slightly prominent beneath; length 3 to 8 in., breadth 1·25 to 2·5 in.; petiole ·15 in., tomentose. *Flowers* 3 to 5 in. long, pedicellate, in dense crowded fascicles from very broad (1 to 2 in. in diam.) tubercles on the larger branches; pedicels ·15 to ·25 in. long, rusty-tomentose; bracteole linear, or absent. *Sepals* ovate-lanceolate, much acuminate, spreading, ·5 in. to ·75 in. long. *Petals* sub-equal in length, narrowly linear, unequal in breadth, ·15 in. broad at the base and at the middle, narrower between and from the middle upwards; 1-nerved; finely pubescent; the inner slightly shorter and narrower. *Torus* columnar, truncate. *Ovaries* strigose; ovules 3 to 5, 1-seriate; stigma punctiform. *Ripe carpels* globose, densely rufous-velvety, shortly stalked. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 48.

Malacca,—*Maingay* (*Kew Distrib.*) No. 41.

Plate 84. Unona crinita, *H. f. & Th.* 1, Branch with inflorescence; 2, calyx—*of natural size;* 3 & 4, anthers; 5 & 6, pistils—*enlarged*.

17. Unona stenopetala, *Hook. fil. & Thoms. Fl. Ind.* 136. A tree 20 to 35 feet high; young branches softly rufous-tomentose; the older dark-coloured, glabrous, striate. *Leaves* thinly coriaceous, oblong-obovate or oblanceolate, more or less acuminate, narrowed below to the slightly cordate and oblique base; both surfaces glabrous, the midrib more or less pubescent on the lower; under-surface faintly reticulate when dry; main nerves 7 to 9 pairs, curving upwards, anastomosing doubly at some distance from the edge, thin, but slightly prominent; length 4 to 7 in., breadth 1·25 to 3 in.; petiole ·1 to ·25 in., rufous-tomentose. *Flowers* 1·5 to 2 in. long, almost sessile or shortly pedicelled, in fascicles of 2 to 4 on minutely bracteate, extra-axillary tubercles from both branches and stem. *Sepals* united at the base, lanceolate, acuminate, the bases broad, ribbed, spreading, pubescent externally, ·4 to ·5 in. long. *Petals* sub-equal, narrowly linear, concave, slightly wider at the base, keeled, sparsely pubescent, 1·25 to 3 in. long. *Stamens* numerous, short, with board flat apices hiding the lateral anthers. *Ovaries* 4 to 7, villous, 4- or 5-ovuled. *Ripe carpels* few, sub-globular or bluntly ovate, softly tomentose at first, ultimately sub-glabrous, the pericarp thick, ·5

to ·65 in. long and ·5 in. in diam. *Seeds* 1 to 3, thickly discoid, bi-concave with grooved edge, rugulose. *Hook. fil. & Th. Fl. Br. Ind.* i. 60; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 43; *Kurz For. Fl. Burm.* i. 35; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 49.

Singapore,—*Lobb*, *Ridley*. Perak,—*King's Collector*, *Scortechini;* common. ? Burmah (in Tenasserim),—*Lobb*.

This is a rare plant in Burmah, if indeed it occurs there at all. The leaves of some of the Perak specimens have petioles ·5 in. long, but usually they are as above described.

Plate 85. Unona stenopetala, *H. f. & Th.* 1, Flowering branch; 2, twig with flowers and fruit; 3, fascicle of flowers; 4, single flower (from another specimen); 5, andro-gynœcium and sepals—*of natural size;* 6 & 7, anthers; 8 & 9, pistils—*enlarged.*

12. Polyalthia, *Blume.*

Trees or shrubs with the habit of *Unona*. *Sepals* 3, valvate or sub-imbricate. *Petals* 6, 2-seriate, ovate or elongated, flat, or the inner slightly vaulted. *Torus* convex. *Stamens* cuneate; anther-cells extrorse, remote. *Ovaries* indefinite; style usually oblong; ovules 1-2, basal and erect, or sub-basal and ascending. *Ripe carpels* 1-seeded, berried. Distrib.—Tropical Asiatic species about 45; African species 3; Australasian species 2.

Sect. I.—Monoon. Ovule solitary, usually basal, erect.

Flowers from the axils of the leaves or of fallen leaves, not from the trunk.

Flowers solitary.

Leaves under 5 in. in length (7 in. in *P. Sumatrana*), more or less lanceolate.

Leaves not glaucous underneath; petals ovate, acute.

Bark of branches hypertrophied . . . . . 1. *P. suberosa.*

Bark of branches not hypertrophied.

Nerves of leaves 8 or 9 pairs, none of the petals sub-orbicular.

Leaves thinly coriaceous, quite glabrous . . 2. *P. dumosa.*

Leaves membranous, pubescent, at least when young . . . . . 3. *P. cerasoides.*

Nerves of leaves 10 or 12 pairs; inner petals sub-orbicular . . . . . 4. *P. persicæfolia.*

Leaves very glaucous beneath; petals linear-oblong, obtuse.

Ripe carpels smooth . . . . . 5. *P. hypoleuca.*

Ripe carpels vertically ridged . . . . . 6. *P. sumatrana.*

Leaves over 5 in. in length (see also No. 7), not glaucous.

Flowers axillary.

Petals more or less narrowly lanceolate.

Leaves ovate-lanceolate, glabrous; ripe carpels oblong, blunt at each end . . . . . 7. *P. andamanica.*

Leaves oblong or oblong-lanceolate, glabrous; ripe carpels tapering to each end . . . . . 8. *P. coffeoides.*
Petals oblong-elliptic, slightly obovate, 1·3 to 2·5 in. long . 9. *P. macrantha.*
Flowers terminal; petals ovate-elliptic, 1 to 1·25 in. long . . . 10. *P. pulchra.*

Flowers solitary or in pairs; ripe carpels little more than ·25 in. long.

Flowers ·4 in. in diam.; petals broadly oblong-ovate, obtuse . . . 11. *P. Kunstleri.*
Petals 1·5 to 2 in. long, lanceolate-oblong; leaves narrowly lanceolate-oblong or elliptic-oblong . . . . . 12. *P. Scortechinii.*
Petals ·85 to 1·5 in. long, broadly lanceolate or oblanceolate; leaves oblong-lanceolate to ovate-elliptic . . . . . 13. *P. Jenkinsii.*
Flowers in pairs; petals obovate-oblong, 1 in. long; carpels ovoid, ·65 in. long . . . . . 14. *P. Hookeriana.*
Flowers solitary or in fascicles of 2 or 3 from the branches below the leaves; petals 2 in. long, ovate-lanceolate; carpels ovoid-globose, 1 in. long . . . . . 15. *P. acuminata.*

Flowers never solitary, but always in fascicles or cymes, axillary or from the branches below the leaves.

Leaves narrowly lanceolate, the edges undulate . . . . . 16. *P. longifolia.*

Leaves elliptic to ovate-oblong, the edges not undulate.

Petals narrowly linear . . . . . 17. *P. fragrans.*
Petals linear sub-acute . . . . . 18. *P. simiarum.*

Flowers in fascicles from the young branches below the leaves or from the larger branches; never axillary.

Leaves 8 to 15 in. long with 12 to 16 pairs of prominent, oblique, or spreading nerves . . . . . 19. *P. lateriflora.*
Leaves 6 to 8 in. long, with 10 to 12 pairs of slender spreading nerves . . . . . 20. *P. sclerophylla.*

Flowers in fascicles from tubercles on the main stem, often near its base, never axillary and probably never from the branches.

Inflorescence ærial.

Leaves under 8 in. in length.

Leaves oblong-lanceolate; nerves 8 or 9 pairs; torus of ripe fruit 1·25 in. in diam.; stalks of ripe carpels ·75 in. long . 21. *P. macropoda.*
Leaves oblong; nerves 7 pairs; torus of ripe fruit ·5 in. in diam.; stalks of ripe carpels 1·5 in. long . . . . . 22. *P. clavigera.*
Leaves elliptic to oblong, slightly oblique . . . . . 23. *P. glomerata.*
Leaves 9 to 16 in. long, oblong-elliptic . . . . . 24. *P. congregata.*
Inflorescence sub-hypogœal . . . . . 25. *P. hypogœa.*

Sect. II.—Eupolyalthia. Ovules 2 (3 in *P. korinti*), superposed.

Flowers solitary.

Leaves under 5 in. in length, not cordate at the base.

Leaves oblong-lanceolate.

Petals oblong . . . . . 26. *P. obliqua.*

Petals broadly ovate or ovate-orbicular.

Leaves glaucous; stalks of carpels ·7 to ·8 in. . . . 27. *P. aberrans.*
Leaves not glaucous; stalks of carpels under ·2 in. . . 28. *P. Moonii.*

Leaves elliptic-oblong to ovate; ovules often 3 . . . . . 29. *P. korinti.*

Leaves upwards of 5 in. long, cordate at the base.

Petals narrowly linear . . . . . 30. *P. bullata.*

Petals oblong.

Flowers 1 in. in diam. . . . . 31. *P. subcordata.*
Flowers 1·25 to 1·75 in. in diam. . . . . 32. *P. oblonga.*

Flowers in fascicles from the older branches.

Petals linear-oblong, 1 to 1·5 in. long; ripe carpels ·35 in. long; their stalks ·6 to ·75 in. long . . . . . 33. *P. Beccarii.*
Petals linear-oblong, 2 to 3 in. long; ripe carpels ·75 to 1 in. long, sub-sessile . . . . . 34. *P. cinnamonea.*
Petals oblong-lanceolate or oblanceolate, ·9 to 1·5 in. long; carpels 1·75 in. long; their stalks ·25 in. long . . . . . 35. *P. pachyphylla.*
Petals linear, obtuse, ·5 to ·75 in. long . . . . . 36. *P. pycnantha.*

* * * *

Of doubtful position . . . . . 37. *P. rufescens.*; 38. *P. nitida.*; 39. *P. bifaria.*; 40. *P. membranacea.*; 41. *P. cauliflora.*

1. Polyalthia suberosa, *Benth. & Hook. fil. Gen. Pl.* i. 25. A shrub or very small tree; the branches when very young rufous-tomentose, when slightly older lenticellate, when old very corky and rugged. *Leaves* membranous, oblong, obtuse, slightly narrowed to the slightly oblique base, glabrous and shining above, pubescent beneath; main nerves about 6 pairs, spreading, faint; length 1·75 to 5 in., breadth ·9 to 1·75 in.; petiole ·05 in. *Flowers* on slender pedicels, usually solitary, extra-axillary, ·4 in. in diam.; pedicels ·5 to 1 in. long, rufous-puberulous, with a minute bract near the base. *Sepals* less than half the size of the petals, spreading, pubescent. *Petals* oval, reddish-brown, silky outside, the outer shorter. *Carpels* stalked, sub-sphærical, silky when young, glabrous when old, ·25 in. in diam.; stalks ·25 in. long. *Seed* roundish, smooth. *Hook. fil. Fl. Br. Ind.* i. 65; *Thwaites' Enum.* 398; *Kurz For. Fl. Burm.* i. 38; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 45; *Beddome Ic. Pl. Ind. Or., t.* 56.—Uvaria suberosa, *Roxb. Cor. Pl.* i. *t.* 34; *Fl. Ind.* ii. 667.—Guatteria suberosa, *Dunal Anon.* 128; *DC. Prodr.* i. 93; *Thwaites' Enum.* 10; *Wall. Cat.* 6437; *W. & A. Prodr.* 10; *H. f. & T. Fl. Ind.* 140.

Bengal, Burmah, Southern Peninsular India and Ceylon. Distrib.—China (prov. Hainan).

Plate 77B. Polyalthia suberosa, *Benth. & Hook. fil.* 1, Flowering branch; 2 to 4, fruit at various stages of ripeness—*of natural size;* 5, flower—*enlarged;* 6, torus with an anther and stamen; 7, section of a seed—*much enlarged.*

2. Polyalthia dumosa, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 52. A shrub; young branches slender, glabrous. *Leaves* thinly coriaceous, lanceolate or oblong-lanceolate,

acuminate, the base rounded; both surfaces dull, glabrous, very minutely lepidote; main nerves 8 or 9 pairs, spreading, faint, inter-arching far from the margin; length 2·5 to 3·25 in., breadth ·5 to ·9 in.; petiole less than ·1 in. *Flowers* solitary, leaf-opposed, ·3 to ·35 in. long; pedicels slender, glabrous, ·3 to ·4 in. long with a small lanceolate bracteole about the middle. *Sepals* thick, spreading, broadly ovate, acute or acuminate, ·1 in. long, glabrescent outside, quite glabrous inside. *Petals* leathery, sub-equal, narrowly oblong, acuminate, not widened at the base, sub-corrugated and glabrous outside, puberulous inside, ·3 in. long. *Stamens* numerous, short; the apical process very broad, rhomboid, truncate, projecting much over the apices of the short dorsal anther-cells. *Ovaries* very few, oblong, pubescent; stigma broad, sessile, hairy. *Ripe carpels* one or two, ovoid-globose, glabrous, cherry-red when ripe, ·25 to ·3 in. long.

Perak; elevat. about 1,200 feet,—*Wray, Scortechini.*

Near *P. suberosa*, H. f. & Th., but with different venation, fewer carpels, and without hypertrophied bark.

PLATE 86A. Polyalthia dumosa, *King.* 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower dissected; 4, anthers; 5, pistils—*enlarged.*

3. POLYALTHIA CERASOIDES, *Benth. & Hook. fil. Gen. Pl.* i. 25. A shrub or small tree; young branches minutely rufous-tomentose, the older glabrous with pale, lenticellate bark. *Leaves* membranous, oblong-lanceolate or lanceolate, acute or acuminate, the base rounded or sub-acute; upper surface shining, glabrous, except the pubescent midrib; lower pubescent, becoming glabrescent when old; main nerves 8 or 9 pairs, ascending, slender, slightly prominent beneath, the intermediate nerves nearly as prominent; length 3 to 7 in., breadth 1 to 1·75 in.; petiole ·1 to ·25 in., tomentose. *Flowers* ·6 to ·8 in. in diam., pedicelled, axillary, solitary, or 2 or 3 together from short woody tubercles; pedicels rather stout, tomentose, ·6 to 1 in. long, with one or two large ovate or obovate concave bracts. *Sepals* membranous, ovate-lanceolate, adpressed-hairy outside, glabrous inside, reflexed, not much shorter than the petals. *Petals* spreading, incurved, dirty green, very coriaceous, oblong to ovate-oblong, sub-acute, puberulous, ·4 in. long. *Carpels* numerous, stalked, broadly ovoid, apiculate, glabrous, ·35 in. long; stalks slender, granular, ·75 to 1 in. long. *Seed* pale, dull, dense. *Bedd. Fl. Sylv. t.* 1; *Brandis For. Flora* 5; *Kurz For. Fl. Burm.* i. 38; *Hook. fil. Fl. Br. Ind.* i. 63.—Unona cerasoides, *H. Bn. Pierre Fl. Forest Coch.-Chine, t.* 26.—Uvaria cerasoides, *Roxb. Corom. Pl.* i. *t.* 33; *Fl. Ind.* ii. 666.—Guatteria cerasoides, *Dun. Mem. Anon.* 127; *DC. Prodr.* i. 93; *Wall. Cat.* 6436; *H. f. & T. Fl. Ind.* 139; *Dalz. & Gibs. Bomb. Fl.* 3; *W. & A. Prodr.* 10.

On dry hills from Bihar southward to Tinnivelly; in Burmah, on the Prome and Shan Hills.

PLATE 86B. Polyalthia cerasoides, *Benth. & Hook. fil.* 1, Flowering and fruiting branch; 2 & 3, sections of ripe fruit—*of natural size;* 4, flower; 5, torus with a stamen and a pistil—*enlarged;* 6, section of pistil—*much enlarged.*

4. POLYALTHIA PERSICÆFOLIA, *Benth. & H. f. Gen. Pl.* i. 25. A shrub; young branches slender, pubescent, lenticellate. *Leaves* thinly coriaceous, shortly petiolate,

lanceolate, acuminate, narrowed to the minutely cordate, slightly unequal, base; upper surface glabrous, shining, the lower pale and puberulous; main nerves 10 to 12 pairs, slender, sub-horizontal; length 2·5 to 5 in., breadth ·8 to 1·5 in.; petiole ·1 to ·15 in. *Flowers* pedicellate, solitary, extra-axillary, ·25 in. in diam.; pedicels woody, pubescent, ebracteate, ·3 to ·4 in. long. *Sepals* ovate, acute, sub-strigose, much smaller than the petals. *Petals* coriaceous; the outer lanceolate, acute; the inner larger, sub-acute, sub-orbicular, adpressed-pubescent, ·2 to ·25 in. long. *Fruit* about 1 in. in diam.; the individual carpels 4 to 6 in number, globose, sub-glabrous, granular, shortly stalked, ·2 in. in diam. *Hook. fil. Fl. Br. Ind.* i. 66; *Thwaites' Enum.* 399; *Beddome Ic. Pl. Ind. Or. t.* 55.—Guatteria persicæfolia, *H. f. & T. Fl. Ind.* 140; *Thwaites' Enum.* 10.

Ceylon, near Galle,—*Champion*; at Colombo,—*Fergusson*.

PLATE 87A. Polyalthia persicæfolia, *Benth. & H. f.* 1, Flowering branch; 2, fruiting branch—*of natural size*; 3, flower; 4, sepal; 5, inner petal; 6 & 7, anthers; 8, pistil; 9, section of same—*enlarged*.

5. POLYALTHIA HYPOLEUCA, *Hook. fil. & Thoms. in Fl. Br. Ind.* i. 63. A tree 50 to 80 feet high; young branches slender, rather pale, striate; all parts glabrous except the flowers. *Leaves* coriaceous, oblong-lanceolate or elliptic-lanceolate, shortly acuminate, the base acute, the edges slightly recurved when dry; upper surface shining, the lower dull, pale; main nerves many pairs, invisible on either surface except in some occasional leaves when dry; length 2·5 to 5 in., breadth ·75 to 1·75 in.; petiole ·2 to ·3 in. *Flowers* sub-erect, small (only ·3 to ·4 in. long), pedicelled, solitary or sub-fascicled, mostly from the axils of fallen leaves; pedicel stout, about ·15 in. long, tomentose and with about two cucullate bracts near the base. *Sepals* very small, triangular, pubescent, deciduous. *Petals* linear-oblong, obtuse, not dilated at the base, grey-pubescent on both surfaces. *Ripe carpels* few, often solitary, stalked, elliptic-oblong, obtuse, glabrous, ·8 in. long; stalks ·1 to ·25 in. *Seed* ovoid-elliptic, blunt, dark-coloured, transversely striate. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 52.

This approaches *Guatteria sumatrana*, Miq., in its leaves; but that species has much larger flowers. But this is still more allied to *Guatteria hypoglauca*, Miq., from which it differs by its much larger fruit. The plant named *P. hypoleuca* by Kurz in his *Forest Flora of Burmah* is, as he himself informed Sir Joseph Hooker in a letter, really *P. sumatrana*. Neither species, however, appears to me to occur either in the Andamans or Burmah.

PLATE 88. Polyalthia hypoleuca, *Hook. fil. & Thoms.* 1, Branch with ripe fruits; 2, twig with flowers; 3, seed; 4, section of seed—*of natural size*; 5, flower dissected; 6, anthers; 7, pistils—*enlarged*.

6. POLYALTHIA SUMATRANA, *King* (*not of Kurz*) *in Journ. As. Soc. Bengal* 61, *pt.* 2, 53. A tree 30 to 60 feet high; young branches pale, the older much furrowed; all parts glabrous except the flowers. *Leaves* coriaceous, oblong-lanceolate, acuminate, the base acute; upper surface shining, the lower dull, glaucous, both

pale (when dry); main nerves 15 to 20 pairs, very slender and little more prominent than the secondary; length 4·5 to 6·5 in., breadth 1·25 to 1·75 in.; petiole ·25 in. *Flowers* 1·4 to 1·75 in. long, solitary or in fascicles of 2 or 3 from the younger branches below the leaves, or axillary; their pedicels ·6 to ·9 in. long, minutely bracteolate near the base, glabrous. *Sepals* very small, half-orbicular-ovate. *Petals* narrowly linear-oblong, sub-acute or obtuse, puberulous, pale green to yellowish; the outer slightly longer than the inner, 1·35 to 1·75 in. long and ·15 to ·2 in. broad. *Ovaries* glabrous, sub-cylindric, with a single ovule; stigma hairy. *Carpels* ovoid, tapering to each end, ridged (when dry), pubescent or glabrous, about 1 in. long and ·6 in. in diam.; their stalks ·5 to ·6 in. long. Guatteria sumatrana, *Miq. Fl. Ind. Bat. Suppl.* 380.—Monoon sumatranum, *Miq. Ann. Mus. Lugd. Bat.* ii. 19.

Perak; at elevations up to 2,500 feet, common. Distrib.—Sumatra,—*Korthals, Beccari* P. S. No. 613. Borneo, *Korthals, Beccari* Nos. 630 and 1168.

This is allied to *P. hypoleuca*, H. f. & T.; but has larger leaves, much larger flowers, and slightly different carpels.

PLATE 89. Polyalthia sumatrana, *King*. 1, Flowering branch; 2, young flowers from another specimen; 3, young carpels; 4, ripe carpel; 5, flower dissected—*of natural size;* 6, anthers; 7, pistils—*enlarged.*

7. POLYALTHIA ANDAMANICA, *Kurz Andam. Report* (1870), *p.* 29. A shrub; young branches slender, tomentose. *Leaves* membranous, ovate-lanceolate, acute; the base broad and rounded, slightly unequal; some of the larger nerves underneath and the midrib on both surfaces pubescent near the base, otherwise glabrous and shining; main nerves 6 or 7 pairs, distant, spreading and forming bold arches far from the margin; reticulations minute, distinct; length 4·5 to 6 in., breadth 2 to 2·4 in.; petiole ·2 in., pubescent. *Flowers* axillary or extra-axillary, solitary, 2 in. in diam.; the pedicel ·4 to ·75 in. long, sub-pubescent, minutely bracteolate. *Sepals* minute (·1 in. long), broadly triangular, pubescent. *Petals* thinly coriaceous, sub-equal, oblong, blunt, 1 in. long. *Ripe carpels* 6 to 8, oblong, smooth, glabrous, slightly apiculate, ·5 or ·6 in. long and ·15 to ·2 in. in diam.; their stalks nearly as long. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 53.—P. Jenkinsii, *Benth. & Hook. fil. in Hook. fil. Fl. Br. Ind.* i. 64 (*in part*); *Kurz For. Fl. Burm.* i. 38.

S. Andaman,—*Kurz, Man, King's Collector.*

Allied to *P. Jenkinsii*, H. f. & T.; but with much smaller flowers, and leaves with broader bases.

PLATE 90. Polyalthia andamanica, *Kurz*. 1, Fruiting branch; 2, flower seen from above; 3, flower from below—*of natural size;* 4 andro-gynœcium; 5, anthers; 6, pistils—*enlarged.*

8. POLYALTHIA COFFEOIDES, *Benth. & Hook. fil. Gen. Pl.* i. 25; *Hook. fil. Fl. Br. Ind.* i. 62. A spreading tree; young branches glabrous; the older lenticellate and corky. *Leaves* membranous, slightly pellucid-dotted, oblong or oblong-lanceolate, acute or shortly acuminate, the edges shortly undulate; the base slightly narrowed, rounded; both surfaces glabrous; the upper shining, the lower dull, paler; main nerves 12 to 16 pairs, oblique,

prominent beneath; length 5·5 to 7·5 in., breadth 1·5 to 2·25 in.; petiole ·25 in. *Flowers* solitary, greenish-yellow, from the young branches below the leaves, or sometimes from tubercles on the trunk; length from ·75 to 1·25 in.; the pedicels about ·5 in. *Sepals* very small, sub-orbicular. *Petals* oblong-lanceolate, acute, glabrous. *Carpels* stalked, ovoid, slightly mammillate; the base tapering, purple and glabrous when ripe, ·75 to 1·15 in. long; stalks ·25 to ·5 in. *Seed* broadly ovoid, grooved. *Thwaites' Enum.* 399; *Beddome Ic. Pl. Ind. Or., t.* 53.—Guatteria coffeoides, *Thwaites' Enum.* 10; *Hook. fil. & Th. Fl. Ind.* 141.

Ceylon, and in the Annamaly Hills and the Wynaad in Peninsular India.

PLATE 91. Polyalthia coffeoides, *Benth. & Hook. fil.* 1, Flowering branch; 2, ripe fruit; 3, seed; 4, section of seed—*of natural size;* 5, andro-gynœcium; 6, the same in section; 7, auther; 8, ovary; 9, section of ovary—*enlarged.* (*All copied from a drawing made in the Herbarium of the Royal Garden, Peradeniya, Ceylon, and kindly lent by Dr. H. Trimen,* F.R.S.)

9. POLYALTHIA MACRANTHA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 54. A tree 20 to 70 feet high; young branches rather slender, glabrous. *Leaves* large, thinly coriaceous, oblong to elliptic-oblong, acute, slightly narrowed below the middle to the rounded or minutely cordate base; upper surface shining, glabrous, except the depressed slightly puberulous midrib; lower surface paler when dry, glabrous, very minutely lepidote; main nerves 20 to 24 pairs, spreading, thin but prominent beneath; length 12 to 18 in., breadth 4·5 to 7·5 in.; petiole ·4 in., stout. *Flowers* solitary, axillary or slightly supra-axillary, 2·5 to 4·5 in. in diam.; pedicels 1·5 to 2 in. long (longer in fruit), glabrescent, with a sub-orbicular bracteole about the middle; the buds conical when young. *Sepals* thick, sub-orbicular, spreading, connate by their edges and forming a cup ·75 in. in diam., puberulous on both surfaces, corrugated outside. *Petals* much larger than the sepals, white, thick, fleshy, flattish, oblong-elliptic, widest above the middle, blunt, puberulous on both surfaces except at the glabrescent bases, nerved inside; the outer row 1·3 to 2·9 in. long, the inner smaller. *Stamens* numerous, compressed; apical process of connective truncate. *Ovaries* few, oblong, puberulous; stigmas large, capitate-truncate, pubescent. *Ripe carpels* elliptic-ovoid, sometimes oblique, blunt at each end; the apex mucronate, glabrous, 1 to 1·25 in. long and ·75 in. in diam. *Seed* ovoid, solitary; the testa corrugated.

Perak,—*King's Collector, Scortechini.*

A remarkable species, with handsome white flowers, allied in many ways to *P. congregata;* but at once distinguished from that by its axillary solitary flowers and glabrous ripe carpels.

PLATE 93. Polyalthia macrantha, *King.* 1, Flowering branch; 2, young flower-bud; 3, advanced flower-bed; 4, calyx of mature flower seen from below; 5, andro-gynœcium; 6, ripe carpel—*of natural size;* 7, anthers; 8, pistils—*enlarged.*

10. POLYALTHIA PULCHRA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 55. A small tree, glabrous except the inflorescence. *Leaves* thinly coriaceous, elliptic to oblong-lanceolate or oblong-oblanceolate, acute or acuminate, the base acute; both surfaces minutely muriculate; the lower paler and dull; length 4·5 to 6 in., breadth 2·5 in. (only 1·75 in;

in var. *angustifolia*); petiole ·25 in. *Flowers* large, solitary, terminal, 2 in. or more in diam. when expanded (often 3·5 in. in diam. in var. *angustifolia*); pedicels 1·4 to 1·75 in. long, puberulous, with a lanceolate foliaceous bracteole at the base. *Sepals* ovate, acute or sub-acute, nerved, glabrous, ·6 to ·75 in. long. *Petals* coriaceous, sub-equal, ovate-elliptic, sub-acute; the base slightly cordate (narrowly oblong-lanceolate in var. *angustifolia*), greenish-yellow, with a triangular blotch of dark purple at the base. *Stamens* numerous; apical process of connective broad, truncate, sub-orbicular, projecting over the apex of the linear anther-cells, pubescent. *Ovaries* oblong, adpressed-pubescent, 1-ovuled; style short, cylindric, thick, crowned by the convex, terminal, pubescent stigma. *Ripe carpels* numerous, elliptic-ovoid, blunt, slightly contracted at the base, sparsely pubescent, but becoming almost glabrous, purple when ripe; pericarp sub-succulent; stalks thick, crimson when ripe, 1·5 in. long. *Seed* solitary, elliptic.

Perak: at Weld's Rest,—*Scortechinii.*

VAR. angustifolia, *Leaves* oblong-lanceolate or oblong-oblanceolate, scarcely muriculate; petals lanceolate or narrowly oblong-lanceolate, often 1·75 in. long; sepals often ·75 in. long.

Perak: on Gunong Bubu; elevat. 5,000 feet,—*Wray.*

PLATE 94. Polyalthia pulchra, *King*. 1, Flowering branch; 2, flower opened up; 3, flower dissected—*of natural size;* 4, anthers; 5, pistils—*enlarged.*

11. POLYALTHIA KUNSTLERI, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 55. A shrub or small tree; young branches puberulous, speedily glabrous. *Leaves* oblong-lanceolate, rarely elliptic-lanceolate, shortly and rather bluntly acuminate, the base narrowed and sub-acute or rounded; upper surface glabrous, shining; the lower paler, dull, puberulous on the midrib and nerves; main nerves 6 to 12 pairs, rather prominent beneath, ascending, inter-arching ·1 to ·2 in. from the margin; length 4·5 to 8 in., breadth 1·5 to 2·35 in.; petiole ·2 in., pubescent. *Flowers* ·4 in. in diam., axillary or extra-axillary, solitary or in pairs; peduncles ·25 in. long, each with two rather large, unequal, broadly ovate bracts above the base. *Sepals* broadly triangular-ovate, obtuse, nearly as long as the petals, and, like them, minutely tomentose. *Petals* sub-equal, broadly oblong-ovate, obtuse. *Ovule* solitary. *Fruit* 2 in. in diam.; individual carpels numerous, ovoid-globular, apiculate, ·3 in. long; stalks slender, ·5 in. long, adpressed rufous-pubescent like the carpels. Ellipeia parviflora, *Scortechini* MSS.

Perak,—*King's Collector, Scortechini, Wray.*

This much resembles *P. Jenkinsii* and *P. andamanica* in its leaves and fruit; but its flowers are totally different.

PLATE 87B. Polyalthia Kunstleri, *King*. 1, Flowering branch; 2, ripe fruit; 3, section of ripe carpel—*of natural size;* 4, flower dissected; 5, flower-bud; 6 & 7, anthers—*enlarged.*

12. POLYALTHIA SCORTECHINII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 56. A small tree 15 to 20 feet high; young branches minutely rufous-tomentose, but speedily glabrous. *Leaves* thinly coriaceous, oblong or oblong-elliptic, acute or shortly acuminate, the base rounded or sub-acute; upper surface glabrous, shining, the midrib pubescent; the

lower dull, very minutely dotted; the midrib and sometimes the nerves puberulous; main nerves 8 to 11 pairs, bold and prominent on the lower surface, oblique, inter-arching close to the edge; length 4 to 8 in., breadth 1·15 to 2·25 in.; petiole ·25 in., pubescent. *Flowers* pedicelled, solitary or in pairs, from the axils of leaves or of fallen leaves; pedicels ·5 to ·75 in. long, rufous-tomentose, with a rather large bract about the middle. *Sepals* small, triangular, pubescent. *Petals* fleshy, sub-equal, greenish-yellow changing into dark dull yellow, oblong-lanceolate or oblong-oblanceolate, acute or rather blunt, the edges wavy, both surfaces minutely pubescent, 1·5 to 2 in. long. *Ovaries* narrowly elongate, adpressed-pubescent, each crowned by large fleshy glabrous stigma; ovule solitary, basal. *Fruit* shortly stalked. *Ripe cârpels* numerous, pedicelled, ovoid, crowned by the remains of the stigma, sparsely pubescent, ·3 in. long; pedicel slender, pubescent, ·75 in. long. *Seed* with pale smooth testa. P. Jenkinsii, *H. f. & T.* (*in part*).—Ellipeia undulata, *Scortechini* MSS.

Malacca,—*Griffith* No. 413; *Maingay* (*Kew Distrib.*) No. 45. Perak,—*King's Collector*, *Scortechini*. Penang,—*Curtis*. Distrib.—Sumatra,—*Beccari* Nos. 935, 976.

PLATE 95. Polyalthia Scortechinii, *King*. 1, Flowering branch; 2, flower from another specimen; 3, young carpels; 4, ripe carpels—*of natural size;* 5 & 6, flower with petals removed—*enlarged;* 7, anther; 8, section of ovary showing the single ovule—*much enlarged*.

13. POLYALTHIA JENKINSII, *Benth. & Hook. fil. Gen. Pl.* i. 25. A tree; young shoots sparsely rufous-pubescent. *Leaves* membranous, oblong-lanceolate to elliptic-ovate, acute or shortly acuminate, slightly narrowed to the acute or rounded sub-oblique base; both surfaces glabrous, minutely reticulate, the upper shining but the midrib puberulous; main nerves about 7 pairs, slender, slightly prominent beneath, inter-arching at some distance from the edge; length 4 to 7 in., breadth 1·35 to 3 in.; petiole ·2 to ·3 in. *Flowers* large (1·75 to 3 in. in diam.), pedicelled, solitary, rarely in pairs, axillary; pedicels ·6 to ·75 in. long, pubescent, and with several small rounded bracts near the base. *Sepals* very small, sub-orbicular, puberulous. *Petals* sub-coriaceous, spreading, greenish changing to yellow, broadly lanceolate or oblanceolate, sub-acute or obtuse, the base much narrowed, puberulous or glabrous. *Ripe carpels* numerous, stalked, oblong, slightly apiculate, glabrous, ·4 in. long; stalk slender, ·6 in. long. *Seeds* smooth. *Hook. fil. Fl. Br. Ind.* i. 64 (*in part*); *Kurz For. Fl. Burm.* i. 375 (*in part*); *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 56.—Guatteria Jenkinsii, *Hook. fil. & Thoms. Fl. Ind.* 141 (*in part*); *Miq. Fl. Ind. Bat.* i *pt.* 2, 46.—Guatteria Parveana, *Miq. Fl. Ind. Bat.* i. *pt.* 2, 48, *& Suppl.* 378.—Uvaria canangioides, *Reichb. fil. et Zoll.* MSS.—Monoon canangioides, *Miq. Ann. Mus. Lugd. Bat.* ii. 18.

Malacca,—*Griffith*; *Maingay* No. 46 (*and* 45 *in part*) (*Kew Distrib.*) Penang,—*Curtis* No. 2704. Perak,—*King's Collector* No. 3910. Assam and Sylhet. Distrib.—Sumatra.

Specimens from Perak have larger flowers than those from Assam; but (otherwise they agree fairly well, and both appear to be specifically identical with the Sumatra plant named *Guatteria* or *Monoon canangioides* by Miquel. The Andaman plant which Kurz originally [*Andam. Report* (1870), *p.* 29] named *Polyalthia andamanica*, but which Sir Joseph Hocker (dealing with imperfect materials) reduced (with Kurz's assent) to this species, I have restored to specific rank. Recently received specimens show its flowers to be different from those of true *P. Jenkinsii* (the petals being shorter and narrower), while the carpels are larger.

PLATE 96. Polyalthia Jenkinsii, *Benth. & Hook. fil.* 1, Flowering branch; 2, flower dissected; 3, ripe fruit—*of natural size;* 4, anthers; 5, pistils—*enlarged.*

14. POLYALTHIA HOOKERIANA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 57. A tree 20 to 70 feet high; young branches softly tawny-pubescent, ultimately glabrous and darkly cinereous. *Leaves* membranous, obovate-elliptic or oblanceolate, shortly acuminate, narrowed from above the middle to the sub-cuneate base; both surfaces reticulate, the upper glabrous except the pubescent midrib and nerves; lower glabrous, the midrib and nerves adpressed-pubescent; main nerves 10 or 11 pairs, oblique, forming imperfect arches close to the edge, prominent beneath; length 5 to 7 in., breadth 2·25 to 3·25 in.; petiole ·15 to ·2 in., tomentose. *Flowers* in pairs from peduncles with several aborted flowers near their bases, extra-axillary; pedicels ·5 to ·75 in. long, lengthening in fruit, stout, pubescent, with 1 or 2 small ovate bracteoles at the middle or below it. *Sepals* broadly ovate, concave, free, or connate only at the base, pubescent outside, glabrous within, ·2 in. long. *Petals* coriaceous, yellowish, sub-equal, ovate or obovate-oblong, sub-acute, puberulous except at the base inside, only slightly contracted at the base, nearly 1 in. long. *Stamens* numerous, very short, cuneate; the apical process of the connective thick, with a truncate orbicular top hiding the linear dorsal anthers. *Ovaries* short, oblong, puberulous, with 1 ovule; stigma sessile, large, obovate with sub-truncate lobed apex. *Ripe carpels* numerous, ovoid, slightly apiculate and somewhat narrowed at the base, ·65 in. long; stalks 1·2 in. long. *Seed* solitary, ovoid, smooth, with a vertical furrow.

Perak,—*King's Collector, Wray.*

This is a common tree in Perak. In Malacca, however, it appears to be rare; for it is so very imperfectly represented in Maingay's great Malayan collection (of which the best set is at Kew) that Sir Joseph Hooker, while recognising it as a *Polyalthia*, had not sufficient material to enable him to describe it in his *Flora of British India.*

PLATE 97. Polyalthia Hookeriana, *King.* 1, Flowering branch; 2, unripe carpels—*of natural size;* 3, anthers; 4, ovaries—*enlarged.*

15. POLYALTHIA ACUMINATA, *Thwaites' Enum. Pl. Ceyl.* 399. A tree; young branches densely tawny-tomentose. *Leaves* membranous, elliptic-ovate to elliptic-oblong, sometimes slightly obovate, shortly acuminate, the base rounded; upper surface shining, glabrous, the midrib depressed and puberulous; under-surface dull, rather darker in colour than the upper (when dry), puberulous, the midrib and 15 to 18 pairs of stout oblique nerves pubescent; length 7 to 11 in., breadth 2·75 to 4 in.; petiole ·4 in., tomentose. *Flowers* large (3 to 4 in. in diam.), greenish-yellow, pedicelled, solitary or 2 to 3 from rough woody peduncles about ·75 to 1 in. long from the branches below the leaves; pedicels from 1 to 2 in. long, tomentose and with one or more bracts. *Sepals* triangular, acute, spreading, tomentose, about ·35 in. long. *Petals* coriaceous, ovate-lanceolate, sub-acute, pubescent, veined, 2 in. long and about 1 in. broad; the inner three rather smaller than the outer. *Ripe carpels* stalked, ovoid-globose, tomentose, about 1 in. long; stalk from ·75 to 1 in. *Seed* broadly ovoid, smooth, shining, grooved. *Beddome Ic. Pl. Ind. Or., t.* 57; *Hook. fil. Fl. Br. Ind.* i. 63.

Ceylon, near Ratnapura.

A magnificent species, but very local.

PLATE 98. Polyalthia acuminata, *Thw.* 1, Branch with young leaf and flower-bud; 2, branch with flower and fruit; 3, adult leaf—*all of natural size and copied from a drawing made in the Peradeniya Herbarium and kindly lent by its Director, Dr. H. Trimen,* F.R.S.

16. POLYALTHIA LONGIFOLIA, *Benth. & Hook. fil. Gen. Pl.* i. 25. A tall tree; young branches slender, glabrous, dark-coloured when dry. *Leaves* membranous, narrowly lanceolate, taper-pointed, the edges undulate; the base broadly cuneate, rarely rounded; both surfaces glabrous, the upper shining; main nerves 20 to 35 pairs, faint, oblique; length 3·5 to 7 in., breadth ·75 to 1·5 in.; petiole ·25 to ·35 in. *Flowers* in fascicles or shortly peduncled umbels, numerous, yellowish-green, about 1 in. long; pedicels slender, 1 to 2 in. long, with one or even two minute bracts about the middle. *Sepals* triangular, spreading, hoary-pubescent, much shorter than the petals. *Petals* sub-equal, linear, spreading, pointed, with slightly expanded bases, puberulous. *Ripe carpels* numerous, stalked, ovoid, obtuse at both ends, glabrous, ·75 in. long; stalk ·5 in. long, stout, glabrous. *Seed* smooth, shining. *Hook. fil. Fl. Br. Ind.* i. 62; *Thwaites' Enum.* 398; *Bedd. Fl. Sylvat., t.* 38.—Guatteria longifolia, *Wall. Cat.* 6442; *W. & A. Prodr.* 10; *Wight Ic., t.* 1; *H. f. & T. Fl. Ind.* 139; *Thwaites' Enum.* 10; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 45.—Uvaria longifolia, *Lam.; Roxb. Fl. Ind.* ii. 664.

Indigenous in the south of British India and in the drier parts of Ceylon. Planted, especially near temples, throughout the warmer and moister parts of British India.

In the south of India known by the vernacular name of *Asoke:* in Northern India named *Debdar.*

PLATE 99. Polyalthia longifolia, *Benth. & Hook. fil.* 1, Flowering branch; 2, ripe fruit; 3 & 4, sections of ripe fruit; 5, section of ripe seed—*of natural size;* 6, flower; 7, anther; 8, pistil—*enlarged.*

17. POLYALTHIA FRAGRANS, *Benth. & Hook. fil. Gen. Pl.* i. 25. A tree; young branches densely but minutely tawny-tomentose, the older dark and lenticellate. *Leaves* membranous, elliptic or ovate, rarely oblong-lanceolate, acute or shortly acuminate, the base rounded; upper surface shining, glabrous, except the puberulous midrib; lower dull, glabrous or puberulous; main nerves 15 to 18 pairs, oblique, curving little, bold and prominent beneath; length 6 to 8 in., breadth 1·5 to 3·25 in.; petiole ·35 to ·5 in. *Flowers* in shortly pedunculate few or many-flowered cymes, from the axils of the leaves or tubercles on the branches; peduncles and branches of the cymes tomentose; pedicels from ·5 to 1 in. long with a sub-orbicular bract about the middle. *Sepals* small, orbicular. *Petals* sub-equal, narrowly linear, puberulous, 1·5 in. long and ·2 in. broad. *Carpels* stalked, ovoid, oblique, blunt, puberulous, 1 to 1·5 in. long; pericarp very brittle. *Seed* orbicular-ovoid. *Beddome Ic. Pl. Ind. Or., t.* 54; *Hook. fil. Fl. Br. Ind.* i. 63.—Guatteria fragrans, *Dalz. in Kew Journ. Bot.* iii. 206; *Hook. fil. & Th. Fl. Ind.* 142; *Dalz. & Gibs. Fl. Bomb.* 4.

Forests of the South Concan, Canara and Malabar in Peninsular India.

PLATE 100A. Polyalthia fragrans, *Benth. & Hook. fil.* 1, Flowering branch; 2, flower; 3, carpel; 4, seed; 5, transverse section of seed—*of natural size;* 6, anthers; 7, pistils—*enlarged* (*partly copied from a drawing kindly lent by Dr. Trimen,* F.R.S.)

18. Polyalthia simiarum, *Benth. & Hook. fil. Gen. Pl.* i. 25; *Hook. fil. Fl. Br. Ind.* i. 63. A tree 50 to 80 feet high; all parts glabrous except the puberulous leaf-buds, under-surface of nerves of leaves and inflorescence; young branches pale brown, striate, sparsely lenticellate. *Leaves* sub-coriaceous, ovate-oblong to oblong-lanceolate, acute or shortly acuminate, the base rounded or sub-acute; upper surface shining; lower dull, sometimes puberulous on the midrib and nerves; main nerves 12 to 16 pairs, oblique, prominent beneath; length 5 to 11 in., breadth 2 to 4·5 in.; petiole ·25 in. *Flowers* pedicelled, in few-flowered sessile fascicles from the axils of fallen leaves or from tubercles on the larger branches; pedicels minutely pubescent, with a small bract below the middle, 1 to 1·25 in. long. *Sepals* small, bluntly triangular, recurved, pubescent outside. *Petals* spreading, linear, sub-acute or acute, greenish-yellow to purplish, puberulous outside, glabrous inside, 1 to 1·25 in. long, the inner rather the longer. *Ripe carpels* stalked, ovoid-elliptic, slightly mammillate, contracted towards the base, glabrous and orange-red to bluish-black when ripe, 1·25 to 1·5 in. long; stalk from 1 to 1·75 in. *Seed* ovoid, grooved, transversely striate. *Kurz For. Fl. Burm.* i. 37; *Hook. fil. Fl. Br. Ind.* i. 63; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 58.—Guatteria simiarum, *Ham., Wall. Cat.* 6440; *Hook. fil. & Thoms. Fl. Ind.* 142.—G. fasciculata, *Wall. mss. ex Voigt Hort. Sub. Calc.* 16.—Polyalthia lateriflora, *Kurz* (*not of King*) *Journ. As. Soc. Bengal, pt.* 2 (*for* 1874), 52.—Unona simiarum, *H. Bn., Pierre Fl. Coch.-Chine, t.* 23.

Andamans,—*Bot. Garden Collectors.* Perak,—*King's Collector.* Forests at the base of the Eastern Himalaya, the Assam range, Chittagong, Burmah.

Var. *parvifolia*, King. Leaves smaller than in typical form (3·5 to 6 in. long and 1·25 to 2·25 in. broad), puberulous beneath.

Perak; at elevation of 3,000 to 4,000 feet. Distrib.—Sumatra: on Goenong Trang, Lampongs,—*Forbes* No. 1536.

Plate 101. Polyalthia simiarum, *Benth. & Hook. fil.* 1, Flowering branch; 2, ripe carpels; 3 & 4, sections of ripe carpels; 5, seed—*of natural size;* 6, flower with the petals removed; 7 & 8, anthers; 9 & 10, pistils; 11, section through ovary—*enlarged.*

19. Polyalthia lateriflora, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 58. A tree 50 to 70 feet high; young branches lenticellate and striate; all parts, except the inflorescence, quite glabrous. *Leaves* coriaceous, oblong to elliptic-oblong, abruptly acute or shortly acuminate, slightly narrowed to the rounded, rarely sub-cordate, and unequal base; upper surface shining, the lower paler, rather dull; main nerves 12 to 16 pairs, rather prominent, oblique, spreading, evanescent at the tips; length 8 to 15 in., breadth 2·5 to 7 in.; petiole ·3 in., stout. *Flowers* in fascicles from tubercles on the stem and larger branches, pedicelled, 1·25 to 2 in. long; pedicels slender, thickened upwards, pubescent, with 2 bracteoles about the middle, 1·25 to 1·75 in. long. *Sepals* coriaceous, ovate-orbicular, very short, densely and minutely tomentose outside. *Petals* coriaceous, greenish-yellow, dull crimson at the base, oblong-lanceolate, gradually tapering to the sub-acute apex; the outer rather shorter than the inner, minutely pubescent, especially on the outer surface. *Ripe carpels* ovoid-elliptic, blunt, slightly narrowed to the base, glabrous, 1·25 in. long and ·7 in. in diam.; the pericarp thin, fleshy; the stalks stout,

glabrous, sub-asperulous, 1·25 to 2 in. long. Guatteria lateriflora, *Bl. Bijdr.* 20; *Fl. Jav.*, *p.* 100, *t.* 50 *and* 52*D*; *Miq. Fl. Ind. Bat* i. *pt.* 2, 47.—Monoon lateriflorum, *Miq. Ann. Mus. Lugd. Bat.* ii. 19.

Perak; at low elevations,—*Wray*, *King's Collector*. Singapore,—*Maingay* (*Kew Distrib.*) No. 96. Distrib.—Java.

This is closely allied to *P. simiarum*, Benth. & Hook. fil., but has smaller flowers which are often borne on the smaller branches; smaller leaves; and shorter-stalked carpels. Moreover the leaves and young branches of this are invariably glabrous. The leaves of old trees are very markedly smaller than those on young specimens. Specimens in young fruit of a plant which may belong to this species have been recently received from the Andamans from the Collectors of the Bot. Garden, Calcutta; but until the receipt of fuller material, I hesitate to include these islands in the geographical area of the species.

PLATE 102. Polyalthia lateriflora, *King*. 1, Leaf-twig; 2, fascicle of flowers; 3, larger flower from another specimen; 4, unripe carpels; 5, ripe carpels—*of natural size;* 6, anthers; 7, pistils—*enlarged*.

20. POLYALTHIA SCLEROPHYLLA, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 65. A glabrous tree; young branches pale. *Leaves* coriaceous, oblong, ovate or linear-oblong, acute or obtusely acuminate; the base broadly cuneate, shining on both surfaces and with the reticulations distinct; main nerves about 10 to 12 pairs, spreading, slender; length 6 to 8 in., breadth 1·5 to 2·6 in.; petiole ·5 in. *Flowers* pedunculate, in fascicles from small tubercles on the trunk, 2 in. in diam., greenish; tubercles ·5 to 1 in. in diam.; peduncles 1 to 1·5 in. long, stout, rusty-pubescent, becoming glabrous; bracts small, orbicular, from about the middle of the peduncle. *Sepals* ovate, obtuse, short. *Petals* linear-oblong, obtuse; the base slightly concave, puberulous on both surfaces, 1·6 in. long; the inner rather smaller. *Torus* broad, flat, the edge raised. *Ovaries* pilose, shorter than the cylindric style. *Ripe carpels* elliptic-oblong, slightly narrowed at either end, 1 to 1·5 in. long, glabrous; the pericarp thin; stalks 1 to 1·5 in. long. *Seed* oblong; the testa shining, pale. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 59.

Malacca,—*Maingay* (*Kew Distrib.*) No. 101.

I have seen only Maingay's Malacca specimens of this plant.

PLATE 103. Polyalthia sclerophylla, *Hook. fil. & Thoms.* 1, Leaf-twig; 2, stem with flower-tubercles; 3, flowers; 4, ripe carpels; 5, seed; 6, section of seed—*of natural size;* 7, calyx and andro-gynœcium; 8, petal; 9 & 10, stamens, front and back view; 11, pistil; 12, section of ovary—*enlarged*.

21. POLYALTHIA MACROPODA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 60. A tree 50 to 60 feet high; young branches rather pale, pubescent but speedily glabrous. *Leaves* membranous, oblong-lanceolate, shortly acuminate, the base acute; the edge slightly revolute; upper surface shining, glabrous, except the puberulous sulcate midrib; the lower paler when dry, minutely lepidote, sparsely strigose on the midrib and 8 or 9 pairs of curving, rather prominent nerves; length 3·5 to 5·5 in., breadth 1·4 to 2·1 in.; petiole ·25 in. *Flowers* nearly 1 in. long, in fascicles on short, broad, rugose, woody tubercles from the stem close to its base; pedicels about 1 in. long, woody in fruit

and 2 in. or more in length, glabrous; bracteoles (if any) deciduous. *Sepals* broadly ovate, acute, spreading, corrugated and glabrescent outside, glabrous inside, connate at the base to form a cup ·65 in. in diam. *Petals* elliptic, blunt, slightly constricted about the middle, sub-equal, puberulous, coriaceous. *Stamens* numerous, compressed, especially the outer rows; apical process of connective transversely elongated, truncate. *Ovaries* numerous, oblong-ovoid. *Ripe fruit* with large woody sub-globular torus 1·25 in. in diam. *Ripe carpels* numerous, oblong-ovoid, tapering to the apex; the base gradually narrowed into a stalk, 2·5 to 3·5 in. long (including the stalk); pericarp rather fleshy, glabrous. *Seed* solitary, elongated-ovoid, grooved vertically.

Perak,—*King's Collector*. Singapore,—*Ridley*.

A species remarkable for the large size of its ripe carpels borne on the stem near the ground. It is possible that Mr. Ridley's plant, collected in Singapore, may really belong to a distinct species, the only specimen of it which I have seen being very imperfect. This comes very near *P. clavigera*, King.

Plate 104. Polyalthia macropoda, *King*. 1, Leafy branch; 2, inflorescence from base of stem; 3, young carpels; 4, ripe carpels—*of natural size*.

22. Polyalthia clavigera, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 60. A tree 30 to 40 feet high; young branches slender, at first puberulous but speedily glabrous and pale. *Leaves* thinly coriaceous, oblong, tapering to each end, acuminate; both surfaces reticulate; the upper shining, glabrous, except the puberulous sulcate midrib; lower surface slightly puberulous at first, but ultimately quite glabrous; main nerves 7 pairs, ascending, curved, not inter-arching, slightly prominent beneath, obsolete above; length 5·5 to 8·5 in., breadth 1·75 to 2·5 in.; petiole ·4 in., slightly winged above. *Flowers* unknown. Peduncle of ripe fruit stout, woody, 2 in. or more in length; the torus depressed-globular, woody, about ·5 in. in diam. *Ripe carpels* ovoid-elliptic, tapering to each end, the base gradually passing into the stout, puberulous, slightly scabrid stalk, greenish-yellow when dry, glabrous; the pericarp succulent; length 2·25 in., breadth nearly 1 in.; stalk 1·5 in., puberulous. *Seed* solitary, ovoid.

Penang: Pinara Bukit, elevat. 2,000 feet,—*Curtis* (No. 2444); Perak: Waterfall Hill,—*Wray*. Distrib.—E. Sumatra,—*Forbes* (No. 1638).

This species is known only by a few fruiting specimens collected by Messrs. Curtis and Wray, Junior. It is nearly allied to *P. macropoda*, King; but its leaves have different venation and texture, the torus of the ripe fruit is smaller, while the carpels themselves are larger and have longer stalks.

Plate 105. Polyalthia clavigera, *King*. 1, Leaf-twig; 2, ripe fruit; 3, section of ripe carpel showing the solitary seed—*of natural size*.

23. Polyalthia glomerata, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 61. A tree 40 to 50 feet high; young branches glabrous, pale, rather slender. *Leaves* membranous, elliptic to oblong, slightly oblique, acute or shortly acuminate, the base slightly cuneate or rounded; both surfaces reticulate, glabrous; the midrib alone puberulous on the upper, adpressed-puberulous on the lower; main nerves 7 to 8 pairs, curved, ascending, not inter-arching, thin but slightly prominent beneath; length 4 to 6 in., breadth

1·8 to 2·6 in.; petiole ·25 to ·35 in. *Flowers* about 1 in. long, in clusters of 20 to 30 from nodulated puberulous tubercles on the stem; pedicels long (1·5 to 2·5 in.), slender, puberulous, with an ovate-lanceolate bracteole about the middle. *Sepals* thick, lanceolate-acuminate with broad connate bases, sub-erect, puberulous. *Petals* coriaceous, sub-erect, linear-oblong, slightly concave and glabrous at the base inside, otherwise minutely tomentose; the inner slightly smaller than the outer. *Stamens* numerous; the connective with an orbicular, sub-convex, apical expansion concealing the linear dorsal anther-cells. *Ovaries* much less numerous than the stamens, oblong, hirsute, apparently 1-ovuled; the stigma small, oblong, slightly pubescent.

Perak,—*King's Collector, Wray.*

Distrib.—Sumatra,—*Forbes* (No. 2804).

In all the flowers I have examined the pistils are very small (as if undeveloped), and I have not been able to find more than one ovule. In the Sumatran specimens the flowers are much longer than in those from Perak.

PLATE 106. Polyalthia glomerata, *King*. 1, Leaf-twig; 2, fascicle of flowers on a stem tubercle; 3, flower from a Sumatran specimen—*of natural size;* 4, flower dissected; 5, anthers; 6, pistils—*enlarged*.

24. POLYALTHIA CONGREGATA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 61. A tree 40 to 60 feet high; young branches at first rusty-puberulous but speedily glabrous and dark-coloured. *Leaves* thinly coriaceous, oblong elliptic, acute, slightly narrowed to the rounded or minutely cordate base; upper surface glabrous except the depressed puberulous midrib; the lower pale when dry, glabrous, minutely lepidote; main nerves 13 to 19 pairs, oblique, curving, thin but prominent beneath; length 9 to 16 in., breadth 3·75 to 7 in.; petiole ·3 or ·4 in., stout. *Flowers* large, in short, much divided, rough, tubercular, woody cymes from the stem near its base; the pedicels 1·25 to 1·75 in. long, glabrescent; bracteole single, sub-orbicular, clasping, infra-median. *Sepals* thick, broadly ovate-triangular, spreading, slightly cuneate at the base, concave, corrugated and puberulous outside, glabrous inside, often reflexed, ·5 in long. *Petals* thick, white, ovate-elliptic, sub-acute, hoary-puberulous, except at the base inside on both surfaces: the outer row 1·5 to 3 in. long and ·65 to 1 in. broad, the inner row narrower. *Stamens* numerous, compressed; the apical process of the connective truncate, oblique, granular; anther-cells linear, dorsal. *Ovaries* 20 to 30, oblong, strigose, with a single basilar ovule; stigma oblong, pubescent. *Ripe carpels* elliptic, beaked, 1 in. or more long, hoary-pubescent, narrowed at the base into the short, thick stalk. *Seed* solitary, pale brown, shining, elliptic.

Perak,—*Scortechini, King's Collector.*

This resembles *P. macrantha*, King; but is distinguished from that by its cymose, cauline inflorescence, smaller flowers and puberulous fruit. Mr. H. O. Forbes collected in the Lampongs in Eastern Sumatra a plant (No. 1642 of his Herb.) which greatly resembles this.

PLATE 107. Polyalthia congregata, *King*. 1, Leaf; 2, inflorescence from the stem; 3, flower-bud; 4, outer petal; 5, inner petal; 6, calyx and andro-gynœcium—*of natural size;* 7 & 8, anthers from an outer row; 9 & 10, anthers from inner row; 11, pistil—*enlarged*.

25. POLYALTHIA HYPOGÆA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 62. A tree 25 to 30 feet high; young branches rather stout, densely but minutely rufous-tomentose, ultimately rather pale, striate. *Leaves* large, thinly coriaceous, oblong, or elliptic-oblong, sometimes slightly obovate, gradually narrowed to the rounded base; both surfaces glabrous when adult; the lower puberulous when young, the veins transverse and (like the reticulations) distinct; main nerves 18 to 22 pairs, oblique, inter-arching within the edge, thin, prominent on the lower and depressed on the upper surface when dry; length 10 to 20 in., breadth 3 to 7 in.; petiole ·4 in., stout, tomentose. *Flowering branches* from the stem near its base, 1 to 8 feet long, flexuose, rufous-pubescent like the lanceolate bracteoles. *Flowers* ·75 to 1 in. long, cream-coloured; pedicels ·75 to 1·5 in. long, usually with one lanceolate tomentose bracteole near the middle, and a second, sub-orbicular and acuminate, close to the flower. *Sepals* broadly triangular-ovate, acute, spreading, tomentose outside, glabrous inside, ·25 in. long. *Petals* coriaceous, the inner row rather smaller than the outer, narrowly oblong, sub acute, pubescent outside except the glabrescent base and edges, inside almost glabrous. *Stamens* numerous, short, compressed; apical process of connective broad, slightly convex, slightly oblique, sub-granular, deeply ridged in front, the anther-cells linear, dorsal. *Ovaries* few, oblong, villous, 1-ovuled; stigma large, ovoid, granular, sessile. *Immature carpels* narrowly ovoid, sub-compressed, the apex beaked, the base slightly contracted, minutely tomentose. *Seed* solitary, elongated, ovoid, smooth.

Perak; near Laroot,—*King's Collector*. Gunong Batu Puteh; elev. 3,400 feet,—*Wray*.

A species remarkable for its hypogæal inflorescence. The flowering branches, which vary from 1 to 8 feet in length, originate from the stem near its base, pass into the soil underneath the surface of which they run for some distance, and bear on their emerging tips the flowers and fruit.

PLATE 108. Polyalthia hypogœa, *King*. 1, Branch with rather small leaves; 2, flowering branch; 3, branch with immature fruits; 4, section of immature fruit showing the solitary seed; 5, flower dissected—*of natural size*; 6, anthers; 7, pistils—*enlarged*.

26. POLYALTHIA OBLIQUA, *Hook. fil. & Thoms. Fl. Ind.* 138. A tree; young branches minutely pubescent, lenticellate. *Leaves* sub-sessile, oblong-lanceolate, acute or shortly acuminate; the base cuneate, minutely and obliquely cordate, shining and glabrous on both surfaces, the lower pale; main nerves 7 or 8 pairs, slender, curving and forming bold arches ·15 in. from the margin; length 4 to 6·5 in., breadth 1·5 to 2·2 in.; petiole ·1 in., very stout. *Flowers* ·4 to 4·5 in. in diam., solitary, pedicellate, extra-axillary; each pedicel rising from a short, conical, woody tubercle, curving, ·25 in. long. *Sepals* coriaceous, broadly triangular, blunt, less than half as long as the petals, pubescent. *Petals* coriaceous, sub-equal, oblong, obtuse, sericeous outside. *Ripe carpels* pisiform, with stalks ·5 in. long, dark brown. *Hook. fil. Fl. Br. Ind.* i. 67; *Miq. Fl. Ind. Bat.* i, *pt.* 2, 44; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 63.

Malacca,—*Griffith*, *Maingay* No. 44 (*Kew Distrib.*) Chittagong Hill Tracts,—*Lister*. Distrib.—Sumatra.

Lister's plant from the Chittagong Hill Tracts agrees well with Griffith's specimens from Malacca.

PLATE 100B. Polyalthia obliqua, *H. f. & Th.* 1, Flowering branch—*of natural size;* 2, flower; 3, side view of a flower from which the petals have been removed; 4 & 5, anthers—*enlarged.*

27. POLYALTHIA ABERRANS, *Maing. ex Hook. fil. Fl. Br. Ind.* i. 67. A large climber, glabrous except the flowers and fruit; young branches slender, black. *Leaves* membranous, oblong-lanceolate, acuminate, the base slightly cuneate; both surfaces reticulate, glabrous, the lower glaucous; main nerves 14 to 18 pairs, very faint, the secondary nerves quite as well marked; length 3·5 to 5 in., breadth 1·4 to 1·8 in.; petiole ·2 to ·25 in. *Flowers* ·5 to ·75 in. in diam., solitary, axillary; pedicels slender, 1·25 in. long (longer in fruit), with one minute bracteole below the middle and another at the base. *Sepals* ovate-orbicular, sub-acute, quite connate into a 3-angled glabrous cup ·25 in. in diam. *Petals* leathery, ovate-orbicular, sub-acute, spreading, concave; the outer row ·35 in. long and ·3 in. broad, yellowish-pubescent on both surfaces except a glabrous patch near the base on the inner; inner petals half the size of the outer but more concave, hoary-puberulous outside, glabrescent inside. *Stamens* numerous; apical process of connective broad, discoid, depressed in the centre, quite concealing the long, linear, lateral anther-cells. *Ovaries* narrowly oblong, glabrous, 1 or 2-ovuled; style as long as the ovary, curved; stigma small. *Ripe carpels* ovoid, slightly apiculate, puberulous or glabrescent, ·35 in. long and ·3 in. in diam.; stalks ·7 to ·8 in., slender, glabrous. *Seeds* solitary, rarely 2, ovoid, shining, smooth. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 63.—Melodorum glaucum, *Scortechini* MSS.

In some carpels there are two seeds, such carpels being about twice as long as those with a single seed. Although referred by the late lamented Father Scortechini to the genus *Melodorum*, this is an undoubted *Polyalthia* in its stamens, in its 1- rarely 2-ovuled ovaries, and in its carpels with usually solitary, ovoid seeds. In externals, save and except the much smaller size of the flowers, this much resembles the plant figured by Pierre under the name of *Unona Mesnyi* (Flore Forest. Coch.-Chine, t. 17), to which indeed Pierre reduces *P. aberrans.*

PLATE 109A. Polyalthia aberrans, *Maing.* 1, Branch with flowers and young fruit; 2, flower dissected; 3, ripe carpels; 4, seeds—*of natural size;* 5, vertical section of a seed; 6, anthers; 7, pistil—*enlarged.*

28. POLYALTHIA MOONII, *Thwaites' Enum. Pl. Ceyl.* 9. A shrub 8 to 10 feet high; young branches slender, lenticellate, slightly pubescent. *Leaves* sub-sessile, oblong-lanceolate, acuminate, narrowed to the minutely cordate, slightly unequal base; upper surface glabrous, lower puberulous; main nerves about 10 pairs, sub-horizontal, faint, forming wide arches far from the margin; length 4 to 6 in., breadth ·9 to 1·9 in.; petiole ·5 to 1 in. *Flowers* axillary or leaf-opposed, solitary, pedicellate, red, ·4 in. in diam.; pedicels slender, 1·25 to 1·5 in. long. *Sepals* spreading, semi-orbicular, acuminate, pubescent outside. *Petals:* the outer 3 broadly ovate-acuminate, their edges minutely ciliate; the 3 inner larger, concave, very blunt. *Ovaries* hairy; the style clavate. *Fruit* ·5 to ·6 in. in diam.; individual carpels ·25 to ·4 in. long, globose or oblong, shortly stalked, glabrous, reddish, 1- or 2-seeded. *Bedd. Ic. Pl. Ind. Or., t.* 83; *Hook. fil. Fl. Br. Ind.* i. 66.

Ceylon: at Caltura and Reigam Corle,—*Thwaites.*

PLATE 109B. Polyalthia Moonii, *Thwaites*. 1, Branch with flower and fruit; 2, ripe seed—*of natural size;* 3 & 4, flower-bud and flower seen from above and from below; 5 & 6, andro-gynœcium; 7, outer petal (*apex downwards*); 8, inner petal; 9, anther; 10, pistil; 11, section of ovary; 12, section of ripe seed—*enlarged in various degrees.* (*Nos.* 3 *to* 11 *are copied from a drawing executed in the Herbarium of the Royal Garden, Peradeniya, and kindly lent by the Director, Dr. H. Trimen,* F.R.S.)

29. POLYALTHIA KORINTI, *Benth. & Hook. fil. Gen. Pl.* i. 25. A spreading shrub; young branches slender, pubescent. *Leaves* thinly coriaceous, elliptic-oblong to ovate, acute or acuminate, the base rounded or acute; both surfaces glabrous, boldly reticulate; main nerves 6 to 8 pairs, slender, sub-horizontal, inter-arching doubly within the margin; the midrib sometimes pubescent beneath; length 2·5 to 5 in, breadth 1 to 2 in.; petiole ·15 to ·25 in. *Flowers* pedicelled, green, solitary, axillary, or extra-axillary, ·6 to ·75 in. in diam.; pedicels slender, ·6 to ·8 in. long, strigose, with 1 to 3 minute bracts. *Sepals* about a fourth of the length of the petals, ovate, sub-acute, adpressed-pubescent. *Petals* coriaceous; the outer oblong, the inner ovate-oblong and rather longer than the outer; all obtuse, sparsely pubescent. *Carpels* numerous, shortly stalked, ovoid-globose, blunt, grooved, glabrous, red when ripe, ·35 in. long. *Seed* smooth, shining. *Hook. fil. Fl. Br. Ind.* i. 64.—Guatteria corinti, *H. f. & T. Fl. Ind.* 141; *Thwaites' Enum.* 398.—Guatteria Korinti, *Dunal Anon.* 134; *DC. Prodr.* i. 94; *W. & A. Prodr.* 10; *Wight Ic., t.* 398; *Thwaites' Enum.* 10; *H. f. & T. Fl. Ind.* 141.—G. acutiflora, *Wall. Cat.* 6438 (*excl. D.*)

The Eastern Ghats of Western Peninsular India and Ceylon; ascending to 1,500 feet.

PLATE 110A. Polyalthia korinti, *Benth. & Hook. fil.* 1, Flowering branch; 2, leaf from another specimen; 3, ripe fruit; 4, back of flower—*of natural size;* 5, andro-gynœcium; 6, anthers; 7, ovaries—*enlarged.*

Concerning the two obscure species of *Polyalthia* named *Guatteria sempervirens* and *acutifolia* by Dunal, Sir J. D. Hooker and Dr. Thomson remark as follows (*Fl. Indica* 141):—

"*G. sempervirens*, Dunal, and *G. acutiflora*, Dunal, founded entirely on Rheede's figures (*Hort. Mal.*, v. t. 16, 18), appear to us to differ in no character of importance from t. 14 of the same volume, which is considered to represent *G. corinti*, Dun. The shape of the petals varies from acute to obtuse, and the flowers vary a good deal in size. *G. sempervirens* is said by Rheede to be common in Malabar, and *G. acutiflora* to grow in mountainous places; and it is not likely that no trace of these species (if distinct) should be found in Dr. Wight's extensive collections. There can at least be no doubt that *G. acutiflora*, which is the only one of the three figured in flower, is only the flowering state of one of the other two."

30. POLYALTHIA BULLATA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 64. A shrub 6 to 8 feet high; young branches densely covered with long, soft, spreading golden hairs. *Leaves* thinly coriaceous, bullate (at least when dry), narrowly oblong, acuminate, narrowed but slightly to the deeply cordate auricled base; both surfaces boldly reticulate; the upper shining, glabrous, except the sulcate puberulous midrib; the lower glabrescent, except the midrib and nerves which have sparse hairs like those on the young branches; main nerves 25 to 40 pairs, spreading

towards the base, sub-ascending towards the apex, forming a double series of arches within the margin, bold and prominent on the lower, depressed on the upper, surface; secondary nerves and reticulations prominent; length 12 to 14 in., breadth 2·75 to 3·35 in.; petiole ·25 in., pubescent like the young branches. *Flowers* solitary, terminal or axillary, 1 in. long; pedicels slender, 1 in. long, pubescent; bracteole small, mesial. *Sepals* small, lanceolate, spreading, free, sparsely pubescent outside, glabrescent inside, about ·25 in. long. *Petals* narrowly linear, slightly wider at the base, sub-equal, sub-concave, sparsely pubescent. *Stamens* numerous; the apical process of the connective sub-convex, orbicular, slightly granular. *Ovaries* much fewer than the stamens, oblong, pubescent; the stigma sub-capitate-truncate, puberulous. *Ripe carpels* globular-ovoid, blunt at each end, puberulous, ·4 in. long; stalks slender, ·2 in. long. *Seeds* 2, plano-convex; the testa rugose, pale; the albumen horny.

Singapore,—*Ridley*. Perak,—*King's Collector*.

Evidently a rare shrub; readily recognisable by its elongate, very bullate leaves.

PLATE 111. Polyalthia bullata, *King*. 1, Fruiting branch; 2, flower from another specimen; 3 & 4, seeds—*of natural size*.

31. POLYALTHIA SUB-CORDATA, *Blume Fl. Jav. Anon.* 71, *t.* 33 *&* 36*B*. A shrub or small tree; young branches sparsely hispid-pubescent, afterwards glabrous and furrowed, not pale. *Leaves* membranous, sub-sessile, oblanceolate-oblong or elliptic-oblong, shortly and obtusely caudate-acuminate; the base slightly narrowed, sub-cordate, auriculate at one side; both surfaces glabrous except the sometimes puberulous midrib; main nerves 9 to 12 pairs, slender; the reticulations lax and faint; length 4·5 to 9 in., breadth 1·6 to 3 in.; petiole ·05 in., pubescent. *Flowers* about 1 in. in diam., solitary, axillary or extra-axillary; peduncles slender, ·5 to ·75 in. long, puberulous and with 1 or 2 lanceolate bracteoles. *Sepals* ovate, sub-acute, united into a cup. *Petals* coriaceous, yellowish, oblong, sub-acute; the inner rather smaller, slightly pubescent outside. *Ripe carpels* numerous, broadly ovoid, not apiculate, furrowed, glabrous, ·4 in. long; stalks slender, ·25 in. long; pericarp thin. *Miq. Fl. Ind. Bat.* i. *pt.* 2, 44; *Ann. Mus. Lugd. Bat.* ii. 14; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 64.—Unona sub-cordata, *Bl. Bijdr.* 15.

Perak; elevation about 800 feet,—*King's Collector* No. 2373. Distrib.—Java.

PLATE 112. Polyalthia sub-cordata, *Blume*. 1, Flowering branch; 2, ripe carpels—*of natural size;* 3 & 4, anthers; 5 & 6, pistils; 7, section of ovary with style and stigma—*enlarged*.

32. POLYALTHIA OBLONGA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 65. A shrub or small tree 10 to 15 feet high; young branches at first rufous-tomentose, afterwards glabrous, pale and furrowed. *Leaves* thinly coriaceous, sub-sessile, oblong or oblong-oblanceolate, abruptly and shortly acuminate, narrowed to the minutely cordate unequal base; upper surface glabrous, except the pubescent midrib; lower puberulous, the midrib prominent as are the 14 to 20 pairs of little curving, sub-ascending, main nerves; reticulations open and distinct; length 9 to 14 in., breadth 3·5 to 5 in.; petiole ·15 in., tomentose. *Flowers* 1·25 to 1·75 in. in diam., solitary, axillary or extra-axillary, from small tubercles; pedicels 1·25 to 2·5 in. long, puberulous and with 2 lanceolate bracteoles

near the base. *Sepals* semi-orbicular, acute, very short, united into a cup, pubescent outside. *Petals* coriaceous, yellow, sub-equal, oblong, tapering to the sub-acute apex, minutely adpressed-pubescent on both surfaces, but especially on the outer; length ·75 to 1·15 in. *Ripe carpels* 10 to 20, ovoid to orbicular, apiculate. ·3 to ·35 in. long, pubescent or sub-glabrous; stalks slender, ·6 to ·75 in. long. *Seeds* usually solitary and ovoid, or sometimes two and plano-convex. Guatteria multinervis, *Wall. Cat.* 6445.

Perak: very common at elevations of from 1,000 to 2,500 feet. Penang,—*Curtis* No. 1409. Distrib.—Borneo,—*Beccari* No. 1621.

This plant closely resembles *Guatteria* (=*Polyalthia*) *elliptica*, Blume; but its leaves have more numerous nerves and its carpels are stalked, those of *P. elliptica* (according both to Blume's description and figure) being sessile and of larger size.

PLATE 113. Polyalthia oblonga, *King*. 1, Branch with young and mature flowers; 2, smaller flower from another specimen; 3, young carpels; 4, ripe carpel; 5, plano-convex seed from a two-seeded carpel; 6, ovoid seed from a single-seeded carpel—*of natural size*; 8 & 9, anthers; 10 & 11, pistils; 12, stigma—*enlarged*.

33. POLYALTHIA BECCARII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 65. A tree 15 to 40 feet high; young branches slender, rufous-tomentose; the older coarsely striate and lenticellate. *Leaves* thickly membranous, narrowly oblong or oblong-lanceolate, acuminate, slightly narrowed to the rounded base; both surfaces shining and reticulate; the midrib pubescent on the upper, tomentose on the lower; main nerves 6 or 7 pairs, slender, spreading, forming bold arches far from the edge; the secondary nerves distinct; length 3 to 4·5 in., breadth ·75 to 1·35 in.; petiole ·1 in., tomentose. *Flowers* 1 in. long, in fascicles from bracteolate tubercles on the older branches; their pedicels slender, pubescent, minutely bracteolate near the base, about 1 in. long. *Sepals* ovate-obtuse, ·15 in. long, pubescent outside. *Petals* coriaceous, dark yellow, sub-equal, linear-oblong, sub-acute, 1 in. to 1·5 in. long and from ·1 to ·2 in. broad, minutely pubescent, especially outside. *Ovaries* pubescent, 2-ovuled. *Ripe carpels* numerous, broadly ovoid, apiculate, glabrous, sub-granular when ripe, ·35 in. long; their stalks granular, puberulous ·6 to ·75 in. long.

Perak: at low elevations,—*Scortechini*, *King's Collector*, *Wray*. Distrib.—Sumatra,—*Beccari P. S.* No. 401. Borneo,—*Motley* No. 743, *Beccari* No. 668.

The leaves of this species, although smaller, have much the same venation as those of *P. Teysmannii*, King. The carpels of this are, however, very much smaller than those of *P. Teysmannii*.

PLATE 110B. Polyalthia Beccarii, *King*. 1, Leaf-twig; 2, a flower from a stem-fascicle; 3, flower with petals removed; 4 & 5, petals; 6, ripe carpels—*of natural size*; 7, anther; 8, ovary; 9, section of ovary—*enlarged*.

34. POLYALTHIA CINNAMOMEA, *Hook. fil & Thoms. Fl. Ind.* 138; *Hook. fil. Fl. Br. Ind.* i. 65. A tree 50 to 70 feet high; young branches rusty-tomentose. *Leaves* thinly coriaceous, narrowly oblong to oblanceolate, tapering to each end, acute or shortly acuminate, the base rounded; upper surface glabrous, shining; the lower sparsely lucid-pubescent (glabrescent when old), the midrib tomentose; main nerves about 12 or 14 pairs, slender, curved, ascending, inter-arching freely; length 4·5 to 7·5 in.,

breadth 1·25 to 2·25 in.; petiole ·2 in., tomentose. *Flowers* sub-sessile, solitary, or in pairs from short woody tubercles from the young branches below the leaves, dull red, 2 to 2·25 in. long; peduncles very short, rusty-tomentose, bracteolate at the base. *Sepals* spreading, sub-orbicular, ·25 in. long, tomentose. *Petals* sub-equal, thick, linear-oblong, sub-acute, slightly narrowed at the base, adpressed-pubescent externally, glabrous within, 2 to 3 in. long. *Anthers* numerous, short, compressed; connective with broad, flat, apical, truncate process. *Pistils* oblong, pubescent; stigma large, sub-truncate. *Torus* convex, tomentose. *Fruit* globose, 2·5 in. in diam.; the individual carpels pyriform with very short stalks, ·75 to 1 in. long and ·5 to ·75 in. in diam., densely rusty-tomentose; pericarp thick. *Seeds* 2, plano-convex, with scaly testa. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 66; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 44.—Guatteria cinnamomea, *Wall. Cat.* 6144.—Unona cauliflora, *H. f. & Th. Fl. Ind.* 137; *Fl. Br. Ind.* ii. 60; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 43.

Singapore,—*Wallich, Ridley.* Penang,—*Wallich, Curtis* No. 2470. Malacca,—*Maingay* (*Kew Distrib.*) No. 37.

Apparently not a common species. Maingay's specimens from Malacca have rather larger and smoother leaves than those from Singapore and Penang.

Plate 114. Polyalthia cinnamomea, *H. f. & Th.* 1, Flowering branch; 2, fruit nearly ripe; 3, individual ripe carpel; 4, outer surface of a young petal; 5, sepals and andro-gynœcium—*of natural size;* 6, anthers; 7, pistils—*enlarged.*

35. Polyalthia pachyphylla, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 66. A tree 50 to 100 feet high; young branches softly pubescent, afterwards glabrous and furrowed. *Leaves* rigidly coriaceous, elliptic-oblong, sub-acute; the edge slightly recurved, the base broad and rounded, or narrowed and sub-acute; both surfaces glabrous; the lower slightly paler, the midrib tomentose at the base beneath; main nerves 11 or 12 pairs, spreading, prominent, evanescent at the tips; length 4·5 to 7·5 in., breadth 1·75 to 3·5 in.; petiole ·35 to ·5 in., tomentose when young. *Flowers* about 1·5 in. long, in few-flowered fascicles from small tubercles on the older branches; their pedicels 2 in. long, bracteolate about the middle, softly tawny-tomentose. *Sepals* broadly half-orbicular, very short, reflexed, tomentose. *Petals* coriaceous, nerved, pale green, oblong-lanceolate or oblanceolate, sub-acute or obtuse, pubescent on the outer, tomentose on the inner, surface; the outer slightly shorter and narrower than the inner, from ·9 to 1·5 in. long and ·3 to ·5 in. broad. *Stamens* numerous, compressed; the apical process of the connective truncate; anthers linear, dorsal. *Ovaries* numerous, glabrous, vertically striate; stigma sessile, truncate, puberulous. *Ripe carpels* numerous, crowded when young, densely covered with minute pale tomentum; when ripe narrowly obovoid, blunt, narrowed to a short stalk, sub-tomentose, 1·75 in. long and about 1 in. in diam.; pericarp thick, fleshy. *Seeds* 2, plano-convex.

In its leaves this resembles *Guatteria pondok*, Miq. (*Fl. Ind. Bat. Suppl.* 380), but that species has carpels with stalks from 2 to 3 in. long.

Perak; at elevation under 1,000 feet—*King's Collector* Nos. 6655 and 7516.

Plate 115. Polyalthia pachyphylla, *King.* 1, Leafy branch; 2, fascicle of flowers from the stem; 3, single flower from another specimen; 4, ripe carpels—*of natural size;* 5, andro-gynœcium; 6, anthers; 7, pistils—*enlarged.*

36. Polyalthia pycnantha, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 67. A tree? Young branches rather stout, covered with soft yellowish pubescence. *Leaves* coriaceous, elliptic-oblong or oblong-lanceolate, obtusely acuminate, the base obtuse or rounded; upper surface glabrous; lower paler and puberulous on the midrib; main nerves arching, prominent; length 6 to 9 in., breadth 2·5 to 3·5 in.; petiole ·2 in., pubescent. *Flowers* ·5 to ·75 in. in diam., in fascicles from tubercles on the larger branches, 1 to 5 in. in diam.; flower-peduncles ·25 in. long, pubescent, with 1 or 2 minute bracteoles at their bases. *Sepals* ovate, acute, ·2 in. long. *Petals* linear, obtuse, flat, sub-equal; the bases of the inner three concave, ·5 to ·75 in. long, pale sericeous outside, glabrescent inside. *Torus* columnar, flat-topped, glabrous; ovules 2, superposed. Unona pycnantha, *Hook. fil. in Fl. Br. Ind.* i. 60.

Malacca.—*Maingay* (*Kew Distrib.*), No. 48.

Plate 116 bis. Polyalthia pycnantha, *King*. 1, Leaf-twig; 2, fascicle of flowers from a stem-tubercle—*of natural size;* 3, flower; 4, inner sepal; 5, andro-gynœcium; 6 & 7, stamens; 8, pistil; 9, section of pistil—*enlarged.*

Species dubiæ.

37. Polyalthia rufescens, *H. f. & T. Fl. Br. Ind.* i. 66. A tree; young branches densely tomentose. *Leaves* membranous, sub-sessile, narrowly oblong, acute or acuminate, the base obliquely cordate; both surfaces glabrous, except the midrib beneath; the upper shining, the lower pale; length 3 to 7 in., breadth 1 to 1·75 in.; petiole very short, glabrous. *Flowers* solitary, ·5 to ·65 in. in diam., brown-tomentose, pedicellate, axillary or leaf-opposed; pedicels stout, ·5 to 1 in. long, tomentose, jointed and minutely bracteolate at the base. *Sepals* small, broadly ovate, acute. *Petals* thick, oblong or ovate-oblong, sub-acute, ·25 in. long, the outer twice as large as the inner. *Ovaries* densely silky.

Indian Peninsula, in Cochin,—*Wight.*

The above description is copied from Hooker (*l. c.*)

Plate 116 tris. Polyalthia rufescens, *Hook. fil. & Thoms.* 1, Flowering branch—*of natural size;* 2, flower; 3, andro-gynœcium; 4 & 5, stamens; 6, pistil; 7, section of pistil—*enlarged.*

38. Polyalthia nitida, *Benth. & H. f. Gen. Pl.* i. 25; *Hook. fil. Fl. Br. Ind.* i. 64. This species is founded on the specimens issued by Wallich as No. 6439 of his Catalogue under the name of *Guatteria nitida*, DC. The Wallichian specimen quoted by A. DeCandolle (*Mem. Anon.* 41) consisted of a leaf-twig with detached fruit, but without flowers. That in the Calcutta Herbarium has, in addition, an Anonaceous flower which, however, does not in the least agree with the flower described by Hook. fil. & Thomson (*Fl. Ind.* 143).

The leaves of the Wallichian specimen above quoted much resemble those issued by the same botanist as No. 4159 of his Catalogue under the name *Sideroxylon? nervosum*, Wall. To *Polyalthia nitida* have also been referred by Hook. fil. & Thomson a plant collected at Singapore by Lobb, and of which the flowers have been described in *Fl. Br. Ind.* i. 64. As a contribution towards further knowledge of this species, I give a

figure prepared for me by Miss M. Smith in the Kew Herbarium both of the Wallichian sheet No. 6439 and of Lobb's Singapore specimen. Roxburgh's species *Uvaria nitida* (Fl. Ind. ii. 668) is stated by him to be a native of the Moluccas. I have seen no specimens of it.

PLATE 92. Polyalthia nitida, *Benth. & H. f.* 1, Fruiting branch (*drawn from Wall. Cat.* 6439); 2, flower and leaf—*of natural size;* 3 & 4, anthers, back and front view; 5, pistil (*drawn from Lobb's Singapore specimen*)—*enlarged.*

39. POLYALTHIA BIFARIA, *Benth. & Hook. fil. Gen. Pl.* i. 25; *Hook. fil. Fl. Br. Ind.* i. 62. Guatteria bifaria, *A. DC. Mem. Anon.* 41; *Wall. Cat.* 6447; *Hook. fil. & Thoms. Fl. Ind.* 139. The only known specimens of this are those collected by Wallich in 1826 on the Prome Hills in Burmah, and subsequently issued by him as 6447 of his Catalogue. It has never been collected since; and I have little doubt that, as suggested by Sir Joseph Hooker, the species is a mixture of the flowers of *P. simiarum* with the leaves and twigs of *P. cerasoides.*

40. POLYALTHIA MEMBRANACEA (*Guatteria membranacea, A. DC. Mem. Anon.* 41; *Hook. fil. & Th. Fl. Ind.* 142). With regard to this species, Sir J. D. Hooker and Dr. Thomson remark (*l. c.*):—"We cannot identify this with anything in Wall. Cat. from Tavoy, so that probably the only specimens known are at Geneva."

41. POLYALTHIA CAULIFLORA, *H. f. & Th. Fl. Ind.* 138; *Fl. Br. Ind.* i. 66. This is known only from Wallich's specimen collected at Singapore (Cat. No. 6476). In order to assist in its rediscovery, I give a figure drawn by Miss Smith from the Wallichian sheet above quoted.

PLATE 116. Polyalthia cauliflora, *H. f. & Th.* 1, Leafy branch with remains of a flower; 2, a pair of flowers—*of natural size;* 3 & 4, stamens; 5, pistil; 6, pistil with vertical section of the ovary—*enlarged.*

13. Anaxagorea, *St. Hilaire.*

Trees or shrubs. *Leaves* with pellucid dots. *Flowers* small, greenish, leaf-opposed. *Sepals* 3, valvate, connate at the base. *Petals* 6 or 3, sub-equal, 2-seriate, valvate, the inner row sometimes absent. *Torus* convex. *Stamens* indefinite; anther-cells extrorse or sub-lateral; connective with a terminal process. *Ovaries* few; style variable; ovules 2, sub-basal, collateral, ascending. *Ripe carpels* follicular; stalk clavate. *Seeds* 1—2, exarillate, testa shining. Distrib.—Tropical Asia and America; species about 8.

Petals 6	1. *A. luzonensis.*
„ 3	2. *A. Scortechinii.*

1. ANAXAGOREA LUZONENSIS, *A. Gray Bot. U. S. Expl. Exped.* 27. A shrub; all parts glabrous. *Leaves* membranous, oblong or elliptic-oblong, shortly acuminate, the base cuneate; the under-surface pale; main nerves 7 or 8 pairs, spreading, slightly prominent beneath; the reticulations wide, rather distinct; length 5 to 7 in., breadth 1·75 to

2·5 in.; petiole ·25 to ·35 in. *Flowers* about ·5 in. long, solitary; pedicels ·25 in. long (twice as long in fruit), with 1 or 2 amplexicaul bracteoles. *Sepals* small, ovate-rotund, obtuse. *Petals* sub-equal, elliptic, obtuse, thin, nerved, white. *Ovaries* few. *Follicles* 1 to 3, cuneate-clavate, somewhat compressed, narrowed into a long stalk, 1- to 2-seeded. *Seeds* plano-convex, obovate, black, shining. *Hook. fil. Fl. Br. Ind.* i. 68; *Kurz For. Flora Burm.* i. 39; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 68.—A. Zeylanica, *H. f. & Th. Fl. Ind.* 144; *Thwaites' Enum.* 10; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 49; *Beddome Ic. Pl. Ind. Or.*, *t.* 46.—Rhopalocarpus fruticosus, *Teysm. & Binn. in Miq. Ann. Mus. Lugd. Bat.* ii. 22, *t.* 2, *fig. B.*—Anaxagorea fruticosa, *Scheff. in Nat. Tijdsch. Ned. Ind.* xxxi. 9.

Burmah; the Andaman Islands; Malacca; Pahang; Ceylon. Distrib.—Philippines, Cambodia, Sumatra.

PLATE 118A. Anaxagorea luzonensis, *A. Gray.* 1, Flowering branch; 2, ripe carpel; 3, the same dehisced—*of natural size;* 4 & 5, flower from above and beneath; 6, torus with a stamen and two ovaries; 7, inner petal; 8, anthers—*enlarged.*

2. ANAXAGOREA SCORTECHINII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 68. A bush or small tree; all parts, except the flower, glabrous; the young branches sub-rugulose, 2-ridged. *Leaves* thinly coriaceous, elliptic-oblong or elliptic-obovate, shortly and abruptly acuminate, slightly narrowed to the rounded or sub-acute base; main nerves 7 to 9 pairs, rather prominent beneath; the reticulations open and distinct; length 6 to 8 in., breadth 2·5 to 3·5 in.; petiole ·3 to ·4 in. *Flowers* ·75 in. long, solitary; pedicels ·3 in. (much longer in fruit) with 1 or 2 amplexicaul bracteoles. *Sepals* membranous, their edges thin, broadly ovate, acute, pubescent outside. *Petals* in a single row, much larger than the sepals, oblong-lanceolate, sub-acute, scurfy-pubescent outside, glabrous within, very fleshy, slightly concave at the base. *Stamens* numerous, those next the pistils barren, elongate and bent over the pistils. *Ovaries* numerous, obovoid, pubescent; styles curved. *Follicles* as in *A. luzonensis*, but two or three times as numerous. *Seeds* obovoid, concavo-convex, compressed, black, shining

Perak: at low elevations,—*Scortechini, King's Collector, Wray, Curtis.* Pahang; *Ridley.*

I have altered the diagnosis of this genus as regards the petals to admit this species in which the inner whorl of petals is absent. In other respects the species agrees perfectly with the original generic diagnosis. Teysmann and Binnindyk's mono-specific genus *Rhopalocarpus* (Miq. Ann. Mus. Lugd. Bat. ii. 22, t. 2, fig. B) is an unmistakable *Anaxagorea* in which the inner petals are narrow and incurved. It is probably near *A. luzonensis*, A. Gray, and *A. javanica*, Bl. (See Benth. and Hook. fil. Gen. Plant. i. 957.)

PLATE 119. Anaxagorea Scortechinii, *King.* 1, Flowering branch; 2, ripe fruit; 3, carpel opened; 4, seeds—*of natural size;* 5, flower dissected; 6, anthers; 7, pistils—*enlarged.*

14. Disepalum, *Hook. fil.*

Trees or shrubs. *Sepals* 2, large, concave, valvate. *Petals* 4, narrowly linear-spathulate, incurved, inserted remotely from each other on the margin of the very broad, sub-concave torus. *Stamens* numerous; the apical process of the connective broadly orbicular, sub-convex. *Pistils* 10 to 15 or numerous, ovoid; style short, terete; stigma

small, terminal; ovule solitary. *Leaves* minutely pellucid-punctate. *Flowers* in long terminal peduncles, solitary or in pairs. Distrib.—Three species; all Malayan.

The genus *Disepalum* was founded by Sir Joseph Hooker on a Bornean shrub collected by Lobb, and the only species known to its founder was that described and figured under the name of *D. anomalum* in the Linnæan Transactions (vol. xxiii. 156, t. 20A). The characters which separate the genus from any other in the family are the dimerous symmetry of the sepals and petals, and the small size of the latter, which originate at some distance from each other from the edge of the broad, sub-concave torus. The species here described differs from *D. anomalum* in its arboreous habit, larger leaves, and much more numerous ovaries, which are, moreover, nearly glabrous and have long stalks. Quite ripe fruit is as yet unknown.

1. DISEPALUM LONGIPES, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 69. A glabrous tree 30 to 40 feet high; young branches slender, pale brown. *Leaves* minutely pellucid-punctate, membranous, oblong, sometimes slightly oblanceolate, rarely oblong-elliptic, abruptly and shortly acuminate, the base cuneate; main nerves 7 to 10 pairs, spreading (sub-horizontal), very faint; length 4 to 7 in., breadth 1·5 to 2·25 in.; petiole ·25 in. *Flowers* on long pedicels, dark red, solitary or in pairs, terminal, ·5 in. in diam.; pedicels slender, ebracteolate, 1·25 to 2 in. long. *Sepals* reflexed, concave, broadly ovate, blunt. *Petals* remote from each other, linear-spathulate, sub-incurved, ·2 in long. *Stamens* numerous; apical process of the connective orbicular, sub-convex. *Ovaries* numerous, stalked, slightly obovoid, glabrescent or sparsely pubescent, 1-ovuled; style short, straight; stigma small, terminal. *Immature carpels* ovoid, sub-glabrous, slightly corrugated; pericarp fleshy, fragrant. *Seed* solitary, ovoid.

Johore; on Gunong Panti at 1,500 feet,—*King's Collector* No. 231. Distrib.—Borneo,—*Beccari* (P. B. 1645).

PLATE 118B. Disepalum longipes, *King*. 1, Flowering branch; 2, immature carpels; 3, carpels nearly mature; 4, flower—*of natural size;* 5 & 6, anthers; 7 & 8, pistils—*much enlarged.*

15. Goniothalamus, *Blume.*

Small trees or shrubs. *Leaves* with faint nerves, forming intra-marginal loops. *Flowers* solitary or fascicled, axillary or extra-axillary; peduncles with basal, scaly, distichous bracts. *Sepals* 3, valvate. *Petals* 6, valvate in 2 series; outer thick, flat, or nearly so; inner smaller, shortly clawed, cohering to form a vaulted cap over the stamens and ovary. *Stamens* many, linear-oblong; anther-cells remote, dorsal; connective produced into an oblong or truncate process. *Ovaries* many; style simple or 2-fid; ovules solitary or 2 superposed, sub-basal (4 in *G. uvarioides*). *Ripe carpels* 1-seeded. Distrib.—About 47 species, natives of Eastern tropical Asia and its islands.

The plants referred to this genus are, by Baillon, treated as part of *Melodorum.*

Ovules 1 or 2.

Style cylindric, slender; stigma subulate, entire.

Sepals persistent.

Flowers 2 to 2·25 in. long; leaves narrowly oblong-lanceolate with acute bases . . . . . 1. *G. Gardneri.*

Flowers 1·25 to 1·5 in. long; leaves elliptic to oblong or elliptic-oblong . . . . . 2. *G. Thwaitesii.*
Sepals not persistent; flowers under 1 in. long . . . . . 3. *G. subevenius.*
Style very short; stigma funnel-shaped, slit on one side, its edges toothed . 4. *G. tenuifolius.*

Style cylindric; stigma truncate, entire.

Flowers in fascicles from the stem only; ripe carpels 1·25 in. long . . 5. *G. Prainianus.*
Flowers solitary from the axils of the leaves or of fallen leaves; ripe carpels ·4 in. long . . . . . 6. *G. Kunstleri.*

Style subulate or cylindric; stigma deeply 2-cleft.

Petals less than 2 in. long.

Nerves 14 to 16 pairs; leaves not reticulate . . . . . 7. *G. Walkeri.*
Nerves 12 to 20 pairs; leaves much reticulate . . . . . 8. *G. reticulatus.*

Nerves of leaves 8 to 11 pairs.

Leaves 2·5 to 4 in. long . . . . . 9. *G. Wightii.*

Leaves 8 to 11 in. long.

Apices of anthers truncate . . . . . 10. *G. Thomsoni.*

Apices of anthers conical, acuminate.

Outer petals flat, broadly ovate, nerved, not clawed . 11. *G. Wynaadensis.*
Outer petals concave, cucullate, clawed . . . . . 12. *G. cardiopetalus.*
Petals 3 to 5 in. long . . . . . 13. *G. giganteus.*
Style cylindric; stigma unequally 2-toothed . . . . . 14. *G. Malayanus.*

Style cylindric; stigma minutely and equally 2-toothed.

Flowers axillary or from the axils of fallen leaves.

Outer petals less than 1 in. long . . . . . 15. *G. salicinus.*

Outer petals more than 1 in. long.

Anthers with slightly convex orbicular apical appendages.

Inner petals ·75 in. long . . . . . 16. *G. Hookeri.*
Inner petals ·3 in. long . . . . . 17. *G. fulvus.*

Anthers with very pointed conical apical appendages.

Nerves of leaves 28 to 34 pairs . . . . . 18. *G. Curtisii.*

Nerves of leaves less than 20 pairs.

Leaves pubescent beneath . . . . . 19. *G. Simonsii.*

Leaves quite glabrous.

Leaves shining, reticulate; ripe carpels oblong, ·5 to ·6 in. long . . . . . 20. *G. Griffithii.*
Leaves opaque, dull, not reticulate; ripe carpels globular, obovoid, ·4 in. long . . . . . 21. *G. macrophyllus.*
Flowers in fascicles from tubercles near the base of the stem . . . . 22. *G. Ridleyi.*

Style cylindric; stigma 3-toothed.

Apices of anthers orbicular, slightly convex . . . . . 23. *G. sesquipedalis.*

Apices of anthers acuminate.

Leaves thickly coriaceous; nerves inconspicuous . . . . . 24. *G. Tapis.*

Leaves strongly and prominently nerved.

Sepals large, orbicular-ovate, obtuse, ·65 to 1 in. long . . . 25. *G. Scortechinii.*
Sepals small, ovate, acuminate, ·2 in. long . . . . . 26. *G. Wrayi.*
Ovules and seeds 4 . . . . . 27. *G. uvarioides.*

1. Goniothalamus Gardneri, *Hook. fil. & Thoms. Fl. Ind.* 107. A glabrous shrub 8 to 10 feet high; young branches dark-coloured, striate. *Leaves* coriaceous, narrowly oblong-lanceolate, acute at each end, the edges recurved; both surfaces dull, pale when dry; main nerves very faint, numerous, sub-horizontal; length 6 to 8 in., breadth 1 to 1·35 in.; petiole ·25 in. *Flowers* solitary, axillary or from the axils of fallen leaves, drooping; pedicels curved, ·3 to ·4 in. long, with 2 long lanceolate bracts at the base. *Sepals* coriaceous, broadly cordate, acute, reticulate, ·7 in. long and ·5 in. broad, persistent. *Petals* coriaceous, yellowish-green, very unequal; the outer oblong-lanceolate, sub-acute, 2 to 2·25 in. long; the inner ovate, acute, ·4 in. long. *Anthers* with orbicular convex apices. *Ovaries* oblong, pubescent, shorter than the slender bent cylindric style; stigma not lobed. *Ripe carpels* ovoid, blunt, tapering at the base, sub-sessile, ·7 in. long. *Thwaites' Enum.* 7; *Hook. fil. Fl. Br. Ind.* i. 73; *Beddome Ic. Pl. Ind. Or., t.* 60.

Ceylon: altitude 2,000 to 4,000 feet.

Plate 120. Goniothalamus Gardneri, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, front view of flower; 4, flower dissected—*of natural size;* 5, anthers; 6, ovaries—*enlarged.*

2. Goniothalamus Thwaitesii, *Hook. fil. & Thoms. Fl. Ind.* 106. A small glabrous tree; young branches pale, glaucous. *Leaves* thinly coriaceous, elliptic to oblong, shortly and rather bluntly acuminate; the base slightly cuneate or rounded, the edges recurved (when dry); both surfaces dull, pale when dry; main nerves 12 to 15 pairs, faint, sub-horizontal; length 4 to 5·5 in., breadth 1·8 to 2·5 in.; petiole ·3 to ·5 in. *Flowers* axillary or leaf-opposed, solitary, sub-clavate; pedicels ·75 to 1·25 in. long with a minute bracteole near the base. *Sepals* broadly ovate, sub-acute, spreading, persistent, ·5 in. long, reticulate when dry. *Petals* coriaceous, very unequal, greenish; the outer oblong-lanceolate, acuminate, puberulous inside, 1·25 to 1·5 in. long; inner broadly ovate, acute, sparsely adpressed-pubescent, ·4 in. long; apex of anthers convex; style subulate; stigma not lobed. *Ripe carpels* ovoid, slightly apiculate, tapering to the short stalk, ·5 in. long; stalk ·1 in. *Thwaites' Enum.* 7; *Hook. fil. Fl. Br. Ind.* i. 72; *Beddome Ic. Pl. Ind. Or., t.* 58.

Ceylon: altitude 2,000 to 4,000 feet. Travancore,—*Wight.* S. Tinnivelly, Shevageri and Papanassum Hills,—*Beddome.*

Plate 121A. Goniothalamus Thwaitesii, *Hook. fil. & Thoms.* 1, Flowering branch; 2, ripe carpels; 3, sepals and andro-gynœcium—*of natural size;* 4, torus and pistils; 5 & 6, anthers; 7, pistil; 8, section of pistil—*enlarged.* (*Nos.* 4 *to* 8 *are copied from a drawing lent to me by Dr. H. Trimen,* F.R.S.)

3. GONIOTHALAMUS SUBEVENIUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 71. A shrub or small tree; young branches slender, puberulous; otherwise glabrous, except the flower. *Leaves* membranous, narrowly oblong, tapering at each end; upper surface shining, pale-greenish when dry; the lower paler, dull; main nerves 10 to 12 pairs, sub-horizontal, invisible or very faint on either side; length 3·5 to 6·5 in., breadth 1·25 to 1·75 in.; petiole ·2 in. *Flowers* solitary, axillary, ·75 to ·9 in. long; pedicels ·4 to ·6 in. long, ebracteate. *Sepals* broadly ovate, bluntly acuminate, 3-nerved, minutely pubescent on both surfaces, ·3 in. long. *Petals* thinly coriaceous, puberulous except towards the base inside, lanceolate, sub-acute; the inner petals half as large as the outer, slightly clawed. *Stamens* with broad, orbicular, sub-convex, apical processes. *Ovaries* narrowly oblong; style cylindric, curved; stigma subulate, entire. *Ripe carpels* ovoid to oblong, obtuse, tapering very little at the base, glabrous, ·5 to ·75 in.; stalks ·35 to ·45 in.

Perak, at low elevations,—*King's Collector.*

PLATE 121B. Goniothalamus subevenius, *King.* 1, Flowering branch; 2 & 3, flowers, dissected; 4, inner petals; 5, ripe carpels—*of natural size;* 6, stamens; 7, pistils—*enlarged.*

4. GONIOTHALAMUS TENUIFOLIUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 71. A shrub 6 to 8 feet high, glabrous except the petals; young branches slender, dark-coloured, striate. *Leaves* thinly membranous, lanceolate or oblong-lanceolate, shortly acuminate, the base acute; main nerves 8 to 11 pairs, spreading, inter-arching within the minutely undulate margin, faint on both surfaces; length 4·5 to 7 in., breadth 1 to 1·75 in.; petiole ·2 in. *Flowers* axillary, solitary, drooping; pedicels slender, bi-bracteolate at the base, ·35 to ·45 in. long. *Sepals* free, large, membranous, green, many-nerved and reticulate, broadly ovate, acute or acuminate, glabrous, ·75 to 1·1 in. long. *Petals* whitish, thinly coriaceous, faintly nerved, broadly lanceolate, acuminate, much contracted at the base, pubescent, 1 to 1·2 in. long (smaller in var. *aborescens*); inner petals less than half as long, ovate, acuminate; the base contracted, pubescent. *Anthers* numerous, compressed; the apices broad, flat, pubescent. *Ovaries* few, narrow, short, 1- rarely 2- ovuled; the style long, straight, thickened upwards; stigma hollowed like a funnel, the edges toothed. *Ripe carpels* partly enveloped by the persistent calyx, ovoid, very slightly apiculate, puberulous or glabrescent, ·4 to ·5 in. long; stalks ·2 in. long. *Seeds* usually 1, rarely 2.

Perak, at low elevations,—*King's Collector* No. 3019, *Wray* Nos. 3379, 3558.

VAR. aborescens, *King.* A small tree 15 to 25 feet high. *Leaves* 4 to 4·5 in. long; *petals* coriaceous, adpressed-pubescent, about half as long as in the typical form; *sepals* only ·3 in. long.

Perak, at elevations from 2,000 to 3,000 feet,—*King's Collector.*

This possibly ought to be considered a distinct species; but as its anthers and ovaries are exactly the same as in the typical shrubby *G. tenuifolius*, I prefer to consider it a mountain form of that species. Both the typical form and the variety have remarkable stigmas, shaped like funnels and with toothed edges.

PLATE 122A. Goniothalamus tenuifolius, *King*. 1, Flowering branch; 2, ripe carpels; 3, inner petals—*of natural size;* 4, andro-gynœcium; 5, anthers; 6, pistil—*enlarged.*

5. GONIOTHALAMUS PRAINIANUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 72. A tree 50 to 70 feet high; young branches rather slender, pale; all parts, except the inflorescence, glabrous. *Leaves* membranous, oblong-oblanceolate to elliptic-oblong, abruptly shortly and bluntly acuminate, the base slightly cuneate; main nerves 14 to 18 pairs, oblique, inter-arching within the margin, prominent beneath; length 7 to 11 in., breadth 2·25 to 2·8 in.; petiole ·35 in. *Flowers* 1·25 to 1·5 in. in diam., on long pedicels from large woody puberulous tubercles at the base of the stem; pedicels 2 to 4 in. long with two minute bracteoles at the base. *Sepals* coriaceous, united so as to form a spreading cup with three broad, sub-acute, triangular teeth, puberulous outside, glabrous inside. *Petals* thickly coriaceous, pale yellow; the outer row large, obovate-rotund, concave, incurved (ovate-oblong in var.), pubescent on both surfaces, nearly 1 in. long; inner row much smaller, clawed. *Stamens* numerous; the connective prolonged into a blunt, conical, puberulous, apical process. *Ovaries* narrowly oblong, glabrous; style cylindric, not lobed, truncate. *Ripe carpels* obovoid, slightly apiculate, tapering to the base, glabrous, 1 to 1·25 in. long; stalks ·25 in. long. *Seed* solitary, smooth.

Perak, at low elevations,—*King's Collector, Wray.*

VAR. angustipetala, *King*. *Petals* oblong-ovate, sub-acute.

Perak,—*King's Collector. Curtis*, No. 2893.

A species collected by Forbes in Eastern Sumatra (Herb. Forbes No. 3172) resembles this closely. The specimens are in fruit only, and the individual carpels being a little smaller and less obovoid, it probably belongs to a distinct species. Forbes' specimens have no flowers.

PLATE 123. Goniothalamus Prainianus, var. angustipetala, *King*. 1, Leafy twig; 2, cluster of flowers from the stem; 3, young fruit; 4, ripe fruit; 5, flower of the typical form dissected; 6, inner petals—*of natural size;* 7 & 8, anthers; 9 & 10, pistils—*enlarged.*

6. GONIOTHALAMUS KUNSTLERI, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 73. A shrub 4 to 10 feet high; young branches minutely rufous-tomentose; the older pale, glabrous and much striate. *Leaves* thinly membranous, oblanceolate to elliptic-oblanceolate, abruptly and bluntly acuminate, the base cuneate; both surfaces pale-brown when dry, minutely pellucid-punctate, glabrous; the midrib alone puberulous on the upper; main nerves 11 to 13 pairs, spreading, curved and inter-arching boldly a little within the margin, slightly prominent on the under-surface; length 6 to 9 in., breadth 2 to 3·25 in.; petiole ·35 in., puberulous. *Flowers* solitary, slightly supra-axillary; pedicels ·15 in. long. *Sepals* green, thinly membranous, puberulous, nerved and reticulate, broadly ovate, acute, spreading, very slightly cuneate at the base, ·3 to ·4 in. long. *Petals* subcoriaceous, yellow or orange-coloured; the outer lanceolate, acuminate, slightly narrowed at the base, puberulous outside, ·8 to 1·25 in. long; inner petals about one-third as

long, ovate, acute, pubescent. *Anthers* many, short, compressed, the tops broad, flat, pubescent. *Ovaries* about as long as the stamens, narrowly cylindric; style long, straight, thick; stigma notched. *Ripe carpels* crowded, broadly ovoid, slightly apiculate, ·4 in. long.

Perak; at Goping,—*King's Collector*, *Scortechini*, *Wray*.

VAR. macrantha, *King*. *Leaves* narrowly elliptic or oblong, bluntly acuminate, puberulous beneath; outer petals 1·25 to 1·5 in. long.

Penang and Province Wellesley,—*Curtis* Nos. 1840 and 2447.

PLATE 124. Goniothalamus Kunstleri, *King*. 1, Branch with buds, flowers and very young fruit; 2, ripe carpels; 3, flower dissected—*of natural size;* 4, anthers; 5, pistils—*enlarged*.

7. GONIOTHALAMUS WALKERI, *Hook. fil. & Thoms. Fl. Ind.* 109. A small tree; all parts, except the flowers and perhaps the fruit, glabrous. *Leaves* membranous, oblong-lanceolate or lanceolate; the base cuneate; upper surface shining, the lower sub-glaucous; main nerves 14 to 16 pairs, very faint, reticulations obsolete; length 5 to 12 in., breadth 1·5 to 2·25 in.; petiole ·25 in. *Flowers* axillary, red, sparsely pubescent; pedicels ·1 to ·2 in. *Sepals* ovate, acute, ·2 in. long, enlarging and persistent in fruit. *Outer petals* ovate-lanceolate, ·8 in. long; inner ·3 to ·5 in.; style clavate; stigma 2-lobed. *Thwaites' Enum.* 8 & 398; *Hook. fil. Fl. Br. Ind.* i. 74.

Ceylon: in the Singla Rajah Forest,—*Walker*.

There are no flowering specimens of this in the Herbarium at Peradeniya (Ceylon); neither are there any at Calcutta. The figure given is from a specimen in the Herbarium, Kew.

PLATE 125. Goniothalamus Walkeri, *H. f. & T.* 1, Leaf twig with young fruit—*of natural size;* 2, ripe carpel; 3, section of same; 4, seed—*enlarged*.

8. GONIOTHALAMUS RETICULATUS, *Thwaites' Enum. Pl. Cey.*, 7 & 398. A shrub 6 to 8 feet high; young branches strigose, the bark very dark. *Leaves* membranous, narrowly oblong or oblong-lanceolate, shortly acuminate, the base slightly cuneate; both surfaces reticulate, minutely glandular-dotted, the upper glabrous; the lower with scattered stiff black hairs; main nerves 12 to 20 pairs, horizontal, inter-arching very freely, slightly prominent beneath; length 8 to 10 in., breadth 1·4 to 2 in.; petiole ·3 in., deeply grooved. *Flowers* solitary, slightly supra-axillary; pedicels decurved, ·15 in. long, bi-bracteolate, strigose. *Sepals* orbicular-ovate, acuminate, pubescent, deciduous. *Petals* reddish or yellowish-brown, oblong-lanceolate, pubescent, ·75 in. long; inner broadly ovate, acute, half as long as the outer. *Ovaries* strigose; styles 2-lobed. *Ripe carpels* sub-globose or oblong, blunt, ·5 in long, rusty-pubescent, 1- to 2-seeded. *Hook. fil. Fl. Br. Ind.* i. 76; *Beddome Ic. Pl. Ind. Or.*, *t.* 64.

The globose carpels are 1-seeded: the oblong 2-seeded.

Ceylon: between Galle and Ratnapoora.

PLATE 126. Goniothalamus reticulatus, *Thwaites*. 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower seen from above; 4, flower dissected; 5, inner petals;

6, anther; 7, pistil; 8, section of pistil—*enlarged.* (*Nos.* 3 *and* 5 *to* 8 *are copied from Beddome's Ic. Pl. Ind. Or., t.* 64.)

9. Goniothalamus Wightii, *Hook. fil. & Thoms. Fl. Ind.* 106. A small tree; all parts glabrous except the leaf-buds and the flowers; young branches slender, dark-coloured. *Leaves* thinly coriaceous, lanceolate, sub-acuminate; the base acute; main nerves about 10 pairs, very faint, sub-horizontal, reticulations obscure; length 2·5 to 4 in., breadth ·75 to 1·1 in.; petiole ·15 in. *Flowers* axillary, solitary; pedicels ·25 in. (lengthening in fruit), pubescent, bracteolate at the base. *Sepals* broadly ovate, sub-acute, adpressed, rufous-pubescent like the petals, ·2 in. long, persistent. *Petals* coriaceous; the outer broadly ovate, sub-acute, ·75 in. long; the inner broadly ovate, acuminate or trapezoid, one-half shorter than the outer. *Ovaries* pubescent; ovules 1 or 2; style bifid. *Ripe carpels* sub-sessile, oblong, slightly pointed at the base and apex, glabrous, ·6 to ·75 in. long; stalk none or ·15 in. long. *Beddome Ic. Pl. Ind. Or., t.* 63; *Hook. fil. Fl. Br. Ind.* i. 76.— ? Myristiceæ, *Wall. Cat.* 9009.

Southern India, in Travancore,—*Wight;* South Tinnivelly Hills, at elevations of 3,000 to 5,000 feet,—*Beddome.*

Plate 122B. Goniothalamus Wightii, *H. f. & Th.* 1, Flowering branch; 2, unripe fruit—*of natural size;* 3, flower dissected; 4 & 5, anthers (front and back view); 6, pistil; 7 & 8, sections of pistil—*enlarged.*

10. Goniothalamus Thomsoni, *Thwaites' Enum. Pl. Ceyl.* 7. A glabrous shrub, only 2 to 3 feet high; young branches stout; the bark rather pale, striate. *Leaves* thickly membranous, flavescent, obovate-oblong or obovate-lanceolate, abruptly caudate-acuminate, narrowed from the middle to the acute base; the edges slightly recurved when dry; main nerves 8 to 11 pairs, spreading, inter-arching rather far from the edge, slightly prominent beneath; both surfaces faintly reticulate, the lower very pale beneath when dry; length 5 to 10 in., breadth 1·75 to 3·5 in.; petiole ·25 to ·5 in. *Flowers* solitary or in pairs from small tubercles on the stem below the leaves; pedicels ·4 or ·5 in., recurved near the apex, thin, with a minute bracteole near the base. *Sepals* ovate, acute, ·25 in. long, reticulate, persistent. *Outer petals* linear-lanceolate, acuminate, yellow, 1·5 in. long; inner ovate, acuminate, ·5 in. long; styles long, bifid. *Ripe carpels* ovoid or obovoid, apiculate, about ·5 in. long; stalks ·15 in. *Hook. fil. Fl. Br. Ind.* i. 74; *Beddome Ic. Pl. Ind. Or., t.* 59.

Ceylon: forests between Galle and Ratnapoora,—*Thwaites.*

Plate 127. Goniothalamus Thomsoni, *Thwaites.* 1, Leafy branch; 2, branch with flower; 3, branch with ripe fruit; 4 & 5, carpels from other specimens—*of natural size;* 6, anther; 7 to 9, pistils—*enlarged.* (*Copied from a drawing made in the Peradeinya Herbarium and kindly lent by Dr. H. Trimen,* F.R.S.)

11. Goniothalamus Wynaadensis, *Beddome Ic. Pl. Ind. Or.* 13, *t.* 61. An erect shrub; young parts minutely pubescent, otherwise glabrous. *Leaves* membranous, much reticulate, narrowly oblong to oblong-lanceolate, shortly and abruptly acuminate, the base acute; upper surface shining, lower pale; main nerves 7 to 9 pairs, very faint;

length 8 to 11 in., breadth 1·5 to 2·5 in.; petiole about ·5 in. *Flowers* solitary, axillary, or from small tubercles on the trunk, pubescent when young, but when expanded nearly glabrous; pedicels ·2 to ·4 in. long, with several minute bracteoles at the base. *Sepals* orbicular, obtuse or acute, deciduous. *Outer petals* broadly ovate, sub-acute, veined, ·5 to ·75 in. long; the inner half as long. *Anthers* with blunt apical points. *Ovaries* numerous, hairy; ovule solitary; style bifid. *Ripe carpels* oblong, apiculate, ·75 in. long; stalk ·15 in. *Hook. fil. Fl. Br. Ind.* i. 74.—Atrutegia (genus), *Bedd. mss.*

Southern India: Wynaad, elevation 2,500 to 3,500 feet,—*Beddome.*

PLATE 128A. Goniothalamus Wynaadensis, *Bedd.* 1, Flowering branch (with small leaves); 2, carpels—*of natural size;* 3, flower seen from above; 4 & 5, anthers; 6 & 7, pistils—*enlarged.* (*Copied from Beddome's Ic. Pl. Ind. Or., t.* 61. *The specimen here figured has unusually short leaves. Specimens in the Kew Herbarium have leaves* 10 *inches long.*)

12. GONIOTHALAMUS CARDIOPETALUS, *Hook. fil. & Thoms. Fl. Ind.* 107. A shrub or small tree; young branches minutely pubescent. *Leaves* membranous, oblong to lanceolate, sometimes slightly obovate, abruptly shortly and bluntly acuminate, the base cuneate, the margin minutely waved; both surfaces glabrous; main nerves 9 or 10 pairs, interarching far from the edge, very faint; length 6 to 9 in., breadth 2 to 3 in.; petiole ·35 in. *Flowers* solitary, or 2 or 3 in a vertical line, axillary, or from small tubercles on the branches below the leaves, sericeous when young, afterwards glabrescent, ·75 in. in diam.; peduncles ·25 to ·5 in., minutely bracteolate at the base. *Sepals* small, free, sub-orbicular, retuse. *Outer petals* coriaceous, concave, cucullate, clawed, ·5 to ·75 in. long; inner one-third shorter, ovate, acute. *Anthers* with a blunt conical apical process; style elongate; stigma 2-lobed; ovule solitary. *Ripe carpels* oblong, apiculate, tapering to the base, sessile, ·75 in. long. *Hook. fil. Fl. Br. Ind.* i. 75.—Goniothalamus cymbiformis, *Bedd. mss. in Herb. Madras; Beddome Ic. Pl. Ind. Or., t.* 62.—Uvaria obovata, *Heyne ex Wall. Cat.* 6471.—Polyalthia cardiopetala, *Dalz. in Hook. Kew Journ. Bot.* ii. 39.—Polyalthia Wynaadensis, *Bedd. mss. in Herb. Madras.*—Atrutegia Thomsoni, *Bedd. mss.*

Southern India: in Canara and North Wynaad, up to 3,000 feet. Annamally Range.

Dalzell, who originally described this species, says the inner petals, when fresh, are marked with the figure of a heart; hence the specific name.

PLATE 129. Goniothalamus cardiopetalus. *H. f. & Th.* 1, Flowering branch; 2, young flower from another specimen; 3, ripe carpels—*of natural size;* 4, inner petal; 5, calyx and andro-gynœcium; 6 & 7, anthers; 8, pistil; 9, section of pistil—*enlarged.*

13. GONIOTHALAMUS GIGANTEUS, *Hook. fil. & Thoms. Fl. Ind.* 109. A tree 30 to 70 feet high; young branches very pale, glabrous. *Leaves* coriaceous, oblong, shortly acuminate, the base cuneate; the edges slightly recurved (when dry); upper surface shining, glabrous; the lower dull, puberulous; the midrib very prominent; main nerves 10 to 14 pairs, very slender, spreading, more conspicuous above than below; length 6 to 10 in., breadth 2·25 to 2·75 in.; petiole ·25 in., deeply channelled. *Flowers* very large, from the axils of fallen leaves and from the younger branches; peduncles recurved, 1 in. or more long (elongated in the fruit), pubescent. *Sepals* ovate, acute, pubescent outside,

spreading or recurved, about ·5 in. long. *Petals* very coriaceous, yellowish tinged with green; the outer broadly ovate to ovate-oblong, with a dark, thick, triangular spot at the base, 3 to 5 in. long, minutely pubescent; the inner only about ·6 in. long, ovate-acute, densely golden sericeous. *Anthers* very numerous, their apices convex. *Ovaries* hairy, 2-ovuled; style long, slender, much curved; stigma 2-lobed. *Ripe carpels* oblong, apiculate, tapering much to the stalk, minutely granular and with obscure vertical ridges when dry, 1·25 to 1·5 in. long and ·6 in. in diam.; stalks ·75 in., stout. *Seeds* 1 or 2, oblong, slightly compressed, the testa brown. *Hook. fil. Fl. Br. Ind.* i. 75; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 28; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 73.—Uvaria gigantea, *Wall. Cat.* 6469 *A. B.* (*in part.*)—Anonacea, *Griff. Icon. Plant., t.* 652?

Singapore,—*Wallich, Ridley, Hullett.* Penang—*Curtis.* Perak,—*King's Collector.*

Plate 130. Goniothalamus giganteus, *H. f. & Th.* 1, Flowering branch; 2, flower from another specimen; 3, nearly ripe carpels; 4, flower with sepals and outer petals removed; 5, andro-gynœcium; 6, flower dissected, the outer petals being removed; 7 & 8, inner petals, seen from the side and from above—*of natural size;* 9, torus with everything removed except the pistils; 10, section of single pistil; 11, anther—*enlarged.*

14. Goniothalamus Malayanus, *Hook. fil. & Thoms. Fl. Ind.* 107. A small glabrous tree 15 to 20 feet high; bark of branches very pale. *Leaves* coriaceous, oblong to elliptic-oblong, shortly and abruptly acuminate; the base slightly cuneate, rarely rounded; the edges recurved; upper surface shining, the lower dull, darker (when dry); main nerves 12 to 15 pairs, sub-horizontal, faint; length 5·5 to 9 in., breadth 1·5 to 2·75 in.; petiole ·25 in., deeply channelled. *Flowers* slightly supra-axillary, solitary, greenish; pedicels ·35 to ·5 in., pubescent, bracteolate at the base. *Sepals* ovate-triangular, acuminate, pubescent, connate at the base, persistent, ·25 in. long. *Petals* coriaceous; the outer broadly ovate, acuminate to ovate-lanceolate, minutely tomentose on both surfaces, with a triangular glabrous basal spot, keeled outside, 1 to 1·25 in. long; the inner about a third as long, ovate, acuminate, sericeous or tomentose. *Anthers* numerous. *Pistils* about 15, the ovary hairy, ovules 3 to 4; style long, slender, much bent outwards; stigma sub-capitate, unequally 2-lobed. *Ripe carpels* narrowly oblong, apiculate, tapering to each end, glabrous, 1·5 in. long and ·5 in. in diam.; stalks ·1 in. thick. *Seeds* 2 or 3, flattened-ovoid, nearly black. *Hook. fil. Fl. Br. Ind* i. 75; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 28; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 74.—Goniothalamus Slingerandtii, *Scheff. Tijdsch. Ned. Ind.* xxxi. 341.—G. dispermus, *Miq. Ann. Mus. Lugd. Bat.* ii. 34.—Uvaria sp. *Griff. Notul.* iv. 710.

Malacca,—*Griffith, Maingay* (*Kew Distrib.*) No. 63. Perak, common. Distrib.—Bangka, Borneo, Phillipines.

Plate 128B. Goniothalamus Malayanus, *H. f. & Th.* 1, Leaf-twig; 2, flower, detached (from another specimen); 3, ripe carpels; 4, flower dissected—*of natural size;* 5, anthers; 6, pistils—*enlarged.*

15. Goniothalamus salicinus, *Hook. fil. & Thoms. Fl. Ind.* 106. A shrub 10 to 12 feet high; young branches slender, dark-coloured, pubescent. *Leaves* narrowly lanceolate or oblong-lanceolate, acuminate, the base acute; upper surface glabrous, the lower paler and with a few adpressed black hairs; main nerves 10 to 12 pairs,

horizontal, short, forming wide loops; length 4 to 5 in., breadth ·7 to 1 in.; petiole ·25 in. *Flowers* solitary, slightly supra-axillary; pedicel curved, ·2 in. long, bracteolate in the lower half, rusty-pubescent, as are the sepals and outer petals. *Sepals* broadly ovate, acute, ·2 in. long, deciduous. *Petals* coriaceous, yellowish outside and pink inside; the outer lanceolate, bluntly acuminate, ·75 in long; the inner half as long, broadly ovate, sub-acute. *Ovaries* pubescent, with stout, clavate, bifid styles. *Ripe carpels* ovoid or oblong, apiculate, adpressed-pubescent, ·3 to ·5 in. long, 1- or 2-seeded; stalks ·1 in., pubescent. *Thwaites' Enum.* 7; *Hook. fil. Fl. Br. Ind.* 76; *Beddome Ic. Pl. Ind. Or., t.* 65.

Ceylon: on Adam's Peak at elevations of 2,000 to 3,000 feet.

PLATE 131A. Goniothalamus salicinus, *H. f. & Th.* 1, Flowering branch; 2, carpels—*of natural size;* 3, flower with a petal removed; 4, inner petal; 5, sepals and androgynœcium; 6, anthers; 7, 8 & 9, ovaries—*enlarged.*

16. GONIOTHALAMUS HOOKERI, *Thwaites' Enum. Pl. Ceyl.* 6. A small glabrous tree; young branches rather stout. *Leaves* coriaceous, oblong or elliptic-oblong, sub-acuminate, the base acute; the edges slightly recurved when dry; both surfaces reticulate; the upper shining, the lower dull, minutely granular when dry; main nerves slightly prominent beneath, 14 to 16 pairs, spreading, straight, inter-arching ·2 in. from the edge; length 7 to 12 in., breadth 2·5 to 4·5 in.; petiole ·3 to ·5 in., thick. *Flowers* solitary, axillary, or in fascicles from tubercles on the stem, pale green; pedicels ·25 to ·75 in. *Sepals* ovate, acute, persistent, reticulate when dry, ·75 in. long. *Petals* coriaceous; the outer lanceolate, slightly concave at the base, about 2 in. long; inner ovate, acute, pubescent inside, ·75 in. long. Apex of anthers orbicular, convex. *Ovaries* about 25; styles subulate; stigma minutely bifid. *Ripe carpels* ovoid, "the size of a small bean, short-stalked." *Hook. fil. Fl. Br. Ind.* i. 73; *Beddome Ic. Pl. Ind. Or., t.* 66.

Ceylon: elevation 1,000 feet.

PLATE 133. Goniothalamus Hookeri, *Thwaites.* 1, Flowering branch—*of natural size* (*copied from a drawing made in the Herbarium of the Royal Botanic Garden, Peradeniya, and kindly lent by Dr. H. Trimen,* F.R.S.); 2, a flower dissected, the outer petals being removed; 3, anthers; 4, pistils—*enlarged.*

17. GONIOTHALAMUS FULVUS, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 75. A shrub; young branches slender, dark-coloured, at first rufous-pubescent, afterwards glabrous. *Leaves* membranous, pellucid-dotted, oblong-oblanceolate, obtuse or with a short broad point; upper surface glabrous, the lower puberulous; main nerves 14 to 16 pairs, slightly prominent beneath, spreading; length 7 to 10 in., breadth 2·5 to 3·25 in.; petiole ·3 in., pubescent. *Flowers* solitary, axillary; pedicels ·25 in., puberulous. *Sepals* broadly ovate, obtuse, pubescent, connate at the base, ·25 in. long. *Petals* coriaceous, densely sericeous; the outer oblong-lanceolate, attenuate to the apex, slightly keeled outside, 1 to 1·25 in. long; inner about ·3 in. long, ovate, acute. *Stamens* numerous; apices of anthers very convex, puberulous. *Ovaries* oblong, pubescent; style cylindric, glabrous; stigma bifid. *Fruit* unknown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 74.

Malacca,—*Griffith* (*Kew Distrib.*) No. 400.

Known only by Griffith's imperfect specimens.

PLATE 134. Goniothalamus fulvus, *H. f. & Th.* 1, Branch with bud and flower—*of natural size;* 2, flower dissected; 3, inner petals; 4 & 5, anthers; 6 & 7, pistils—*enlarged.*

18. GONIOTHALAMUS CURTISII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 75. A shrub or small slender tree; young branches densely rusty-tomentose, the larger pale and glabrous. *Leaves* stoutly membranous, narrowly oblong to obovate-oblong, more or less abruptly and shortly acuminate, slightly narrowed to the rounded base; upper surface shining, glabrous, except the puberulous midrib; the lower sparsely puberulous, the midrib and nerves dark rusty-tomentose; the latter 28 to 34 pairs, sub-horizontal, inter-arching near the margin, very prominent, as is the midrib, on the lower and depressed on the upper surface; length 9 to 15 in., breadth 3 to 5·5 in.; petiole ·35, channelled, pubescent. *Flowers* solitary, from the stem; pedicels stout, decurved, each with two deciduous bracteoles at the base, ·6 in. long. *Sepals* large, green, rigidly membranous, conjoined into a cup with 3 broadly-ovate, sub-acute teeth, boldly nerved and reticulate, minutely rufous-pubescent, persistent; length from ·75 to 1 in. *Petals* coriaceous, velvety-tomentose, yellowish, tinged with red; the outer broadly lanceolate, acuminate, slightly narrowed and thickened at the base, from 1·25 to 1·75 in. long; the inner rather more than one-third as long, ovate, acuminate. *Anthers* numerous, compressed, linear, with acute granular conical apices. *Ovaries* numerous, narrowly elongate, densely pubescent, 1-ovuled; style straight; stigma oblique, minutely lobed. *Ripe carpels* obliquely ovoid, with long pointed slightly hooked apices, rufous-pubescent, ·75 in. long; stalks only ·1 in. long, stout.

Selangor,—*Curtis* Nos. 310 and 2316. Perak,—*King's Collector* No. 10548, *Scortechini* No. 660.

A very distinct species.

PLATE 135. Goniothalamus Curtisii, *King.* 1, Flowering branch; 2, flower dissected; 3, inner petals; 4, ripe carpels—*of natural size;* 5, anthers; 6 & 7, pistils—*enlarged.*

19. GONIOTHALAMUS SIMONSII, *Hook. fil. & Thoms. Fl. Ind.* 108. A small tree; young branches brown-tomentose. *Leaves* thinly coriaceous, oblong-elliptic, shortly abruptly and bluntly caudate-acuminate, the base cuneate; upper surface glabrous, the lower sparsely (the midribs and nerves densely) pubescent; main nerves 14 to 18 pairs, spreading, inter-arching boldly, prominent beneath; the transverse veins few, conspicuous; length 9 to 14 in., breadth 2·75 to 5 in.; petiole ·5 in., brown-pubescent. *Flowers* axillary or from the branches below the leaves, ·4 in. long, with a brown-pubescent oblong obtuse bracteole near the base. *Sepals* broadly ovate, acuminate, nerved, pubescent, persistent, ·3 in. long. *Petals* very coriaceous, densely pubescent outside, minutely pubescent inside; the outer ovate-acuminate, boldly nerved outside, 1·5 to 2 in. long; the inner about one-third as long, ovate, acute, not nerved. *Anthers* with a conical apical process. *Style* cylindric. *Torus* large, pubescent, globular, ·5 in. in diam. *Ripe carpels* oblong, mucronate, ·5 in. long. *Hook. fil. Fl. Br. Ind.* i. 74.

Khasia Hills: alt. 2,000 to 4,000 feet,—*Simons, Hooker, Mann.*

PLATE 137. Goniothalamus Simonsii, *H. f. & Th.* 1, Branch with leaf and flowers; 2, leaf from another specimen; 3, flower dissected—*of natural size;* 4, anthers; 5, pistil—*enlarged.*

20. GONIOTHALAMUS GRIFFITHII, *Hook. fil. & Th. Fl. Ind.* 110. A large shrub or small tree; all parts glabrous except the ovaries and carpels; young branches dark-coloured. *Leaves* coriaceous, oblong, sub-acute, or shortly and obtusely acuminate, the base cuneate; both surfaces shining and reticulate; main nerves 12 to 20 pairs, faint, speading, inter-arching within the edge; length 7 to 12 in, breadth 1·8 to 3·5 in.; petiole ·25 to ·5 in., thick. *Flowers* solitary, axillary or extra-axillary; pedicel ·5 to 1 in. long with a few scale-like bracteoles near the base. *Sepals* thinly coriaceous, orbicular-ovate, blunt, connate below, nerved and reticulate, persistent, ·5 to ·75 in. long. *Petals* thickly coriaceous; the outer broadly lanceolate, acuminate, 1·5 to 2·5 in. long; the inner ovate, acute, ·6 to ·8 in. long. *Anthers* with an acute apical process. *Ovaries* strigose; style long, subulate; stigma slightly bifid. *Ripe carpels* sub-sessile, oblong, ·5 or ·6 in. long, glabrescent or glabrous. *Hook. fil. Fl. Br. Ind.* i. 73; *Kurz For. Fl. Burm.* i. 42; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 75.

Burmah: Mergui,—*Griffith;* Moulmein,—*Falconer.*

PLATE 136. Goniothalamus Griffithii, *H. f. & Th.* 1, Flowering branch; 2, flower dissected (from another specimen); 3, ripe fruit—*of natural size;* 4, anthers; 5, pistil—*enlarged.*

21. GONIOTHALAMUS MACROPHYLLUS, *H. f. & Th. Fl. Br. Ind.* i. 74. A glabrous shrub 5 to 15 feet high; young branches very stout, dark-coloured. *Leaves* coriaceous, large, oblong-lanceolate to oblong-oblanceolate, acute or shortly acuminate, slightly narrowed to the sub-acute or rounded base; main nerves 16 to 20 pairs, spreading, impressed above and slightly prominent beneath; length 10 to 18 in., breadth 2·5 to 4·5 in.; petiole ·6 to 1 in., very stout. *Flowers* slightly supra-axillary or from the branches below the leaves, solitary or in pairs, green; pedicels ·35 in. long, sub-clavate. *Sepals* broadly ovate, acute, connate at the base, ·65 in. long, slightly puberulous, tinged with purple. *Petals* coriaceous; the outer oblong-lanceolate, acute or acuminate, 1 to 1·5 in. long; the inner half as long, ovate, acuminate, the edges ciliate. *Stamens* numerous, linear *Ovaries* 12 to 18, glabrous, 1-ovuled; style slender, dilated above; stigma 2-lobed. *Ripe carpels* globular-obovoid, slightly apiculate, glabrous, ·4 in. long. *Seed* pale brown. *Miq. Fl. Ind. Bat.* i. *pt.* 2, 28; *Ann. Mus. Lugd. Bat.* ii 38; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 76.—Polyalthia macrophylla, *Blume Fl. Jav. Anon.* 79, *t.* 39.—Unona macrophylla, *Blume Bijdr.* i. 17.

It is possible that two species may be included here, there being some difference between the specimens in the nervation of the leaves, and also in the size and nervation of the calyx.

Malacca,—*Griffith, Maingay* (*Kew Distrib.*) Nos. 62 and 1515. Perak,—*King's Collector.* Penang,—*Curtis.* Kedah,—*Curtis.* Distrib.—Sumatra,—*Beccari, Forbes* No. 1379. Java, —*Lobb, Blume.*

PLATE 132. Goniothalamus macrophyllus, *H. f. & Th.* 1, Branch with leaves and flower; 2, ripe carpels; 3, flower; 4, flower with outer petals taken out; 5, side view

of sepals and andro-gynœcium; 6, inner petals; 7, andro-gynœcium—*of natural size;* 8, anthers; 9, pistils—*enlarged.*

22. Goniothalamus Ridleyi, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 76. A tree; young branches slender, puberulous. *Leaves* membranous, broadly elliptic, shortly and abruptly acuminate; the base sub-acute, pale when dry; both surfaces reticulate; the upper dull, glabrous except the puberulous midrib and nerves; the lower shining, puberulous on the midrib nerves and reticulations; main nerves about 6 pairs, curving, ascending; length about 8 in., breadth 4·5 in.; petiole ·25 in., puberulous. *Flowers* 1·75 to 2 in. long, in fascicles on long pedicels from warted, puberulous, woody tubercles on the stem; pedicels 2·5 to 3·5 in. long, minutely bracteolate at the base. *Sepals* coriaceous, broadly ovate-elliptic, obtuse, nerved, ·6 in. long, free, spreading, puberulous. *Petals* coriaceous, pale brown; the outer elliptic-oblong to ovate, obtuse or sub-acute, with a broad thickened claw, puberulous, 1·65 to 2 in. long; inner row a little longer than the sepals, obovate, apiculate, with narrow claw. *Stamens* numerous, long, narrow, much compressed; the apical process of the connective small, sub-conic. *Ovaries* oblong, narrow; style cylindric, puberulous; stigma 2-lobed. *Ripe carpels* obovoid-globular, tapering slightly to the short stalk, glabrous, about 1 in. long.

Singapore; at Sunga Murai,—*Ridley.* Borneo,—*Beccari* No. 3610.

It is possible that in the above description the size of the leaves may be understated, as the only one which I have seen may not be of average size.

Plate 138. Goniothalamus Ridleyi, *King.* 1, Leaf; 2, fascicle of flowers; 3, carpel; 4, flower dissected—*of natural size;* 5 & 6 anthers; 7, pistil—*enlarged.*

23. Goniothalamus sesquipedalis, *Hook. fil. & Thoms. Fl. Ind.* 108. A glabrous erect shrub 2 to 5 feet high; young branches stout, rather dark or cinereous. *Leaves* coriaceous, oblong or oblong-lanceolate, shortly and abruptly acuminate, the base cuneate or rounded; the edges recurved; both surfaces shining, the lower paler; main nerves 16 to 20 pairs, spreading, inter-arching boldly far from the edges, prominent beneath, transverse veins oblique, distinct; length 7 to 15 in., breadth 2·5 to 3·5 in.; petiole ·5 to ·75 in., stout. *Flowers* axillary or supra-axillary, solitary, rarely in pairs, greenish-yellow; pedicels ·1 to ·2 in., stout, with a few scale-like bracteoles at the base; sepals broadly ovate, acute, glabrous, membranous, persistent, reticulate, ·25 in. long. *Petals* coriaceous; the outer linear-lanceolate, acuminate, nearly 1 in. long, glabrous, with a pubescent spot inside; the inner about ·6 in. long, ovate-acuminate, pubescent inside. *Ovaries* narrowly ovoid, not so long as the cylindric styles, strigose; stigma minutely 2- or 3-toothed. *Ripe carpels* few, ovoid, apiculate; the base blunt, glabrous, ·75 to 1 in. long, orange-red when ripe. *Hook. fil. Fl. Br. Ind.* i. 73; *Kurz For. Fl. Burm.* i. 41.—Guatteria sesquipedalis, *Wall. Pl. As. Rar.* iii. *t.* 266; *Cat.* 6446.—*G.* macrophylla, *A. DC. Mem.* 42 (*not of Blume*); *Wall. Cat.* 6451.

Along the base of the Himalayas in tropical forests; from Sikkim to Assam; the Assam range; Burmah: at low elevations.

Plate 139. Goniothalamus sesquipedalis, *Hook. fil. & Thoms.* 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower dissected; 4, anthers; 5, ovaries—*enlarged.*

24. Goniothalamus Tapis, *Miq. Fl. Ind. Bat. Suppl.* 371. A tree 15 to 40 feet high; all parts, except the flowers, glabrous; young branches pale brown. *Leaves* coriaceous, oblong, abruptly shortly and bluntly acuminate, the base rounded or slightly cuneate; the edges recurved (when dry); both surfaces dull, brown when dry, the lower paler; main nerves 10 to 12 pairs, thin, spreading, very indistinct, the midrib prominent beneath; length 5·5 to 9 in., breadth 2·5 to 3·25 in.; petiole ·3 in. *Flowers* solitary and supra-axillary, or in fascicles from tubercles on the branches; pedicels curved, ·4 in. long, bracteolate at the base. *Sepals* free, ovate, acute, spreading, pubescent, persistent, ·4 in. long. *Petals* coriaceous, puberulous; the outer ovate-lanceolate, acuminate, contracted and thickened at the base, 1·75 in. long; the inner ovate, acute, much contracted and thickened at the base, ·65 in. long. *Anthers* numerous and with conical apices. *Ovaries* narrow, hairy; style straight; ovules solitary; stigma sub-discoid-capitate, 2- to 3-lobed. *Ripe carpels* crowded, obovoid, smooth, sub-sessile, ·4 to ·5 in. long. *Miq. Ann. Mus. Lugd. Bat.* ii. 35; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 77.

Perak; at low elevations, very common,—*Scortechini, Wray, King's Collector.* Penang and Pangkore,—*Curtis.* Distrib.—Sumatra, Borneo.

Plate 140. Goniothalamus Tapis, *Miq.* 1, Flowering branch; 2, ripe carpels; 3, flower dissected; 4, inner petals separated from andro-gynœcium; 5 & 6, young carpels—*of natural size;* 7, anthers; 8, pistils; 9, section of ovary—*enlarged.*

25. Goniothalamus Scortechinii, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 77. A shrub or small tree, glabrous except the flowers; young branches with rather pale striate bark. *Leaves* membranous, oblanceolate or oblong-oblanceolate, very shortly acuminate, narrowed from above the middle to the acute or sub-acute base; when dry the upper surface greenish, the lower pale brown; main nerves 18 to 24 pairs, spreading and inter-arching near the edges, slender, slightly prominent beneath; length 10 to 15 in., breadth 2·75 to 4 in.; petiole ·3 in. *Flowers* solitary, rarely in pairs, from the branches below the leaves; pedicels clavate, decurved, bi-bracteolate at the base, ·5 in. long. *Sepals* rigidly membranous, large, orbicular-ovate, obtuse or sub-acute, much nerved and reticulate, connate below, persistent, from ·65 to 1 in. long (according to age). *Petals* coriaceous, rusty-puberulous; the outer oblong-lanceolate, sub-oblique, not much longer than the full grown sepals; the inner broadly ovate, acute, about ·5 in. long. *Anthers* numerous, narrow, with elongate, conical apical processes. *Ovaries* narrow, puberulous, 1-ovuled; style straight; stigma 2- or 3-lobed. *Ripe carpels* crowded, ovoid-oblong, apiculate, glabrous, narrowed to the short stalks, ·45 in. long; stalks ·2 to ·25 in. *Seed* smooth, pale.

Perak; at low elevations,—*Scortechini, Wray, King's Collector.*

The leaves of this species much resemble those of *Polyalthia oblonga*, King.

Plate 141. Goniothalamus Scortechinii, *King.* 1, Leaf-twig; 2, flowers on a branch; 3, flower opened up; 4, flower with outer petals removed; 5, outer and inner petals; 6, flower with all the petals removed; 7, inner petals; 8, torus; 9, carpels—*of natural size;* 10, anthers; 11, pistils—*enlarged.*

26. Goniothalamus Wrayi, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 78. A shrub 3 to 12 feet high, glabrous except the flowers; young branches slender, very pale. *Leaves* membranous, oblanceolate to lanceolate or oblong, shortly and bluntly acuminate,

the base cuneate; both surfaces pale (when dry), obscurely reticulate; main nerves 14 to 18 pairs, spreading, straight, slender and very slightly prominent even when dry; length 4·5 to 9 in., breadth 1·25 to 2 in.; petiole ·2 to ·25 in. *Flowers* solitary, slightly supra-axillary; pedicels slender, decurved, minutely bracteolate, ·35 in. (elongated to ·75 in. in fruit). *Sepals* membranous, slightly nerved and reticulate, ovate, acuminate, spreading or recurved, puberulous outside, ·2 in. long, persistent. *Petals* sub-coriaceous, greenish-yellow, puberulous; the outer narrowly lanceolate, acuminate, the bases thickened and not narrowed to a claw, ·65 to ·75 in. long; inner petals about half as long, ovate, acuminate. *Anthers* numerous, half as long as the ovaries, compressed, their apices with a long thin point from a broad base. *Ovaries* about 20, narrowly cylindric, hairy like the stout straight style, 1- to 2-ovuled; stigma truncate. *Ripe carpels* narrowly obovoid to oblong, apiculate, gradually tapering to the stalk, glabrous, ·6 in. long. *Seeds* usually 1, rarely 2, oblong.

Perak: at low elevations, very common,—*Wray*, *Scortechini*, *King's Collector*.

PLATE 142. Goniothalamus Wrayi, *King*. 1, Flowering branch; 2, leaf from another specimen; 3, flower dissected; 4, ripe carpels; 5, sepals and andro-gynœcium; 6, inner petals—*of natural size;* 7, anthers; 8, pistils—*enlarged*.

27. GONIOTHALAMUS UVARIOIDES, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 78. A shrub 6 to 15 feet high; all parts glabrous except the flower and fruit; young branches pale. *Leaves* thinly coriaceous, oblong, slightly obovate, slightly narrowed to the minutely cordate base; both surfaces rather dull when dry, the lower pale brown, the edges slightly recurved; main nerves 22 to 25 pairs, spreading, rather straight, inter-arching near the margin; length 10 to 15 in., breadth 3 to 6 in.; petiole ·4 in., stout, channelled. *Flowers* on the trunk (solitary?); pedicels curved, stout, ·35 in. long. *Sepals* coriaceous, semi-orbicular, blunt, pubescent, 2 in. long. *Petals* very coriaceous, yellow; the outer broadly lanceolate, thickened and truncate at the base, rufous-pubescent, 1·5 in. long; inner petals like the outer, but with contracted bases and only 1 to 1·2 in. long. *Anthers* with conical apices. *Ovaries* hairy; style cylindric; stigma small, truncate, minutely bifid. *Ripe carpels* oblong, tapering to each end, puberulous, 1·5 in. long and ·65 in. in diam.; stalks ·7 in. long. *Seeds* 4, compressed, rugose, ·5 in. long.

Perak: Ulu Slim,—*King's Collector* No. 10664. Ulu Bubong,—*King's Collector* No. 10126. Distrib.—Borneo,—*Motley* No. 960.

Motley's Bornean specimen above quoted is in flower only; but it so entirely resembles in leaves and wood those of my Collector in Perak, which are in fruit only, that I have ventured not only to consider them as belonging to the same species, but to draw up the above description of the flowers from the Bornean and of the fruit from the Perakian specimens. The species resembles *G. fulvus* in leaves and flower and *G. malayanus* in flower. The fruit is more like that of a *Uvaria* than of a *Goniothalamus*, having 4, sub-horizontal, rugose seeds.

PLATE 143. Goniothalamus uvarioides, *King*. 1, Leaf twig; 2, flower dissected and the inner petals removed; 3, inner petals; 4, ripe carpels; 5, section of ripe carpel—*of natural size;* 6, anthers; 7, pistils—*enlarged*.

There are in the Herbarium, Royal Botanic Garden, Calcutta, specimens in young fruit of a *Goniothalamus* which in leaf resembles *G. Griffithii* and *G. malayanus*, but they

are too imperfect for description. There are also, but too incomplete for description and for figuring, specimens of a fine species collected in Malacca by Mr. Derry (Herb. No. 100).

16. Orophea, *Blume.*

Trees or shrubs. *Flowers* usually small, axillary, solitary, fascicled or cymose. *Sepals* 3, valvate. *Petals* 6, valvate, in two series; outer ovate; inner clawed, usually cohering by their margins into a mitriform cap; sometimes oblong and slightly approximate below the middle, the apices divergent, not vaulted; rarely without claws, and in one species slightly imbricate. *Stamens* definite, 6—12, ovoid, fleshy; anther-cells dorsal, large, contiguous; the connective sometimes prolonged into a conical apical point, not truncate. *Staminodes* 0, or 3 to 6. *Ovaries* 3—15; style short or 0; ovules 4. *Ripe carpels* 1- or more-seeded, globular or oblong (very long in several species). Distrib.—Species about 25,—all Eastern Asiatic.

Intermediate between *Mitrephora* and *Bocagea*, having the perianth of the former and stamens of the latter.

Inner petals distinctly vaulted, the limbs coherent by their thickened edges.

Stamens 12.

Carpels globose.

Peduncles 1-flowered.

Flowers unisexual . . . . . 1. *O. setosa.*
Flowers hermaphrodite . . . . . 2. *O. uniflora.*
Peduncles 2- to 3-flowered . . . . . 3. *O. Thomsoni.*
Carpels oblong . . . . . 4. *O. erythrocarpa.*

Stamens 6.

Leaves glabrous at all ages (see also No. 10) . . . . . 5. *O. Katschallica.*
Leaves more or less pubescent (except No. 10).

Ripe carpels globose.

Leaves 3·5 to 4·5 in. long and with 8 or 9 pairs of main nerves . . . . . 6. *O. hirsuta.*
Leaves 2·5 to 3·25 in. long and with 5 or 6 pairs of nerves . . . . . 7. *O. zeylanica.*

Ripe carpels oblong.

Carpels under 2 in. in length.

Flowers ·8 in. long; nerves of leaves 11 to 13 pairs . 8. *O. Brandisii.*
Flowers ·35 in. long; nerves of leaves 7 to 9 pairs . 9. *O. hexandra.*

Carpels 3 to 5 in. long.

Leaves quite glabrous; main nerves 6 or 7 pairs . . 10. *O. enterocarpa.*
Leaves puberulous beneath; main nerves 10 to 12 pairs . . . . . 11. *O. maculata.*

Inner petals slightly vaulted, trapezioid . . . . . 12. *O. gracilis.*

Inner petals spreading, not vaulted and not trapezioid.

Stamens 10 or 12.

Inner petals hastate; ripe carpels globular . . . . . 13. *O. hastata.*
Inner petals linear-oblong; the apices divergent and recurved; ripe carpels ovoid or slightly obovoid . . . . . 14. *O. dodecandra.*

Stamens 6.

Inner petals cuneiform or cuneiform-retuse; ripe carpels cylindric . 15. *O. cuneiformis.*
Inner petals irregularly oblong, their apices broad and curved outwards; ripe carpels globular . . . . . 16. *O. polycarpa.*
Inner petals not clawed but distinctly vaulted . . . . . 17. *O. coriacea.*
Inner petals not clawed, often slightly imbricate but always connivent . . 18. *O. obliqua.*

1. Orophea setosa, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 89. A shrub; young branches densely covered with a layer of minute pubescence with numerous, long, brownish, straight bristles projecting beyond it; the older branches dark-coloured and almost glabrous. *Leaves* membranous, oblong or oblong-oblanceolate, shortly acuminate, the base rounded; main nerves 8 to 10 pairs, oblique, inter-arching near the edge; both surfaces sparsely setose, more densely so on the midrib and nerves; the lower also with sparse, minute pubescence; length 5·5 to 7·5 in., breadth 2 to 2·75 in.; petiole ·05 in., setose. *Flowers* solitary, extra-axillary, about ·2 in. in diam. when expanded; pedicels very slender, ·75 in. long, pubescent, with a single minute bracteole below the middle. *Sepals* sub-orbicular, blunt. *Outer petals* much larger than the sepals, broadly ovate, sub-acute, pubescent outside and glabrous inside like the sepals. *Inner petals* longer than the outer, vaulted, ·22 in. long, the limb trapezoid sagittate, pubescent on the back and edges, glabrous in front; the claw narrow, shorter than the limb. *Male flower;* stamens numerous, cuneate; the connective broadly truncate at the apex. *Ovaries* unknown. *Ripe carpels* 4 or 5, sessile, globose or oblong-globose, ·3 in. in diam., densely and minutely pubescent and with a few long setæ besides. *Seeds* solitary, rarely 2; the testa pale, rather rough; the albumen very dense.

Perak: at elevations from 800 to 1,200 feet,—*King's Collector, Scortechini.*

Plate 131B. Orophea setosa, *King.* 1, Flowering branch; 2, ripe carpels—*of natural size.*

2. Orophea uniflora, *Hook. fil. & Thoms. Fl. Ind.* 111. A shrub or small tree; young branches slender, glabrous, dark-coloured. *Leaves* thinly coriaceous, oblong-lanceolate to ovate-lanceolate, shortly and bluntly acuminate, the base cuneate or rounded; both surfaces glabrous; main nerves about 4 pairs, spreading, very faint, inter-arching at some distance from the margin; length 1·75 to 2·25 in., breadth ·75 to 1·1 in.; petiole ·1 in. *Flowers* usually solitary, axillary; pedicels slender, ·25 to ·5 in. long; bracteoles minute, one about the middle, the others basal. *Sepals* small, orbicular or broadly ovate, ciliate. *Outer petals* ovate or orbicular, membranous, glabrous, ·25 in. long; the inner much longer, trapezioid, with a long narrow claw. *Stamens* 12, in two rows. *Ovaries* about 6, 2-ovuled; the stigma sub-sessile, oblong. *Carpels* globose, ·4 in. in diam., glabrous; pedicels ·1 to ·2 in. long. *Hook. fil. Fl. Br. Ind.* i. 90; *Beddome Ic. Pl. Ind. Or., t.* 69.

Western Peninsular India, on the Western Ghats; in the forests of Coorg and Travancore,—*Wight, Beddome.*

PLATE 144A. Orophea uniflora, *H. f. & T.* 1, Flowering branch; 2, ripe carpels—*of natural size;* 3 & 4, flowers; 5 & 6, stamens; 7, pistil; 8, section of same—*enlarged.* (*Nos.* 3 *to* 8 *are copied from Beddome's Icones Pl. Ind. Or., t.* 69.)

3. OROPHEA THOMSONI, *Bedd. in Trans. Linn. Soc.* XXV. 210, *t.* 21; *Ic. Pl. Ind. Or., t.* 67. A small tree; all parts glabrous except the under-surface of the midribs and the inflorescence. *Leaves* ovate-lanceolate, shortly and obtusely acuminate; the base sub-cuneate or rounded, glabrous except the pubescent midrib on the lower surface; main nerves 6 or 7 pairs, oblique, faint; length 2 to 3 in., breadth ·8 to 1·2 in.; petiole ·15 in. *Peduncles* axillary, solitary, very short, 2- to 3-flowered, strigose; bracteoles minute, basal. *Flowers* sub-sessile. *Sepals* and *outer petals* ovate-orbicular, strigose on the outside. *Inner petals* with a long claw, pubescent inside at the apex. *Stamens* 10 to 12 in two rows. *Ovaries* 5 or 6, ovoid, pubescent on the outer side, 2-ovuled. *Carpels* pisiform. *Hook. fil. Fl. Br. Ind.* i. 91.

Western Peninsular India, in the Anamally Hills; alt. 1,500 to 2,500 feet,—*Beddome.*

PLATE 144B. Orophea Thomsoni, *Bedd.* 1, Flowering branch—*of natural size;* 2, flower-bud; 3 & 4, flowers; 5, stamen; 6, flower with outer petals and stamens removed; 7, ovaries; 8 & 9, single ovaries; 10 & 11, sections of ovaries—*enlarged.* (*Copied from Trans. Linn. Soc.* XXV. *t.* 25.)

4. OROPHEA ERYTHROCARPA, *Bedd. in Trans. Linn. Soc.* XXV. 210; *Ic. Pl. Ind. Or., t.* 68. A small tree; young branches at first softly pubescent, afterwards glabrous, lenticellate and striate. *Leaves* membranous, elliptic-oblong, very shortly and abruptly acuminate, the base rounded; upper surface glabrous when adult, the lower puberulous, especially on the midrib; main nerves 7 or 8 pairs, oblique, faint; length 3 to 4 in., breadth 1·25 to 1·75 in.; petiole ·1 in. *Peduncles* 1 in. long or less, axillary or supra-axillary, 3- or 4-flowered, golden-tomentose; bracts several; pedicels with a linear basal and a supra-median bracteole. *Flowers* about ·5 in. in diam. *Sepals* orbicular, pubescent. *Outer* petals ovate, acute; the outer surface and margins pubescent; inner petals trapezioid, hairy, with a long, narrow, glabrous claw. *Stamens* 12 in two rows (those of the outer row often imperfect), small. *Ovaries* 6, oblong, blunt, pubescent, 2-ovuled; stigma sub-capitate, sessile. *Ripe carpels* oblong, pointed at each end, but especially at the apex, nearly 1 in. long and red in colour. *Seed* 1, scrobiculate. *Hook. fil. Fl. Br. Ind.* i. 91.

Western Peninsular, in the forests of the Anamally Hills; alt. 2,000 feet,—*Beddome.*

PLATE 145A. Orophea erythrocarpa, *Bedd.* 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower with inner petals removed; 4, inner petal; 5, flower with all the petals and stamens removed; 6, anther; 7, ovary; 8, section of the same—*all enlarged more or less.* (*Copied in part from Beddome's Ic. Pl. Ind. Or., t.* 68.)

5. OROPHEA KATSCHALLICA, *Kurz in Trimen's Journ. Bot.* 1875, *p.* 323. A small tree 25 to 30 feet high; young branches slightly puberulous at first, ultimately glabrous,

black and furrowed. *Leaves* membranous, oblong-lanceolate to oblong or elliptic, shortly and bluntly acuminate, the base sub-cuneate or rounded; upper surface glabrous, shining; the lower much reticulate, slightly adpressed-puberulous; main nerves 3 to 10 pairs, ascending, slender; length 4 to 7 in., breadth 1·5 to 2·75 in.; petiole ·15 in. *Peduncles* extra-axillary, solitary, ·5 to ·75 in. long, with numerous ovate-acuminate, rusty-pubescent bracts. *Flowers* 1 to 4, rather large; their pedicels about ·4 in. long, pubescent, and with a single adpressed ovate-lanceolate bracteole. *Sepals* ovate-acuminate, adpressed-pubescent outside, sub-glabrescent inside. *Outer petals* much larger than the sepals, ovate-orbicular, acute, veined, pubescent on the outer surface and on the upper half of the inner, ·4 in long. *Inner petals* ·75 in. long, trapezoid, acute, tomentose on both surfaces except a glabrous patch bearing a transverse callosity on the inner; the claw long, narrow and glabrous. *Stamens* 6 perfect, with a few imperfect in an outer row; anther-cells large, dorsal; the connective oblique, slightly produced above their apices. *Ovaries* about 3, narrowly ovoid, densely sericeous, 3-ovuled; stigmas sessile, truncate. *Fruit* unknown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 89.

Nicobar Islands,—*Kurz*, *King's Collector*.

Plate 145B. Orophea Katschallica, *Kurz*. 1, Flowering branch—*of natural size;* 2, flower dissected—*slightly enlarged;* 3, anthers, front and back view—*much enlarged*.

6. Orophea hirsuta, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 81. A shrub 8 to 12 feet high; young branches at first densely rufous-hirsute, afterwards becoming glabrous and dark-coloured. *Leaves* elliptic or elliptic-oblong, often slightly obovate, shortly and bluntly acuminate, narrowed from below the middle to the rounded minutely cordate base; upper surface glabrous, shining; the lower pale, dull, sparsely hirsute, the midrib setose at the base; main nerves 8 to 9 pairs, spreading, very faint; length 3·5 to 4·5 in., breadth 1·24 to 1·75 in.; petiole 0·5, setose. *Peduncles* extra-axillary, about ·5 in. long, 1- to 3-flowered, rufous-hirsute like the pedicels; pedicels about ·75 in. long and with several minute bracteoles. *Flowers* ·5 in. in diam. *Sepals* broadly ovate, acute, coarsely hirsute outside and on the edges, glabrous inside. *Outer petals* much larger than the sepals, broadly obovate, blunt, sparsely pubescent outside and on the edges, glabrous inside, ·15 in. long. *Inner petals* ·25 in. long, vaulted; the limb trapeziform, rather thick, glabrous outside, pubescent inside; the claw very narrow, longer than the limb, glabrous. *Stamens* 6, in a single row, curved; anthers broad, dorsal; the connective not produced above their apices. *Ovaries* about 6, ovoid, glabrous, 1- to 2-ovuled; stigma sessile, roundish. *Carpels* 4 to 5, globular, yellow when ripe, sparsely hirsute, ·4 in. in diam.; stalks ·1 in.

Perak,—*King's Collector* No. 4283.

Only once collected. In its leaves this resembles *Mitrephora setosa*, King.

Plate 146A. Orophea hirsuta, *King*. 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower dissected; 4, anthers—*enlarged*.

7. Orophea zeylanica, *Hook. fil. & Thoms. Fl. Ind.* 111. A small tree or shrub; young branches slender, yellow-pubescent. *Leaves* sub-coriaceous, ovate to ovate-oblong, shortly and obtusely acuminate, the base slightly narrowed or rounded, sub-oblique; the under-surface puberulous when young, ultimately both surfaces glabrous; main

nerves 5 or 6 pairs, very faint; length 2·25 to 3·25 in., breadth 1· to 1·5 in.; petiole 1·1 in. *Peduncles* extra-axillary, 1 to 2 in. long, 1- to 3-flowered, slender, rufous-pubescent; pedicels varying in length, each with a small basal bracteole. *Flowers* about ·4 in. in diam., green. *Sepals* orbicular, obtuse or acute, veined, pubescent. *Outer petals* like the sepals, but larger; *inner petals* ·3 in. long, trapezioid, glabrous, with pubescent margins. *Stamens* 6 in a single row, their apices pointed. *Ovaries* about 12 or 15, obovate, glabrous, 2-ovuled; stigma oblong, sub-sessile. *Carpels* globose, about ·4 in. in diam., glabrous, smooth; their stalks ·1 in. long. *Hook. fil. Fl. Br. Ind.* i. 91; *Thwaites' Enum. Pl. Ceyl.* 8; *Bedd. Ic. Pl. Ind. Or., t.* 70.

Western Peninsula: in Canara and Coorg. Ceylon: elev. 2,000 to 3,000 feet.

PLATE 146B. Orophea zeylanica, *H. f. & Th.* 1, Branch with flowers and nearly ripe fruit—*of natural size;* 2 & 3, flowers from above and beneath; 4, side view of flower, the outer petals removed; 5, sepals, anthers, and pistils; 6, inner petal; 7, 8 & 9, anthers; 10, pistil; 11, section of same—*enlarged.* (*Nos.* 5, 6, 10 *&* 11 *are copied from Beddome's Icones Pl. Ind. Or., t.* 70. *The rest are copied from a drawing made in the Peradeniya Herbarium and kindly lent by Dr. H. Trimen,* F.R.S.)

8. OROPHEA BRANDISII, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 91. A tree 20 to 25 feet high; young branches slender, softly tawny-tomentose at first, soon becoming glabrous, dark-coloured and striate. *Leaves* membranous, oblong-oblanceolate, much acuminate, narrowed from above the middle to the rounded or sub-cuneate, slightly unequal, base; upper surface glabrous, under-surface sparsely pubescent; the nerves and midribs densely softly tomentose; main nerves 10 to 13 pairs, oblique, distinct beneath; length 6 to 10 in., breadth 1·75 to 3 in.; petiole ·15 in., tomentose. *Peduncles* supra-axillary, slender, tomentose, ·5 to 1 in. long, 1- or 2-flowered; pedicels as long as, or longer than, the peduncles, tomentose, and with 1 or 2 subulate bracteoles; the *flowers* large. *Sepals* ovate-lanceolate, acuminate, softly pubescent outside. *Outer petals* ·35 to ·5 in. long, much larger than the sepals, broadly ovate-acuminate, veined, pubescent on the outer and on the upper half of the inner surface. *Inner petals* about ·8 in. long, trapeziform, pubescent, with a large rounded glabrous callosity on the inner surface; the claw much larger than the limb, very narrow, pubescent. *Stamens* 6, slightly apiculate; anther-cells large, dorsal. *Ovaries* 4 to 6, densely villous, oblong, 1- to 2-ovuled; style oblong, short, glabrous. *Ripe carpels* sessile, narrowly oblong, densely pubescent, about 1 in. long and only 1·5 in. in diam. when ripe. *Seed* elongate, cylindric. *Kurz For. Fl. Burm.* i. 50.

Burmah,—*Brandis, Kurz.*

PLATE 147A. Orophea Brandisii, *H. f. & T.* 1, Flowering branch; 2, nearly ripe fruit—*of natural size;* 3, flower dissected; 4 & 5, anthers; 6, pistil—*enlarged.*

9. OROPHEA HEXANDRA, *Blume Bijdr.* 18. A small tree; young branches slender, minutely tomentose, soon becoming dark-coloured, glabrous and furrowed. *Leaves* thinly coriaceous, oblong-lanceolate to elliptic-oblong, rather abruptly acuminate, the base sub-cuneate or rounded; upper surface glabrous, shining; the lower reticulate, puberulous, the midrib pubescent; main nerves 7 to 9 pairs, oblique; length 4·5 to 6 in., breadth 1·5 to 2·25 in.; petiole ·2 in. *Peduncles* axillary or supra-axillary, slender, 1- to

3-flowered, pubescent; bracts several, subulate, hairy. *Flowers* about ·35 in. long, greenish-white. *Sepals* minute, ovate to ovate-lanceolate, densely pubescent outside. *Outer petals* thin, ovate-cordate, acuminate, pubescent; the inner larger, trapezioid, with long narrow claw, glabrous, with pubescent margins. *Stamens* 6, in one row. *Ovaries* about 6, pubescent, 2-ovuled. *Ripe carpels* oblong, sub-sessile, acuminate, minutely adpressed-pubescent, 1·4 to 1·75 in. long. *Seeds* usually solitary, sometimes ·2 in. long, narrowly cylindric. *Kurz For. Fl. Burm.* i. 49; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 29; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 81.—Orophea acuminata, *A. DC.* in *Mem. Soc. Genev.* v. 39; *Hook. fil. & Thoms. Fl. Ind.* 112; *Hook. fil. Fl. Br. Ind.* i. 91; *Wall. Cat.* 6432.—Bocagea hexandra, *Blume Fl. Jav. Anon.* 83, *t.* 40.

Burmah: province Tenasserim,—*Wallich.* Great Coco Island,—*Kurz.* S. Andaman,—*King's Collectors.* Distrib.—Java.

Pierre (*Flore Forestiere Cochin-China, t.* 44) figures a species called *O. Thorelii*, which, as he remarks, must be closely allied to this.

PLATE 147B. Orophea hexandra, *Blume.* 1, Flowering and fruiting branch; 2, ripe carpel from another specimen—*of natural size;* 3, side view of flower in natural position; 4, flower inverted; 5, flower with the inner petals removed; 6, inner petals—*enlarged;* 7, sepals and ovaries; 8 & 9, anthers; 10, pistils—*much enlarged.*

10. OROPHEA ENTEROCARPA, *Maingay ex Hook. fil. Fl. Br. Ind.* i. 92. A small tree 15 to 30 feet high; all parts, except the inflorescence, glabrous; young branches slender, black, striate. *Leaves* membranous, ovate or sometimes obovate-lanceolate to elliptic, acuminate (sometimes abruptly so); the base rounded, sometimes sub-cuneate; both surfaces shining; main nerves 6 or 7 pairs, spreading, slender; length 2·5 to 5 in., breadth 1·2 to 2 in.; petiole ·1 in. *Flowers* nodding, solitary, extra-axillary; the pedicels very slender, ·75 to 1·25 in. long, glabrous below, pubescent above, and with several ovate-lanceolate bracteoles. *Sepals* small, broadly ovate, acuminate, pubescent. *Outer petals* much larger than the sepals, ovate, acuminate, puberulous; the inner a little longer (·6 to ·75 in. long); the limb elongated-trapezioid, puberulous; the claw narrow and glabrous, yellowish with a reddish band; staminodes 6. *Stamens* 6, with broad connective, not apiculate. *Ovaries* 6, cylindric, glabrous, 2- to 7-ovuled; stigma small, sessile. *Carpels* 4 to 6, elongate-cylindric, glabrous, moniliform when dry, 3 to 5 in. long and ·3 in. in diam. *Seeds* 2 to 7, linear-oblong. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 82.

Malacca,—*Maingay* (*Kew Distrib.*) No. 88. Perak,—*Scortechini, King's Collector.*

PLATE 148A. Orophea enterocarpa, *Maing.* 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, sepals, staminodes, anthers and pistils; 4, outer petal; 5, inner petal; 6 & 7, anthers; 8, pistil—*enlarged.*

11. OROPHEA MACULATA, *Scortechini* MSS. A shrub or small tree; young branches slender, rusty-tomentose at first, afterwards glabrous, black and striate. *Leaves* membranous, elliptic-oblanceolate, caudate-acuminate, narrowed from below the middle to the rounded or sub-cuneate, slightly unequal, base; upper surface glabrous, the lower glabrescent, the midrib and nerves pubescent; main nerves 10 to 12 pairs, spreading, rather faint; length 3·25 to 7 in., breadth 1·5 to 2·25 in., tomentose. *Peduncles*

solitary, 1- to 3-flowered, extra-axillary, very slender, ·5 to 1 in. long, pubescent with numerous, distichous, sub-deciduous, linear-lanceolate, pubescent bracts. *Flowers* large, sub-pendulous. *Sepals* narrowly lanceolate, acuminate. *Outer petals* larger than the sepals, mottled red and yellow, ovate, very acuminate, veined, pubescent on both sides, ·5 in. long. *Inner petals* 1 in. long, with lanceolate, much acuminate, very pubescent limb; the claw long, narrow, pubescent. *Stamens* 6, broad, not apiculate, hairy at the base. *Staminodes* 3, orbicular. *Ovaries* 3 to 6, cylindric, very hirsute, 6- or 7-ovuled; stigma sessile. *Carpels* 4 to 6, much elongate, cylindric, puberulous, 3 to 5 in. long and about ·3 in. in diam., moniliform when dry. *Seeds* 4 to 7, linear-oblong. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 82.

Perak,—*Scortechini, King's Collector.*

PLATE 148B. Orophea maculata, *Scort.* 1, Flowering branch; 2, flower; 3, flower dissected; 4, flower-bud; 5, ripe carpels—*of natural size;* 6, anthers; 7, pistil; 8, section of pistil—*enlarged.*

12. OROPHEA GRACILIS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 83. A tree 20 to 30 feet high; young branches slender, at first minutely tomentose, afterwards darkly cinereous and glabrous. *Leaves* thinly coriaceous when adult, lanceolate, much acuminate, the base cuneate or slightly rounded; both surfaces glabrous; main nerves 5 or 6 pairs, spreading, inter-arching far from the edge, very indistinct; length 2·5 to 3·5 in., breadth ·9 to 1·2 in.; petiole ·05 in. *Flowers* solitary, ·25 in. in diam., extra-axillary; pedicels ·75 to 1 in. long, very thin, glabrous, jointed, and with several minute subulate bracteoles above the middle. *Sepals* broadly ovate, sub-acute, connate at the base, spreading or reflexed. *Outer petals* larger than the sepals, ovate, acute, ·15 in. long; both surfaces glabrous, the edges alone minutely pubescent. *Inner petals* ·25 in. long, slightly vaulted; the limb thick, trapezioid, with pubescent edges; the claw narrow, not so long as the limb, glabrous. *Stamens* 6, in a single row; the connective much produced above the rather small dorsal anther-cells. *Ovaries* 4 to 10, ovoid, glabrous, 2-ovuled; stigma large, sessile. *Ripe carpels* 6 to 10, globular, glabrous, ·45 in. in diam., their stalks ·25 in. long. *Seeds* solitary or two together, depressed-globose, with a transverse groove and ridge, shining, pale.

Perak,—*Scortechini, King's Collector.*

This is closely allied to the W. Peninsular *O. uniflora,* but that species has twice as many stamens.

PLATE 149A. Orophea gracilis, *King.* 1, Flowering branch; 2, ripe carpels; 3, pair of seeds from a carpel seen from the side and showing the lateral grooves and ridges; 4, convex surface of a seed; 5, flat surface—*of natural size;* 6, flower unexpanded; 7, flower dissected; 8, anthers—*enlarged.*

13. OROPHEA HASTATA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 83. A tree 20 to 40 feet high; all parts glabrous except the inflorescence; young branches rather slender, dark-coloured. *Leaves* thinly coriaceous, elliptic to elliptic-oblong, shortly caudate-acuminate, the base cuneate, rarely rounded; both surfaces shining, the lower pale; main nerves 6 to 8 pairs, spreading, inter-arching within the edge; length 3·5 to 5·5 in., breadth 1·6 to 2·4 in.; petiole ·2 in. *Peduncles* axillary or supra-axillary,

solitary, about ·25 in. long, bearing towards the apex 3 or 4 1-bracteolate, pubescent pedicels. *Flowers* ·4 in. long. *Sepals* broadly ovate, acute, pubescent outside, glabrous inside as are the outer petals. *Outer petals* twice as large as the sepals, broadly ovate, acute. *Inner petals* ·35 in. long; the limb hastate, triquetrous, thickened, the edges and the base ciliate; the claw long, narrowed to the base, glabrous. *Staminodes* 0. *Stamens* 10, in two rows, curved, slightly apiculate; the anther-cells large. *Ovaries* about 10, obliquely oblong, curved, pubescent, 2-ovuled; stigma small, capitate, sessile. *Ripe carpels* 5 or 6, globular, glabrous, ·4 in. in diam.; their stalks about ·25 in. *Seeds* solitary.

Perak,—*Wray*, *King's Collector*; at low elevations. Singapore,—*Ridley*.

This is closely allied to *O. dodecandra*, Miq.

PLATE 149B. Orophea hastata, *King*. 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower dissected; 4 & 5, anthers; 6, pistil—*enlarged*.

14. OROPHEA DODECANDRA, *Miq. in Ann. Mus. Lugd. Bat.* ii. 25. A tree 20 to 40 feet high; young branches sparsely adpressed-pubescent, afterwards glabrous dark-coloured and striate. *Leaves* membranous, elliptic, rarely elliptic-oblong, slightly inequilateral, shortly caudate-acuminate, the base cuneate; upper surface glabrous, shining; the lower paler with a few scattered, pale, adpressed hairs; main nerves 5 or 6 pairs, bold beneath, inter-arching ·25 in. from the margin; length 3·5 to 5·5 in., breadth 1·75 to 2·3 in.; petiole ·2 in., stout, channelled. *Peduncles* supra-axillary, longer than the pedicels, 3- to 7-flowered, glabrous; pedicels ·5 in. long, clustered near the apex, bracteolate above the middle. *Flowers* ·5 in. long. *Sepals* smaller than the outer petals, spreading, dotted, conjoined at the base, slightly tubercular outside, glabrous inside. *Outer petals* broadly ovate, acuminate, narrowed at the base, ·15 in. long. *Inner petals* thick, linear-oblong, blunt, puberulous outside, slightly arched below the middle, the apices divergent and recurved. *Staminodes* 0. *Stamens* 12, in two rows; the connective rather narrow, prolonged beyond the apices of the large, broad, dorsal anthers. *Ovaries* 6 to 8, oblong, curved, oblique, glabrous, 2-ovuled; stigma oblong, sessile. *Ripe carpels* ovoid or slightly obovoid, blunt, glabrous, ·85 in. long; their stalks ·8 to ·9 in. *Seeds* solitary, sub-rotund or oblong, with rugose, pale, scaly testa. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 84.

Perak,—*Scortechini*, *King's Collector*; at low elevations.

PLATE 150A. Orophea dodecandra, *Miq.* 1, Flowering branch; 2, young carpels; 3, ripe carpel—*of natural size;* 4, flower dissected; 5, anthers; 6, pistils—*enlarged*.

15 OROPHEA CUNEIFORMIS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 84. A tree 20 to 40 feet high; young parts rusty-pubescent or tomentose; the branchlets rather stout, ultimately glabrous dark-coloured and furrowed. *Leaves* thinly coriaceous, oblong, narrowly elliptic or oblanceolate-oblong, more or less sharply acuminate, very little narrowed to the rounded or minutely cordate base; upper surface at first with many long, thin, pale, adpressed hairs, ultimately glabrous; lower softly but rather coarsely pubescent, the midrib and 8 to 12 pairs of oblique rather prominent main nerves rufous-tomentose; length 3·5 to 6 in., breadth 1·1 to 2·2 in.; petiole ·05, tomentose. *Peduncles* 4- or 5-flowered, solitary, supra-axillary, slender, sub-glabrous below, rufous-sericeous above, longer than the pedicels; bracts numerous, linear-lanceolate; pedicels

·3 in. long, rufous-sericeous like the outer surface of the sepals and outer petals, bracteolate at the base. Flower-buds globose. *Sepals* ovate, much acuminate, glabrescent inside like the outer petals. *Outer petals* ovate, acute, veined. *Inner petals* with a cuneiform, sometimes retuse, thick limb, and a short narrow claw. *Staminodes* 3, in an outer row, sub-orbicular, fleshy. *Stamens* 6, with broad flat connective not produced at the apex, and large dorsal anthers. *Ovaries* about 6, oblong, oblique, densely villous, 2- or 3-ovuled; stigma sessile, broad. *Ripe carpels* 2 to 4, sessile, cylindric, tapering a little at each end, puberulous, 1·5 to 1·75 in. long and about ·35 in. in diam. *Seeds* 2, oblong.

Perak,—*Scortechini, King's Collector.*

This is readily distinguished from the closely allied species *O. maculata*, by its scorpiod cymes, globular flower-buds, and by the cuneiform (not lanceolate) limbs of its petals.

PLATE 150B. Orophea cuneiformis, *King*. 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower dissected; 4 & 5, anthers; 6, pistil; 7, section of ovary—*enlarged.*

16. OROPHEA POLYCARPA, *A. DC. in Mem. Soc. Genev.* v. 39. A large shrub or small tree; young branches slender, pubescent at first, but speedily glabrous furrowed and dark-coloured. *Leaves* membranous, ovate to ovate-oblong, obtusely and very shortly acuminate, the margins undulate, the base rounded or narrowed; both surfaces glabrous; main nerves 6 to 8 pairs, spreading, faint; length 2 to 4 in., breadth 1 to 1·75 in.; petiole ·05 in. *Peduncles* axillary or supra-axillary, slender, 1- to 3-flowered, pubescent; bracteoles several. *Sepals* ovate, acute, very pubescent. *Outer petals* ovate, acuminate, more than twice as large as the sepals, pubescent on the outer, glabrous on the inner, surface. *Inner petals* twice as long as the outer, irregularly oblong, the apices broad and curved outwards, the base slightly narrowed, puberulous outside, glabrous within, ·4 in. long. *Stamens* 6 or 7, in a single row; the anther-cells quite dorsal, separate; the connective flat and very slightly prolonged above their apices. *Ovaries* about twice as many as the stamens, glabrous, ovate, oblique; stigma small, sessile, sub-capitate. *Ripe carpels* globular, glabrous, shining, ·35 in. in diam.; their stalks ·25 in. long. *Seeds* 1 or 2. *Wall. Cat.* 6431; *Hook. fil. & Thoms. Fl. Ind.* 111; *Hook. fil. Fl. Br. Ind.* i. 91; *Kurz For. Fl. Burm.* i. 49; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 85.—Anonacea, *Griff. Ic. Pl. Ind. Or.* iv. *t.* 654.—Bocagea polycarpa, *Steud. Nomen.* 212.—Melodorum? monospermum, *Kurz* in *Andaman Report, App. B, p.* 1.—Bocagea polycarpa, *Steud.*

S. Andaman,—*Kurz, King.* Burmah: Martaban,—*Wall. Cat.* No. 6431, *Griffith* (*Kew Distrib.*) No. 399.

Orophea undulata (Pierre Fl. Forest. Coch.-Chine, t. 45) must be closely allied to this, as must also the same author's *O. anceps.* (l. c. t. 46).

PLATE 151A. Orophea polycarpa. 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower dissected; 4, sepals and torus; 5, pistils—*slightly enlarged;* 6 & 7, anthers; 8, pistil—*much enlarged.*

17. OROPHEA CORIACEA, *Thwaites' Enum. Pl. Ceyl.* 8; *Beddome Ic. Pl. Ind. Or., t.* 71. A large tree; young branches dark-coloured, rather slender. *Leaves* very coriaceous,

ovate-lanceolate, acute or sub-acute, the base rounded; both surfaces dull when dry; the midrib impressed on the upper, very prominent on the lower; main nerves about 6 pairs, spreading, very faint; length 3 to 4 in., breadth 1·25 to 1·6 in.; petiole ·15 in. *Flowers* bisexual, yellow and purple, ·3 in. in diam., solitary or in short, few-flowered, extra-axillary cymes; pedicels ·3 in. long, with several basal strigose bracteoles. *Sepals* minute, glabrous, deltoid, their edges ciliate. *Petals* orbicular, concave, sub-acute, glabrous; the outer valvate, spreading, yellowish, not much larger than the inner; the inner vaulted, but without claws, dark purple. *Stamens* 12, in two rows. *Ovaries* 1 or 2, oblong-oblique, 2-ovuled; the stigma sessile. *Carpels* sub-sessile, obliquely sub-globose, apiculate when young, glabrous, ·4 to ·6 in. in diam. Bocagea coriacea, *H. f. & Th. Fl. Br. Ind.* i. 93.

Ceylon: altitude 3,000 feet,—*Thwaites.*

This plant appears to me to be rather an *Orophea* than a *Bocagea*, and I venture to retain it in the former genus. The inner petals, it is true, are not clawed, as in typical *Orophea*, but they are vaulted; while the anthers, and especially the 2-ovulate ovary and small sessile stigma and ripe carpels, are quite those of *Orophea*. The outer petals, moreover, appear to me to be valvate and not imbricate. Dr. H. Trimen, F.R.S., suggests (*in litt.*) that it might be advisable to establish a new genus for this plant. Dr. Trimen informs me that, in its distribution, this is quite montane.

PLATE 151B. Orophea coriacea, *Thwaites.* 1, Flowering branch; 2, carpels—*of natural size;* 3, flower with one of the outer petals removed; 4, inner petal; 5 & 6, andro-gynœcium; 7, flower with the petals and stamens removed; 8, anther; 9, section of ovary—*enlarged.* (*All copied from a drawing made in the Peradeniya Herbarium and kindly lent by Dr. H. Trimen,* F.R.S.)

18. OROPHEA OBLIQUA, *Hook. fil. & Thoms. Fl. Ind.* 112. A tree; young branches rather slender, dark-coloured. *Leaves* thinly coriaceous, shining, oblong-lanceolate to elliptic-acute or acuminate, narrowed and slightly oblique at the base; lower surface paler than the upper, reticulate; main nerves 5 to 7 pairs, spreading, inter-arching far from the edge, faint; length 4 to 5·5 in., breadth 1·5 to 2·25 in.; petiole ·15 in. *Peduncles* leaf-opposed, supra-axillary or sometimes terminal, ·4 to ·5 in. long, 1- to 3-flowered; pedicels half as long, bracteolate at the base. *Flowers* bisexual, ·25 in. in diam., purple. *Sepals* minute, lanceolate. *Petals* thick, glabrous, the outer valvate, broadly ovate, obtuse; the inner slightly shorter, orbicular, valvate or slightly imbricate, vaulted over the stamens and pistil, without claws. *Stamens* 6, in two rows; the connective broad, flat, slightly longer than the broad dorsal anthers. *Ovaries* 3, oblong, slightly oblique, glabrous, 2-ovuled; stigma sessile, broad, flat. *Ripe carpels* sessile, ovoid-globose, smooth, red, ·5 in. in diam. *Seeds* 1 or 2, globular or slightly compressed on one side, shining, brown. Orophea? obliqua, *H. f. & T., Thwaites' Enum. Pl. Ceyl.* 8; *Beddome Ic. Pl. Ind. Or., t.* 72.—Bocagea obliqua, *Hook. fil. & Th. Fl. Br. Ind.* i. 93.

Ceylon; at low elevations in the Galle and Ratnapura districts.

Inasmuch as the inner petals of this plant are not clawed, and that they are often slightly imbricate, it does not conform strictly to the characters of the genus *Orophea* as previously understood. I have therefore ventured to modify the diagnosis of the genus so as to admit this and the species *O. coriacea*. For in all respects, except the two just

mentioned, this plant has the characters of *Orophea*,—the leaves, stamens, ovaries, and carpels being, in my opinion, quite those of this genus.

PLATE 152A. Orophea obliqua, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower-bud with outer petals opened up; 4, mature flower with the inner petals removed; 5 & 6, anthers; 7, pistil; 8, section of ovary—*enlarged.* (*All copied from a drawing made in the Peradeniya Herbarium and kindly lent by Dr. H. Trimen,* F.R.S.)

NOTE.—Imperfect specimens of a plant, which appears to be *Orophea latifolia*, Miq., have been sent from Perak by Mr. Ridley (No. 2985); but in the absence of full materials I hesitate to include that species here.

17. Mitrephora, *Blume.*

Trees. *Leaves* usually coriaceous, strongly ribbed, plaited in vernation. *Flowers* usually terminal or leaf-opposed, sometimes 1-sexual. *Sepals* 3, orbicular or ovate. *Petals* 6, 2-seriate, valvate; outer ovate, thin, veined; inner clawed, vaulted, and cohering. *Stamens* oblong-cuneate; the anther-cells dorsal, remote; the connective broadly truncate at the apex. *Ovaries* oblong; style oblong or clavate, ventrally furrowed; ovules 4 or more, 2-seriate. *Ripe carpels* globose or ovoid, stalked or sub-sessile. Distrib.—Species about 10; tropical Asiatic.

Flowers hermaphrodite.

Leaves pubescent or tomentose beneath; ripe carpels densely tomentose, not furrowed . . . . . 1. *M. tomentosa.*

Leaves glabrescent beneath.

Ripe carpels densely tomentose, not furrowed . . . . . 2. *M. Maingayi.*
Ripe carpels minutely tomentose, furrowed . . . . . 3. *M. grandiflora.*
Leaves quite glabrous when adult . . . . . 4. *M. Heyneana.*

Flowers unisexual.

Ripe carpels ovoid, apiculate, rugulose . . . . . 5. *M. reticulata.*
Ripe carpels globular, not apiculate, not rugulose . . . . . 6. *M. macrophylla.*
Ripe carpels sub-globular, sub-truncate at each end, rugulose . . . 7. *M. Prainii.*

1. MITREPHORA TOMENTOSA, *Hook. fil. & Thoms. Fl. Ind.* 113. A tree 20 to 40 feet high; branchlets and young parts generally tawny-tomentose. *Leaves* coriaceous, oblong-lanceolate, ovate-oblong to elliptic, acute or shortly acuminate, the base rounded; upper surface shining, glabrous except the puberulous midrib; the lower softly pubescent or even tomentose; main nerves 10 to 15 pairs, oblique, rather straight; length 3 to 7 in., breadth 1·75 to 3 in.; petiole ·3 in. *Flowers* in small, tomentose, pedicelled, leaf-opposed cymes; pedicels ·25 to ·6 in., each with a large amplexicaul bract. *Sepals* broadly ovate, acute, tomentose outside, glabrous inside, ·3 in. long. *Petals* rather thick, tomentose outside; the outer nearly 1 in. long, ovate, acute, parallel-nerved; the inner trapezioid above, narrowed at the base, shorter than the outer. *Ripe carpels* sub-globose, densely tawny-tomentose, 1 in. long when quite ripe; their stalks 1 in. long. *Seeds* 2, thick, plano-convex. *Hook. fil. Fl. Br. Ind.* i. 76; *Kurz For. Fl. Burm.* i. 44.

Assam, Chittagong, Pegu: at the bases of the hill ranges.

PLATE 153. Mitrephora tomentosa, *H. f. & Th.* 1, Flowering branch; 2, carpels nearly ripe; 3, section of carpel—*of natural size;* 4, flower dissected; 5, anthers—*enlarged.*

2. MITREPHORA MAINGAYI, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 77. A tree 20 to 50 feet high; young branches softly rufous-tomentose, afterwards glabrous, dark-coloured and striate. *Leaves* coriaceous, oblong to ovate (oblong-lanceolate in var. *Kurzii*), acute or shortly and bluntly acuminate, the base rounded or sub-cuneate; upper surface shining, glabrous except the pubescent midrib; under-surface glabrescent, the midrib and nerves thinly adpressed-pubescent (pubescent in var. *Kurzii*); main nerves 6 to 10 pairs, oblique, curving, slightly prominent beneath; length 3 to 5·5 in., breadth 1·5 to 2 in.; petiole ·3 to ·4 in. *Flowers* 1 in. or more in diam., axillary or leaf-opposed, solitary or 2 or 3 in a multi-bracteolate and tomentose raceme; pedicels ·5 to 1·5 in. (lengthening with age), bracteolate. *Sepals* connate into a cup, broadly ovate, acute (or obtuse in var.), tomentose. *Petals* rather thin, pale yellow mottled with red, all more or less pubescent outside; the outer orbicular or obovate with undulate erose edges, slightly narrowed at the base (oblong in var. *Kurzii*); inner shorter; the outer very pubescent inside, vaulted, ovate or cordate with a long linear claw. *Anthers* numerous, short, with broad, flat, smooth tops. *Ovaries* gradually narrowed into the short style; ovules 4; stigma sub-capitate-discoid. *Ripe carpels* broadly ovoid, blunt at each end, densely tomentose, 1 in. long and ·75 in. in diam.; their stalks stout, ·75 in. long. *Seeds* 4, compressed. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 86.—M. Teysmannii, *Scheff. in Flora* lii (1869), 302.—Uvaria obtusa (*not of Blume*), *Hook. fil. & Thoms. Fl. Ind.* 113; *Hook. fil. Fl. Br. Ind.* i. 76; *Wall. Cat.* 6484.

Penang,—*Wallich, Curtis.* Pangkore,—*Curtis.* Malacca,—*Maingay* (*Kew Distrib.*) No. 65. Perak,—*King's Collector, Scortechini, Wray.* Burmah,—*Kurz.* Distrib.—Java.

VAR. *Kurzii. Leaves* oblong-lanceolate, acuminate to elliptic; peduncles of racemes woody, 1 in. or more long, tomentose; outer petals narrowly oblong. M. vandæflora, *Kurz For. Fl. Burm.* i. 45.

Burmah,—*Kurz, Brandis.*

Allied to the Cambodian species *M. Thorellii* (Pierre Fl. Forest Coch.-Chine, t. 37).

PLATE 154. Mitrephora Maingayi, *H. f. & T.* 1, Flowering branch; 2, twig from another specimen; 3, flower; 4, the same dissected; 5, inner petals; 6, young carpels; 7, ripe carpels; 8, section of ripe carpel—*of natural size;* 9, anthers; 10, pistils—*enlarged.*

3. MITREPHORA GRANDIFLORA, *Beddome Ic. Pl. Ind. Or., t.* 101; *Fl. Sylvat., t.* 75. A large tree; young parts minutely golden-pubescent. *Leaves* thinly coriaceous, elliptic or ovate-lanceolate, shortly and bluntly acuminate, shining and glabrous above, glabrescent beneath; the axils of the nerves glandular and hairy; main nerves 6 to 8 pairs, spreading, slender; length 4 to 5 in., breadth 1·5 to 2·5 in.; petiole ·5 in. long. *Peduncles* 2- to 3-flowered, leaf-opposed, with a bract below each flower. *Flowers* 2 to 3

in. in diam., sub-sessile. *Sepals* small, ovate, acute. *Outer petals* broadly elliptic, acute, 1 to 1·25 in. long and from ·6 to ·8 in. broad, adpressed-pubescent outside, glabrous inside, white turning to yellow; inner petals smaller, cuneate, acute, clawed, white streaked with red, deciduous. *Carpels* globose or ovoid, with a prominent vertical furrow, ·75 to 1 in. long, minutely tomentose. *Seed* solitary.

S. Canara,—*Beddome.*

This species has been collected only by Colonel R. H. Beddome, from whom both description and figure are copied.

PLATE 155. Mitrephora grandiflora, *Bedd.* 1, Flowering branch; 2, 3 & 4, different views of the flower; 5 & 6, inner petals; 7, carpels nearly ripe—*of natural size;* 8, andro-gynœcium; 9 & 10, anther; 11 & 12, pistils—*enlarged.* (*Copied from Bedd. Fl. Sylvat., t.* 75.)

4. MITREPHORA HEYNEANA, *Thwaites' Enum. Pl. Ceyl.* 8. A small tree; young branches slender, pale, minutely pubescent at first, but speedily glabrous. *Leaves* thinly but firmly coriaceous, ovate-lanceolate, the base rounded or very slightly cuneate; both surfaces pale when dry (the upper shining, the lower dull), much reticulate, glabrous, the younger leaves sparsely pubescent beneath; main nerves 6 or 7 pairs, very faint, inter-arching far from the margin; length 2 to 3 in., breadth ·8 to 1·35 in.; petiole ·15 to ·2 in. *Flowers* 1 to 1·25 in. in diam., solitary or in leaf-opposed sub-racemose cymes; peduncles very short, the bracts minute, distichous; pedicels ·25 in. long, with small bracteoles. *Sepals* minute, orbicular, puberulous outside. *Outer petals* yellow, cuneate-lanceolate, acuminate, parallel-veined, puberulous on both surfaces; the inner trapezioid, acute, clawed, yellowish with red spots, pubescent, ·4 in. long. *Anthers* numerous, with broad flat or concave heads. *Ovaries* 6 to 9, strigose, 2- to 4-ovuled; style short; stigma sub-capitate. *Ripe carpels* few, obovoid or sub-globose, narrowed to the base, densely and minutely tawny-pubescent when ripe, about ·5 in. long. *Beddome Ic. Pl. Ind. Or., t.* 77; *Hook. fil. Fl. Br. Ind.* i. 77.—Orophea Heyneana, *H. f. & T. Fl. Ind.* 110.—Uvaria Heyneana, *Wall. Cat.* 6483.—U. lutea, *W. & A. Prodr. Fl. Pen. Ind.* 8.

Base of the Tinnivelly Hills in Southern India,—*Wight, Beddome.* Ceylon,—*Thwaites, Trimen.*

PLATE 152B. Mitrephora Heyneana, *Thw.* 1, Branch with flowers; 2, branch with ripe fruit; 3, flower, with all the outer petals but one removed so as to show inner petals and andro-gynœcium—*of natural size;* 4, sepals and andro-gynœcium—*enlarged;* 5, section through the same; 6 & 7, anthers; 8, pistil; 9, section through ovary—*much enlarged.*

5. MITREPHORA RETICULATA, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 77. A tree 20 to 30 feet high; young branches tawny-tomentose, ultimately glabrous and dark-coloured. *Leaves* narrowly oblong, often slightly obovate, acuminate, the base cuneate or rounded; both surfaces shining, reticulate, glabrous; the midrib puberulous on the upper, sparsely setose on the lower, surface; main nerves 12 to 14 pairs, spreading, prominent, distinct beneath; length 5 to 14 in., breadth 2 to 4·5 in.; petiole ·25 in., swollen. *Flowers* ·2 in diam., in. axillary, solitary, or in pairs, or in few-flowered puberulous cymes; pedicels long, slender, with many lanceolate bracteoles. *Flowers*, as in *M. macrophylla*, monœcious. *Ripe carpels* ovoid, apiculate, rugose, hoary, ·8 in. long and ·65 in. in diam. *Seeds* 2.

Kurz For. Fl. Burm. i. 44; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 87.—Orophea reticulata, *Miq. Ann. Mus. Lugd. Bat.* ii. 23.—Uvaria reticulata, *Blume Fl. Jav. Anon.* 50, *t.* 24.—Pseuduvaria reticulata, *Miq. Fl. Ind. Bat.* i. *pt.* 2, 30.

Burmah: province Tenasserim,—*Helfer*. Malacca,—*Maingay* (*Kew Distrib.*) No. 64. Perak,—*Wray, King's Collector, Scortechini*; not so common as *M. macrophylla*, Oliver.

This species has the inner petals rather larger than the outer and much vaulted; and in that respect it conforms to the characters of *Orophea;* but its stamens are Uvarioid in character and they are numerous; its flowers, moreover, are unisexual. The characters of *Mitrephora* therefore preponderate, and it is better located in the latter genus. But there is no doubt it forms a connecting link between the two genera.

Plate 156A. Mitrephora reticulata, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, section of carpel—*of natural size;* 4, female flower dissected; 5, male flower with inner petals removed; 6, section through torus of male flower to show the stamens; 7 & 8, anthers; 9, pistil—*enlarged.*

6. Mitrephora macrophylla, *Oliver in Hook. Ic. Plant., t.* 1562. A small tree; young branches more or less puberulous, speedily becoming glabrous and cinereous. *Leaves* thinly coriaceous, elliptic-obovate or oblong-oblanceolate, acute or shortly acuminate, the base rounded, slightly oblique; both surfaces puberulous at first but speedily glabrous, shining, minutely reticulate; main nerves 14 to 20 pairs, oblique, inter-arching ·15 in. from the margin, prominent beneath; length 7 to 13 in., breadth 1·75 to 4 in.; petiole ·25 in., swollen. *Flowers* ·25 to ·3 in. in diam., axillary, usually in pairs, or in cymes 1 to 2 in. long, the cymes minutely pubescent; bracts few, lanceolate; pedicels long, with several broadly lanceolate partly deciduous bracteoles, or ebracteolate. *Sepals* free, or connate below, reniform, or broadly ovate, puberulous outside and on the edges, glabrous inside. *Outer petals* larger than the sepals, orbicular-ovoid, sub-acute, slightly narrowed at the base, puberulous on both surfaces, ·15 in. long. *Inner petals* ·3 in. long, thick, vaulted, reniform-sagittate, puberulous, with a glabrous callosity on the inside near the base, the edges pubescent; the claw shorter than the limb, pubescent. *Male flower: stamens* very numerous, short, cuneate; the connective truncate, small and not concealing the tops of the anthers; pistils 3, or a few rudimentary. *Female flower: staminodes* in two imperfect rows. *Ovaries* about 12, ovoid-cylindric, oblique, pubescent, 4-ovuled; stigmas sessile, large, fleshy, truncate, often oblique. *Ripe carpels* globose, densely and minutely tawny-tomentose, ·4 or ·5 in. in diam.; stalks ·2 in. long. *Seeds* several, compressed; the testa membranous. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 87.

Penang,—*Maingay* (*Kew Distrib.*) No. 92-2, *Curtis*. Perak,—*Scortechini, King's Collector, Wray.*

This species, although rare in Penang, is very common in Perak. Specimens of it vary considerably in several respects. In some plants the young shoots are densely puberulous, in others they are almost glabrous; the leaves also vary in size and in amount of pubescence. In the specimen figured by Professor Oliver (*Hook. Ic. Pl.* 1562), the flowers are in axillary pairs; but in the majority of the Perak specimens they are in cymes. The species is practically dicœcious; the staminate flowers having no ovaries at all or only a few rudiments, while the pistillate flowers have rarely a few perfect stamens, and not always any staminodes. The best marks of distinction

between this and *M. reticulata*, of which this must be a very close ally, are the smaller number of the nerves in the leaves of this and the ovoid shape of its rugose fruit. In its leaves this plant somewhat resembles some of the species of *Popowia*. And, inasmuch as its inner petals are larger than the outer and are vaulted, it is related to *Orophea*, from which, however, its numerous Uvarioid stamens and unisexual habit exclude it.

Plate 157. Mitrephora macrophylla, *Oliver*. 1, Flowering branch; 2, branch with young fruit; 3, carpels nearly ripe; 4, section of a ripe carpel—*of natural size;* 5, flower dissected; 6 & 7, anthers; 8, 9, 10, pistils—*enlarged.* (*Nos.* 8, 9, 10 *are copied from Oliver's figure in Hooker's Icones, t.* 1562.)

7. Mitrephora Prainii, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 88. A tree 30 to 40 feet high; young branches tawny-pubescent, speedily becoming glabrous and dark-coloured. *Leaves* membranous, elliptic-oblong, rather abruptly and shortly acuminate, the base cuneate and often slightly unequal-sided; upper surface glabrous except the depressed strigulose midrib; lower surface much reticulate, glabrous, but with a few scattered hairs on the midrib and 12 to 14 pairs of rather bold, oblique, curving nerves; length 6 to 9 in., breadth 2·25 to 3 in.; petiole ·24 in., pubescent. *Flowers* bisexual, from the axis of the fallen leaves, solitary, ·4 in. in diam.; pedicels about ·5 in. long, softly tomentose, minutely bracteolate at the base. *Sepals* broadly ovate, acute, concave, tomentose outside, glabrous inside. *Outer petals* much larger than the sepals, ovate-orbicular, sub-acute; tomentose outside, glabrous inside. *Inner petals* longer but narrower than the outer; the limb trapezioid, densely tomentose, glabrous inside at the base; the claw narrow, about as long as the limb, tomentose on both surfaces. *Stamens* in the male flower numerous, short, cuneate; the apical process of the connective truncate, concealing the apices of the dorsal anthers. *Pistils* 0. *Female flowers* unknown. *Ripe carpels* sub-globose, rather truncate at base and apex, rugulose, minutely pubescent, ·65 in. in diam. *Seeds* about 5, plano-convex; the testa membranous, rugulose.

Andaman Islands,—*Prain, King's Collector.*

The inner petals of this species are undoubtedly longer than the outer; but they are much narrower. Technically they are the petals of *Orophea* rather than of *Mitrephora;* but the numerous Uvarioid stamens and the unisexual habit are those of the latter, to which I accordingly refer it. I have been able to examine only a few flowers of the species, and these are all tetramerous; but whether this arrangement is normal or only occasional I am unable to say until larger suites of specimens shall be obtained.

Plate 158. Mitrephora Prainii, *King.* 1, Leaf-twig; 2, flowering branch; 3, ripe carpels—*of natural size;* 4, flower dissected; 5, anthers—*enlarged.*

18. Popowia, *Endl.*

Trees. *Flowers* small, sub-globular, opening but slightly, usually hermaphrodite, sometimes polygamous, extra-axillary or leaf-opposed. *Sepals* 3, ovate, valvate. *Petals* 6, valvate, in 2 series (the inner series imbricate in *P. Kurzii*), more or less orbicular; outer like the sepals, spreading; inner thick, concave, connivent, acute, the tip sometimes inflexed. *Stamens* indefinite or sub-definite, short, cuneate; anther-cells dorsal, remote. *Carpels* about 6, ovoid; style large, oblong or sub-clavate, straight or recurved;

ovules 1-2 on the ventral suture, rarely 1, basal, erect. *Ripe carpels* berried, globose or ovoid, stalked.

Distrib.—About 20 Asiatic species, 12 Australian and 1 African. (The Australian and African species may be generically separable.)

There has been considerable variety of opinion as to the place of *Popowia* amongst the genera of *Anonaceæ*. The genus was founded by Endlicher (Genus No. 4710) to accommodate the species which had been named *Bocagea pisocarpa* by Blume [*Flora Javæ* (*Anonaceæ*) 90, *t.* 45]. Endlicher placed it next to *Orophea*, from which it is distinguished by its inner row of petals being free and having their apices inflexed in æstivation, while those of *Orophea* are clawed, vaulted, attached by their edges, and not inflexed in æstivation. In their *Flora Indica* Hooker filius and Thomson added the species *P. ramosissima* to the original plant of Endlicher, with a remark to the effect that *Uvaria Vogelii*, H. f., should be included in the genus. Further they associated *Popowia* with the genera *Orophea*, *Mitrephora* and *Goniothalamus* in the tribe *Mirtephoreæ*. In their *Genera Plantarum* Mr. Bentham and Sir Joseph Hooker take a different view of the position of *Popowia* and, in the arrangement adopted in that great work, *Popowia* is put amongst the *Unoneæ*; *Orophea* is relegated to the tribe *Miliuseæ*; while *Goniothalamus* and *Mitrephora* are retained side by side in the tribe *Mitrephoreæ*. Now the character of the tribe *Unoneæ* is:—"petals flat, slightly unequal, or those of the inner row smaller than those of the outer, or absent," while in several of the *Popowias* (e.g., *P. pisocarpa*, *P. ramosissima*) the inner petals are longer than the outer. Baillon, whose arrangement of tribes differs from that of Messrs. Bentham and Hooker, puts *Popowia* into *Unoneæ*, leaving *Mitrephora* and *Orophea* side by side in his tribe *Oxymitreæ*.

Dr. Scheffer differs from the opinion of the authors of the *Genera Plantarum* and of Baillon, and rather inclines to that of the authors of the *Flora Indica*. He points out with much force that the proper place of *Popowia* is in the tribe characterised by its "outer petals being open, the inner connivent over the andro-gynœcium, erecto-connivent or connate"—that is to say, in the tribe *Mitrephoreæ* of these authors. The stamens of *Popowia* present considerable diversity, but on the whole they have the character of those of *Uvariæ* rather than those of *Unoneæ*. As Scheffer remarks, there is little difference between the genera *Orophea* and *Mitrephora* except that the outer petals of *Mitrephora* are usually larger than those of *Orophea*. And, if M. Baillon's plan of reducing the number of the genera in *Anonaceæ* were to be carried out, Dr. Scheffer would suggest the union of these two and of *Popowia* into a single genus, from which would be excluded, however, all the African species. Of these new genus *Orophea* would be the typical form, and the other two would form sub-genera.

There is no doubt that in externals many species of *Popowia* are like *Orophea*; and the non-unguiculate character of the inner petals is really the best character by which to distinguish them from *Orophea*.

I venture to follow Dr. Scheffer and the authors of the *Flora Indica* in putting *Popowia*, *Orophea*, and *Mitrephora* together in the tribe *Mitrephoreæ*.

Flowers hermaphrodite.

Both surfaces of leaves glabrous except the nerves.

Both surfaces minutely granular; nerves 9 or 10 pairs, sparsely pilose beneath . . . . . 1. *P. pauciflora*.

Lower surface granular, the midrib and 6 to 8 pairs of nerves pubescent . . . . . 2. *P. ramosissima.*
Both surfaces shining, reticulate, glabrous, except the tomentose midrib on the upper; nerves about 10 pairs, very faint . . . . 3. *P. nitida.*
Upper surface of leaves glabrous; the lower minutely granular and sub-strigose; nerves 4 or 5 pairs . . . . . 4. *P. Helferi.*
Upper surface of leaves glabrous; the lower granular, tomentose on the midrib and 4 or 5 pairs of nerves . . . . . 5. *P. Beddomeana.*
Upper surface of leaves glabrous except the puberulous midrib, the lower yellowish-tomentose; nerves 11 to 13 pairs; fruit large . . . 6. *P. fœtida.*
Upper surface of leaves glabrous, except the tomentose midrib and 8 to 10 pairs of nerves; lower surface pubescent and sub-granular . . . 7. *P. Perakensis.*
Both surfaces minutely granular; upper shortly puberulous; lower pubescent; nerves 8 to 11 pairs . . . . . 8. *P. fusca.*
Both surfaces minutely granular; upper with a few scattered hairs; lower fuscous, densely and softly pubescent; the nerves 6 or 7 pairs, tomentose or pubescent . . . . . 9. *P. velutina.*
Both surfaces, but especially the lower, softly pubescent; nerves about 10 pairs . . . . . 10. *P. tomentosa.*

Flowers polygamous.

Upper surface of leaves glabrous, except the puberulous midrib; nerves 10 or 11 pairs; flowers ·5 to ·75 in. in diam.; inner row of petals larger than the outer, valvate, their apices inflexed in bud . . . . 11. *P. nervifolia.*
Upper surface of leaves sub-granular, minutely and sparsely adpressed-pubescent; nerves 9 to 12 pairs; flowers ·4 in. in diam.; inner petals slightly smaller than the outer, imbricate . . . . . 12. *P. Kurzii.*
Both surfaces of leaves glabrous; the lower silvery, shining; nerves 7 pairs . . . . . 13. *P. Hookeri.*

1. Popowia pauciflora, *Maingay mss.; Hook. fil. Fl. Ind.* i. 69. A tree? Young branches slender, cinereous, strigose. *Leaves* membranous, elliptic-lanceolate, acuminate, the base acute; both surfaces glabrous, minutely granular; the midrib and 9 or 10 pairs of oblique, little curving main nerves, sparsely pilose beneath; length 5 to 6 in., breadth 1·5 to 2 in.; petiole ·2 in., pubescent. *Flowers* extra-axillary, solitary or axillary, ·25 in. in diam.; pedicels ·15 to ·25 in. long, with a basal bracteole, rusty-strigose. *Sepals* minute, ovate. *Petals:* the outer small and like the sepals; the inner three times as large, sub-orbicular, concave, their apices inflexed. *Stamens* many. *Ovaries* about 6, strigose; ovule solitary, erect. *Ripe carpels* sub-sessile, globular, glabrous. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 92.

Malacca,—*Maingay* (*Kew Distrib.*) No. 56.

Known only by Maingay's imperfect specimens—an obscure species.

Plate 159A. Popowia pauciflora, *Maing. mss.* 1, Flowering branch; 2, branch with fruit—*of natural size;* 3, flower; 4, andro-gynœcium; 5 & 6, stamens; 7, pistil; 8, section of pistil—*enlarged.*

2. Popowia ramosissima, *Hook. fil. & Thoms. Fl. Ind.* 105. A small spreading tree; young branches at first rufous-pubescent; the older dark-coloured and furrowed. *Leaves* membranous, sub-sessile, narrowly elliptic to lanceolate, sometimes slightly obovate,

shortly, bluntly and abruptly acuminate, the base rounded or slightly narrowed; both surfaces glabrous; the lower granular and pubescent on the midrib and 6 to 8 pairs of ascending rather straight nerves; length 2·75 to 4 in., breadth 1 to 1·75 in.; petiole ·05 in. *Flowers* globular in bud, leaf-opposed, solitary or in small fascicles, ·2 in. in diam.; pedicels ·15 to ·25 in. long (longer in fruit), minutely bracteolate, rufous-tomentose. *Sepals* broadly triangular-ovate, acute, nearly as large as the outer petals and, like them, tomentose outside and glabrous inside. *Petals* sub-equal, coriaceous, rotund, concave; the inner rather larger and with incurved points. *Stamens* short, with very broad, truncate, concave heads. *Ovaries* 5 or 6, villous; ovules 1 or 2. *Ripe carpels* globose, with short stalks, pubescent, ·25 to ·35 in. in diam. *Miq. Fl. Ind. Bat.* i. *pt.* 2, 27; *Hook. fil. Fl. Br. Ind.* i. 68; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 92.—Guatteria ramosissima, *Wall. Cat.* 7294, 8006.—Popowia rufula and P. affinis, *Miq. Ann. Mus. Lugd. Bat.* ii. 20.

In all the provinces, common. Distrib.—Sumatra, Borneo.

Plate 159B. Popowia ramosissima, *Hook. fil. & Thoms.* 1, Flowering branch; 2, branch with fruit—*of natural size;* 3, flower, dissected; 4, stamens; 5, pistil—*enlarged.*

3. Popowia nitida, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 92. A shrub? Young branches sparsely and softly rufous-pubescent, the bark brown. *Leaves* thinly coriaceous, oblong-lanceolate to oblong-ovate, bluntly acuminate, the base rounded; both surfaces reticulate, glabrous and shining, the midrib tomentose on the upper; main nerves about 12 pairs, very faint, spreading and forming double arches inside the edge; length 2·5 to 4 in., breadth ·6 to 1·25 in.; petiole ·1 in. *Flowers* few, in short, extra-axillary racemes, sub-globular, ·25 in. in diam.; pedicels about as long as the flowers, each with 2 sub-orbicular, stem-clasping, pubescent bracteoles. *Sepals* orbicular, concave, puberulous on both surfaces, about ·15 in. in diam. *Petals* sub-equal, about twice as large as the sepals, orbicular-ovate, sub-acute, cordate at the base, the edges incurved. *Stamens* about 27, in three rows; anther-cells linear, lateral; the apical process of the connective obliquely truncate, papillose. *Pistils* numerous, forming a large mass with their stigmas agglutinated. *Ovaries* sub-cuneate, pubescent, especially near the truncate apex; stigma very large and viscous, sessile; ovules 1 to 3, ascending. *Ripe carpels* ovoid, pointed, glabrous, ·4 to ·5 in. long. *Seeds* 1 to 3, compressed; the testa pale brown, shining.

S. Andaman,—*King.* Nicobars,—*Kurz.* Perak,—*Ridley* No. 2984.

In its leaves this much resembles *Uvaria micrantha*, H. f. & T., as which I have reason to believe some specimens of it have been distributed from the Calcutta Herbarium.

Plate 165B. Popowia nitida, *King.* 1, Flowering branch; 2, ripe fruit; 3, section of ripe fruit—*of natural size;* 4, flower dissected; 5 & 6, stamens; 7, pistil; 8, section of pistil—*enlarged.*

4. Popowia Helferi, *Hook. fil. & Thoms. Fl. Ind.* i. 69. A small spreading tree; young branches coarsely hairy. *Leaves* membranous, lanceolate or oblong-lanceolate, acuminate, the base narrowed but rounded; upper surface glabrous; the lower granular, sub-strigose, especially on the midrib; main nerves indistinct, about 4 or 5 pairs, ascending; length 2 to 4 in., breadth ·8 to 1·25 in.; petiole ·05 in. *Flowers* minute, globose, extra-axillary; peduncles ·05 to ·2 in., tomentose. *Sepals* ovate, strigose. *Outer*

petals like the sepals; the inner orbicular, larger than the outer, concave, very strigose, their apices inflexed. *Stamens* 15; ovule solitary. *Carpels* about 6, globular, strigose. *Kurz For. Fl. Burm.* i. 39; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 93.

Andamans: north of Port Mouatt,—*Kurz.* Burmah: Tenasserim, on King's Island,—*Helfer.*

A very little known species, closely resembling *P. Beddomeana*, H. f. & Th.

PLATE 160A. Popowia Helferi, *Hook. fil. & Thoms.* 1, Flowering branch—*of natural size;* 2, flower; 3 & 4, anthers; 5, pistil—*enlarged.*

5. POPOWIA BEDDOMEANA, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 68. A tree; young branches slender, cinereous-tomentose. *Leaves* thickly membranous, rather broadly lanceolate, acuminate (those on the lower parts of the tree smaller and ovate, acute), the bases of all slightly narrowed, rarely rounded; upper surface glabrous; the lower granular, tomentose on the midrib and 4 or 5 pairs of ascending indistinct main nerves; length 1 to 2·75 in., breadth ·6 to 1 in.; petiole ·1 in., granular and pubescent. *Flowers* solitary, extra-axillary, ·35 in. in diam.; pedicels ·1 to ·2 in., tomentose, with a median bracteole. *Sepals* small, connate below, ovate, acute. *Petals* coriaceous, tomentose outside, glabrous inside; the outer larger than the inner, ovate-rotund; the inner more acute, apices not inflexed. *Stamens* numerous. *Ovaries* 4 or 5, hairy; ovules 1 or 2. *Carpels* unknown. P. ramosissima, *Bedd.* (*not of H. f. & Th.*) *Ic. Pl. Or., t.* 75.

Mountains of Southern India in the S. Tinnivelly and S. Travancore districts, at elevations of 3,000 to 3,500 feet,—*Beddome.*

PLATE 160B. Popowia Beddomeana, *Hook. fil. & Th.* 1, Flowering branch—*of natural size;* 2 & 3, fully expanded flowers; 4, anthers, back and front view; 5, pistils, —*enlarged.* (*Nos. 2 to 5 are copied from Beddome Ic. Pl. Ind. Or., t.* 75.)

6. POPOWIA FŒTIDA, *Maingay MSS.; Hook. fil. Fl. Br. Ind.* i. 69. A large tree; young branches tawny-tomentose. *Leaves* sub-coriaceous, elliptic-lanceolate, shortly caudate-acuminate, the base sub-acute; upper surface glabrous, except the puberulous midrib; lower densely covered with yellowish-grey tomentum as are the petioles; main nerves 11 to 18 pairs, rather prominent beneath, curved, spreading, inter-arching close to the margin; length 4·5 to 6·5 in., breadth 1·6 to 2 in.; petiole ·2 in. *Flowers* solitary, ·35 in. in diam.; pedicels ·2 in., tomentose. *Sepals* minute, ovate, obtuse. *Petals* unequal; the outer ovate-elliptic, obtuse, yellow; the inner slightly larger, apiculate, concave, the margins thick. *Stamens* about 30; the connective large. *Ovaries* about 6, strigose, 2-ovuled. *Ripe carpels* few, very large, oblong-ovoid, obtuse, sessile, densely and shortly yellowish-tomentose, 2·25 in. long and 1·5 in. in diam. *Seed* solitary, oblong; the testa bony. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 93.

Malacca,—*Maingay* (*Kew Distrib.*) No. 55. Penang,—*Curtis.*

I give the locality Penang on the strength of an imperfect specimen recently received from Mr. Curtis (No. 2768). Good flowering and fruiting specimens of this rather obscure species are much wanted.

PLATE 161A. Popowia fœtida, *Maing. MSS.* 1, Flowering branch; 2, ripe carpel—*of natural size;* 3, outer petal; 4, inner petal; 5, andro-gynœcium; 6, anther—*enlarged.*

7. Popowia Perakensis, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 94. A shrub 6 to 15 feet high; young branches densely and minutely dull rusty-tomentose, the older dark and furrowed. *Leaves* elliptic to oblong-elliptic, very shortly and rather abruptly acuminate, the base slightly narrowed, sometimes sub-oblique; upper surface glabrous, the midrib and nerves tomentose; lower pubescent, sub-granular; main nerves 8 to 10 pairs, spreading, slightly prominent beneath; length 4 to 5·5 in., breadth 2 to 2·5 in.; petiole ·1 in., tomentose. *Flowers* extra-axillary, usually in pairs (but not contemporaneous), ·3 in. in diam.; pedicels ·4 in. long, ferrugineous-tomentose, minutely bracteolate. *Sepals* smaller than the petals, semi-orbicular, acute, coarsely tomentose outside, sub-glabrous inside. *Petals* thick, ovoid-orbicular, sub-acute, sub-concave, densely whitish-sericeous outside, glabrous within; the inner row slightly larger than the outer, neither their edges nor apices incurved. *Stamens* numerous, flattened, with truncate, corrugated heads. *Ovaries* about 10, thin, glabrous, except a few long hairs near the base, 2-ovuled; stigmas large, rounded. *Ripe carpels* few, ovoid, with sub-truncate apices, slightly narrowed to the stalks, glabrous or sparsely pubescent, with several horizontal constrictions, when ripe ·5 in. long and ·25 in. in diam.; stalks ·25 to ·5 in. long. *Seeds* 2, superposed, plano-convex.

This resembles *P. ramosissima* in its leaves, but has much larger flowers of which the inner petals are not inflexed and the carpels have 2 seeds. It also resembles *P. hirta*, Miq.

Perak,—*King's Collector*, *Wray;* from 200 to 2,500 feet.

Plate 161B. Popowia Perakensis, *King*. 1, Flowering branch; 2, ripe carpels; 3, flower dissected—*of natural size;* 4 & 5, anthers; 6 & 7, pistils—*enlarged*.

8. Popowia fusca, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 94. A tree 40 to 50 feet high; young branches densely covered with purplish-brown tomentum; the older cinereous, sub-pubescent and much furrowed. *Leaves* coriaceous, oval-oblong, obtuse or sub-acute, the base rounded; both surfaces minutely granular; the upper shortly puberulous; the lower pubescent, the midrib and 8 to 11 pairs of spreading rather prominent main nerves tomentose on both; length 2·5 to 3·5 in., breadth 1·4 to 1·8 in.; petiole ·2 in., purplish-tomentose like the flower pedicels. *Flowers* in small, extra-axillary fascicles from small bracteate tubercles, ·25 in. in diam.; pedicels ·15 to ·25 in. *Sepals* ovate-obtuse, tomentose outside, glabrous inside. *Petals* sub-equal, rotund, very thick and fleshy, tomentose outside, puberulous inside. *Ripe carpels* few, globular, densely tomentose, ·25 in. in diam.; stalks ·1 to ·2 in. long, tomentose. *Seeds* solitary.

Perak, near Ulu Kerling, at an elevation of 500 feet,—*King's Collector* No. 8602.

This much resembles *P. velutina*, King; but its leaves are more oval, have more nerves, and are not so pubescent.

Plate 162A. Popowia fusca, *King*. 1, Branch with flower-buds and young carpels; 2, ripe carpels—*of natural size;* 3, flower-bud; 4, flower dissected; 5, anthers; 6, pistil —*enlarged*.

9. Popowia velutina, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 94. A tree 20 to 40 feet high; young branches covered with minute, soft, deep brown tomentum.

Leaves elliptic-oblong to ovate-elliptic, acute or shortly and narrowly acuminate, slightly narrowed to the rounded, sub-unequal base; both surfaces minutely granular; the upper with a few scattered hairs; the lower fuscous and more densely and softly pubescent, both the midrib and nerves tomentose or pubescent; main nerves 6 or 7 pairs, spreading indistinct; length 3 to 5 in., breadth 1·4 to 1·8 in.; petiole ·1 in. *Flowers* solitary or in pairs, extra-axillary, about ·25 in. in diam.; pedicels densely tomentose, ·35 in. long, bracteolate. *Sepals* broadly ovate, sub-acute, densely tomentose outside, glabrous inside, persistent in the fruit. *Petals* sub-equal, thick, sub-orbicular, very tomentose outside, glabrous inside. *Ripe carpels* few, sometimes solitary, ovoid, blunt, slightly oblique at the base and slightly narrowed to the stalk, minutely velvety-pubescent, ·5 in. long and ·35 in. in diam.; stalks ·2 in., tomentose. *Torus* small. *Seed* solitary, glabrous, rugose, vertically furrowed.

Perak, at Kinta; at elevations under 1,000 feet,—*King's Collector*.

A species very like *P. fusca*, but with shorter, fewer-nerved leaves; evidently not common. None of the Collector's specimens have fully developed flowers, and the foregoing description of these is taken from a bud.

PLATE 162B. Popowia velutina, *King*. 1, Leaf-twig; 2, branch with young fruit and flower-bud; 3, branch with solitary single ripe carpels; 4, section of ripe carpel—*of natural size*.

10. POPOWIA TOMENTOSA, *Maingay MSS. ex Hook. fil. Fl. Br. Ind.* i. 70. A tree; young branches softly rusty-tomentose, when older black and rugose. *Leaves* elliptic-oblong to elliptic, acute or shortly acuminate; the base rounded, slightly unequal-sided both surfaces, but especially the lower, softly pubescent; main nerves about 10 pairs, slightly prominent, spreading; length 4·5 to 5·5 in., breadth 1·75 to 3 in.; petiole ·1 in., tomentose. *Flowers* extra-axillary, sub-sessile, ·25 in. in diam. *Sepals* broadly ovate, connate, slightly smaller than the petals. *Petals* slightly unequal, villous outside, glabrous inside; the outer ovate, thick; the inner larger, very thick and concave, oblong, connivent. *Stamens* about 25. *Ovaries* 7 to 9, oblong, pubescent; ovules 2. *Ripe carpels* globose, slightly pubescent, ·5 to ·75 in. in diam., 2-seeded; their stalks ·35 in., pubescent. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 95.

Malacca,—*Maingay* (*Kew Distrib.*) No. 54. Penang,—*Curtis* (No. 648). Perak,—*Scortechini*.

I am not satisfied that there are not two species involved here, the one with broader leaves and shorter pubescence.

PLATE 163A. Popowia tomentosa, *Maingay MSS.* 1, Flowering branch; 2, carpels (nearly ripe)—*of natural size;* 3, flower dissected, showing sepals, inner petals, and androgynœcium; 4*a*, inner petals—*slightly enlarged;* 4 & 5, anthers; 6, pistil—*much enlarged*.

11. POPOWIA NERVIFOLIA, *Maingay MSS. ex Hook. fil. Fl. Br. Ind.* i. 60. A small tree 12 to 25 feet high; young branches at first densely rusty-tomentose, afterwards dark-coloured and furrowed. *Leaves* coriaceous, from oblong-lanceolate or oblanceolate to elliptic-oblong, shortly, abruptly and bluntly acuminate, the base acute; upper surface shining, glabrous, except the puberulous midrib; lower paler, sparsely rusty-pubescent; main nerves 10 or 11 pairs, oblique, rather prominent on the lower surface; length 5·5

to 8·5 in., breadth 1·8 to 3 in.; petiole ·35 to ·5 in., rusty-pubescent. *Flowers* polygamous, extra-axillary, solitary or 2 or 3 together, sub-globose, from ·5 to ·75 in. in diam.; pedicels stout, tomentose, ·15 to ·25 in. long, with 2 bracts nearly as large as the sepals. *Sepals* ovate-orbicular, acute, slightly smaller than the outer petals, very thick, villous-tomentose outside and glabrous inside as are all the petals; inner petals larger than the outer, their apices much inflexed in bud. *Stamens* numerous, with flat, rhomboid heads. *Ovaries* numerous, hirsute. *Carpels* numerous, cylindric ovoid, apiculate, narrowed to the stalk, sparsely strigose, ·5 in. long and ·25 in. in diam.; stalks ·2 to ·3 in. long, strigose-pubescent. *Torus* globular, ·4 in. in diam. *Seed* pale, shining. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 95.

Malacca,—*Maingay* (*Kew Distrib.*) No. 53. Perak: common at low elevations.

Allied to *P. Kurzii*, but with larger flowers which have their inner petals valvate with much inflexed edges.

Plate 164. Popowia nervifolia, *Maing.* 1, Branch with flowers; 2, ripe fruit; 3, bud opened out to show the inner petals; 4, flower dissected—*of natural size;* 5, anthers; 6, pistils—*enlarged.*

12. Popowia Kurzii, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 96. A shrub or small tree; young branches at first tawny-pubescent, afterwards dark-coloured, glabrous and furrowed. *Leaves* sub-coriaceous, oblong-lanceolate or elliptic-oblong, sub-acute, or shortly and bluntly acuminate, narrowed to the sub-cuneate (sometimes almost rounded) base; upper surface sub-granular, minutely and sparsely adpressed-pubescent; lower sparsely pubescent; main nerves 9 to 12 pairs, oblique, inter-arching close to the edge, rather prominent beneath; length 5 to 9 in., breadth 1·5 to 3 in.; petiole ·2 to ·25 in., tomentose. *Flowers* polygamous, solitary, or in pairs, sub-sessile, extra-axillary, sub-globose, ·4 in. in diam.; pedicels tomentose, ·1 to ·2 in. long, bracteolate. *Sepals* smaller than the petals, valvate, semi-orbicular and, like the petals, tomentose externally and glabrous internally. *Petals* sub-equal, concave; the outer ovate-orbicular, valvate; the inner slightly smaller than the outer, imbricate. *Stamens* numerous, flattened, elongate, with linear lateral anther-cells and flat, oblique, rhomboid apices. *Ovaries* (often absent) about 10, elongate, pubescent; the stigmas clavate. *Fruit* unknown. Polyalthia macrophylla, *Hook. fil. & Thoms.* (*not of Blume*) *Fl. Br. Ind.* i. 68 (*excl. syn.* Guatteria macrophylla).—P. dubia, *Kurz For. Fl. Burm.* i. 38.

South Andaman,—*Kurz*, *King's Collector.* Burmah: province Tenasserim,—*Falconer*, *Kurz.*

This species appears to be practically dicœcious. In its flowers the inner petals are distinctly imbricate; they are not connivent, and their points are not inflexed. And in these respects they do not answer to the diagnosis of *Popowia* as heretofore understood. I have therefore ventured to modify the generic character of *Popowia* in these points, and to institute a section of it to receive this and other two species. This species is closely allied to the plant originally described and figured by Blume as *Guatteria macrophylla* (Fl. Jav. Anon. 96, t. 47), and to receive which Miquel founded his genus *Trivalvaria* (Ann. Mus. Lugd. Bat. ii. 19). But in Blume's and Miquel's plant the inner petals are distinctly valvate, although their apices are not inflexed. And in the non-inflection of its petals it also fails to conform to the character of the genus *Popowia* as originally defined by its founder Endlicher.

PLATE 163B. Popowia Kurzii, *King*. 1, Flowering branch; 2, flower—*opened up and of natural size;* 3, flower dissected; 4, anthers—*enlarged*.

13. POPOWIA HOOKERI, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 97. A shrub; young branches dark-coloured, glabrous. *Leaves* thinly coriaceous, broadly lanceolate or oblanceolate, acute or acuminate, the base acute; both surfaces glabrous, the lower silvery, shining; main nerves about 7 pairs, spreading, ascending, curving, rather prominent beneath, evanescent at the tips; length 5·5 to 7 in., breadth 1·6 to 2·4 in. *Flowers* solitary or in fascicles of 2 or 3, from short extra-axillary woody tubercles, polygamous, minute; "the males as in *Popowia Kurzii*, but smaller; the females with many densely pubescent ovaries and a few imperfect stamens; bracts many, minute, strigose. *Carpels* many, ·75 in. long, oblong, granulate, glabrous; stalk ·35 in." Guatteria pallida, *H. f. & Th. Fl. Ind.* 143 (*not of Blume*).—Polyalthia argentea, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 67.

Assam and Sylhet; in dense forests,—*Hook. fil. & Thoms.* Naga Hills,—*Masters.* Khasia Hills,—*Griffith.*

A species of which I have seen only imperfect specimens. The description given above of the flowers is copied from Sir Joseph Hooker. In my opinion the plant is a *Popowia* rather than a *Polyalthia*, and to the former genus I have ventured to remove it.

PLATE 165A. Popowia Hookeri, *King*. 1, Fruiting branch—*of natural size;* 2 carpel; 3, section of carpel—*enlarged*.

Doubtful species.

POPOWIA PARVIFOLIA, *Kurz in Journ. of Botany for* 1875, *p.* 324. Of this I have seen only leaf specimens with a few detached fruits. It appears to have also had the mss. name *P. nitida* given to it by Kurz.

19. Oxymitra, *Blume*.

Climbing shrubs. *Leaves* parallel-nerved; nervules transverse, not forming intramarginal loops. *Flowers* leaf-opposed or extra-axillary. *Sepals* 3, valvate, connate below. *Petals* 6, valvate, in two rows; outer large, long, flat or triquetrous and narrow, leathery, more or less spreading or connivent; inner much smaller, ovate-lanceolate or oblong (long and narrow in *O. filipes* and *O. glauca*), conniving over the stamens and ovaries. *Stamens* many, linear-oblong or cuneate, truncate; anther-cells dorsal, remote (small and ovoid in *O. glauca*). *Ovaries* oblong, strigose; style oblong or clavate, recurved; ovules 1-2, sub-basal, ascending. *Ripe carpels* 1-seeded, stalked. Distrib.—About 28 species, Asiatic and African.

A genus of which the flowers have some resemblance to those of *Goniothalamus;* but the inner petals are not contracted into a claw as in *Goniothalamus*, and the calyx is smaller and not persistent.

Outer petals flat.

Sepals ovate-lanceolate, deciduous	1. *O. fornicata.*
Sepals broadly ovate or orbicular-ovate, persistent in the fruit	2. *O. affinis.*

Outer petals concave.

Pedicels slender, much longer than the flowers . . . . . 3. *O. filipes.*

Pedicels shorter than the flowers.

Leaves oblong-elliptic, more or less obovate, blunt.

Sepals elliptic, nearly half as long as the petals . . . . 4. *O. calycina.*
Sepals sub-orbicular or slightly triangular, minute . . . . 5. *O. latifolia.*

Leaves oblong-elliptic to oblong-lanceolate or elliptic-lanceolate, not obovate, acute or acuminate.

Outer petals expanded and concave in the lower half; inner petals similar in shape to, but only half as long as, the outer . . 6. *O. Maclellandi.*
Outer petals expanded and concave in the lower third; the inner only one-fourth as long as the outer, very acuminate . . . 7. *O. biglandulosa.*
Outer petals narrowly linear-lanceolate, slightly expanded and concave at the very base . . . . . 8. *O. glauca.*
Of doubtful position . . . . . 9. *O. unonæflora.*

1. Oxymitra fornicata, *H. f. & Th. Fl. Ind.* 146; *Hook. fil. Fl. Br. Ind.* i. 71. A climber; young branches rusty-tomentose. *Leaves* membranous, oblong-lanceolate, acute or shortly acuminate, the base slightly narrowed or rounded; upper surface shining, glabrous except the pubescent midrib; the lower slightly glaucous, sparsely hoary-pubescent, the midrib and hairs thickly pubescent; main nerves 15 to 18 pairs, oblique, rather straight; length 5·5 to 7·5 in., breadth 1·5 to 2 in.; petiole ·25 in., pubescent. *Flowers* solitary; the pedicels only about ·25 to ·5 in. long with a large oblong deciduous median bract, tomentose. *Sepals* ovate-lanceolate, membranous, adpressed rusty-pubescent veined, about ·65 in. long. *Petals* yellow, very unequal, flat; the outer thin, oblong-lanceolate, 1·75 to 2 in. long, about 3- to 5-nerved, adpressed, rusty-tomentose; the inner ovate, acute, connivent, concave at the base, ·35 in. long. *Ripe carpels* cylindric, slightly tapering at each end, sub-sessile, puberulous, ·75 to 1 in. long and ·25 in. in diam. *Kurz For. Fl. Burm.* i. 41.—Unona Roxburghiana, *Wall. Cat.* 6423*A*.—Uvaria fornicata, *Roxb. Fl. Ind.* ii. 662.

Sylhet and Assam; Chittagong Hills: at low elevations. Andamans?

Of the plant collected by Helfer and Kurz in the Andamans, and which has been referred to this species, I have seen no sufficiently good specimens to warrant me in so referring it. They may belong to species closely allied to *O. glauca.*

Plate 156B. Oxymitra fornicata, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, flower with two of the outer petals removed; 4, outer petal—*of natural size;* 5, anther; 6, pistil—*enlarged.*

2. Oxymitra affinis, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 70. A spreading shrub or climber; young branches at first densely rusty-tomentose, afterwards dark-coloured and glabrous. *Leaves* membranous, elliptic to oblong-elliptic, sometimes slightly obovate, acute or very shortly acuminate, rarely obtuse, the base rounded or slightly narrowed; upper surface shining, minutely scaly, glabrous except the pubescent midrib; under-surface slightly glaucous, pubescent especially on the midrib and nerves; main nerves 8 to 14 pairs, spreading, ascending, rather prominent on the lower

surface; length 3·5 to 10 in., breadth 1·25 to 4·5 in.; petiole ·3 in., tomentose. *Flowers* solitary, extra-axillary; pedicels ·25 to ·4 in. *Sepals* slightly connate at the base, spreading, broadly ovate or orbicular-ovate, sub-acute, 3- to 7-nerved, adpressed-pubescent, ·5 in. long and slightly narrower than the base of the petals, persistent in the fruit. *Petals* flat, very unequal; the outer thinly coriaceous, oblong-lanceolate, sub-acute, the midrib thick and with several strong sub-parallel nerves, adpressed-pubescent on both surfaces, 1·5 to 1·75 in. long and ·4 to ·6 in. broad; inner petals thickly coriaceous, ovate, sub-acute, ·5 in. long, pubescent outside, glabrous inside. *Ripe carpels* cylindric, blunt at each end, pubescent, ·5 to ·8 in. long and ·3 in. in diam.; stalks pubescent, ·2 in. long. *Seed* solitary. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 98.

Malacca,—*Maingay* (*Kew Distrib.*) No. 59. Perak,—*King's Collector*, *Scortechini*. Distrib.—Siam.

PLATE 166A. Oxymitra affinis, *H. f. & Th.* 1, Branch with flower and young fruit; 2, ripe fruit; 3, flower—*of natural size;* 4, outer petal; 5 to 7, inner petals detached; 8, sepals and andro-gynœcium; 9, anthers—*enlarged.*

3. OXYMITRA FILIPES, *H. f. & Th. Fl. Br. Ind.* i. 71. A climber; young branches softly brown-tomentose, dark-coloured, and lenticellate when old. *Leaves* membranous, oblong-lanceolate or oblong-elliptic, often slightly obovate, acute or shortly acuminate, slightly narrowed to the sub-cordate, sometimes slightly oblique, base; upper surface glabrous, minutely scaly, sometimes pubescent, the midrib and nerves always so; under-surface paler, sub-glaucous, pubescent, the midrib tomentose; main nerves 12 to 14 pairs, spreading, prominent beneath; secondary nerves obliquely transverse, prominent; length 4·5 to 7·5 in., breadth 1·4 to 2·5 in.; petiole ·2 to ·25 in., tomentose. *Flowers* very long and narrow, often curved, 1·75 to 2·5 in. long, solitary on slender extra-axillary pedicels 3 or 4 in. long, which are pubescent and have a subulate bract near the middle. *Sepals* ·25 in. long, spreading, ovate, acute, pubescent. *Petals* very unequal; the outer fleshy, very narrow, triquetrous, expanded and concave at the base, pubescent; the inner less than one-fifth of the outer in length, lanceolate with caudate-acuminate apex, glabrous. *Stamens* numerous; ovaries 1-ovuled. *Ripe carpels* numerous, ovate-cylindric, shortly apiculate, softly pubescent, ·5 in. long and ·25 in. in diam.; stalks ·3 in. long, pubescent. *Seed* solitary, pale. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 99.

A species readily distinguished in this genus by the extreme length and narrowness of the outer petals. Evidently closely allied to *O. cuneiformis*, Miq. (*Polyalthia cuneiformis*, Bl. Fl. Javæ Anon. 75, t. 35, 36D, 37), which it resembles in that respect as also in its filiform, elongated pedicels.

Malacca,—*Maingay* (*Kew Distrib.*) No. 60. Perak,—*King's Collector.*

PLATE 167. Oxymitra filipes, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, flower with the outer petals removed; 4, 5 & 6, outer petals; 7, inner petals—*of natural size;* 8, sepals and andro-gynœcium; 9 & 10, anthers; 11, pistil—*enlarged.*

4. OXYMITRA CALYCINA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 99. A slender, woody creeper; young branches densely rusty-tomentose. *Leaves* coriaceous, oblong and sub-acute or cuneiform-oblong, very blunt or even emarginate, always slightly narrowed

to the rounded or minutely cordate base; upper surface glabrous, shining, the midrib sometimes rufous-pubescent; under-surface pale, glaucous, pubescent especially on the midrib and nerves; main nerves 7 to 14 pairs, prominent on the under, impressed on the upper, surface, spreading; the secondary nerves obliquely transverse, prominent; length 6 to 12 in., breadth 2·65 to 7·5 in.; petiole ·2 to ·4 in., rufous-tomentose. *Flowers* solitary, extra-axillary; pedicels ·3 to 1 in., rufous-tomentose, bearing two bracts, one small, the other large, obovate, ribbed. *Sepals* free, nearly half as long as the outer petals, elliptic, sub-acute; the edges undulate, rufous-tomentose on both surfaces. *Petals* thick, lanceolate, caudate-acuminate, the midrib prominent; the base concave, both rows glabrous inside; the outer about 1 to 1·25 in. long, tomentose outside; the inner about ·5 in. shorter, connate into a narrow acute cone, puberulous outside. *Ovaries* 1-ovuled. *Ripe carpels* elliptic, apiculate, pubescent, ·35 in. long; stalks ·2 in., pubescent.

This closely resembles *Oxymitra cuneiformis*, Miq., of which Blume (under the name of *Polyalthia cuneiformis*) gives an excellent description and three admirable figures (*Fl. Javæ Anon.* 75, *t.* 35, 36*D and* 37). But in Blume's plant the flowers are much larger, the petals are falcate, while the sepals are much smaller and have caudate apices; the pedicels too are much longer and have smaller bracteoles.

Perak; Ulu Bubong at elevations of 500 to 1,000 feet,—*King's Collector* No. 10604. Singapore,—*Ridley*. Penang,—*Curtis*.

Plate 168. Oxymitra calycina, *King*. 1, Flowering branch; 2, carpels nearly ripe; 3, flower dissected—*of natural size;* 5, torus with the pistils on its summit; 6, pistil—*enlarged*; 4, anthers—*much enlarged*.

5. Oxymitra latifolia, *H. f. & Th. Fl. Ind.* 145. A large climber 20 to 60 feet long; young branches rusty-tomentose. *Leaves* large, thickly membranous, oblong-ovate, often slightly obovate, obtuse, truncate or retuse, often unequal-sided, slightly narrowed to the rounded or slightly cordate, equal or unequal-sided base; upper surface shining, glabrous except the tomentose midrib; the lower sparsely but softly puberulous; the midrib and nerves pubescent, sub-glaucous; main nerves 10 to 15 pairs, oblique, rather straight, inter-arching near the edge; the secondary nerves obliquely transverse, distinct; length 7 to 11 in., breadth 3 to 6 in.; petiole ·25 to ·45 in., tomentose. *Flowers* solitary, extra-axillary, about 1·3 in. long; pedicels ·25 in. (twice as long in fruit), rusty-tomentose, with an ovate or oblong bracteole. *Sepals* thick, sub-orbicular or broadly triangular, sub-acute, connate, minute. *Petals* very thick and concave in the lower half, yellow; the outer 1 to 1·25 in. long, ovate-lanceolate, with triquetrous tips, tomentose outside; inner much shorter, broadly ovate, acuminate, connivent. *Carpels* cylindric-ovoid, apiculate, slightly narrowed to the stalk, puberulous or sub-glabrous, yellow when ripe, slightly granular when dry, ·5 to ·75 in. long and ·3 to ·4 in. in diam.; stalk ·5 to ·75 in. long, tomentose. *Seed* solitary, transversely ridged, pale, shining. *Hook. fil. Fl. Br. Ind.* i. 70; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 50.

Malacca,—*Maingay* (*Kew Distrib.*) No. 57. Penang,—*Phillips*, *Curtis*. Perak; very common. Distrib.—Kedah,—*Ridley*.

Plate 166B. Oxymitra latifolia, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower dissected; 4, anthers; 5, pistils—*enlarged*.

6. Oxymitra Maclellandii, *H. f. & Th. Fl. Br. Ind.* i. 70. An erect shrub, about 4 feet high; young branches rusty-adpressed-tomentose; the older glabrous, dark-coloured, furrowed. *Leaves* thickly membranous, oblong-elliptic or oblong-lanceolate, acute, the base rounded; upper surface shining, glabrous, minutely scaly, the midrib and nerves pubescent; under-surface minutely adpressed-pubescent, purplish, glaucescent; the main nerves 13 to 18 pairs, ascending, curving, prominent as are the obliquely transverse straight secondary nerves and the reticulations; length 7 to 10 in., breadth 2·25 to 3 in.; petiole ·3 in. *Flowers* solitary, extra-axillary, pedicels ·2 in., tomentose, ebracteate. *Sepals* very short, connate, ovate-lanceolate, sub-acute. *Petals* coriaceous, slightly concave in the lower half, yellowish, adpressed-pubescent; the outer lanceolate-oblong, obtuse, 1·5 in. long; the inner half as long, broadly ovate, sub-acute. *Ovaries* oblong, strigose; style oblong. *Fruit* unknown. *Kurz For. Fl. Burm.* i. 40.

Burmah: not unfrequent in shady forests at low elevations,—*Maclelland, Kurz.*

Var. stenopetala, *King.* Leaves narrowly oblong-lanceolate, tapering to either end; petals all with ovate bases, tapering into long very narrow limbs; the outer 2 in. long and only ·15 in. in diam.; the inner shorter. Oxymitra stenopetala, *H. f. & Th. Fl. Br. Ind.* i. 71; *Kurz For. Fl. Burm.* i. 40.

Burma: Martaban,—*Falconer;* Tenasserim—*Gallatly.*

Plate 169. Oxymitra Maclellandii, *H. f. & Th.* 1, Flowering branch—*of natural size;* 2, flower—*dissected;* 3 & 4, stamens, front and back view; 5, pistil—*enlarged.*

7. Oxymitra biglandulosa, *Scheffer in Nat. Tijdsch. Ned. Ind.* xxxi. 341. A creeper 50 to 100 feet long; young branches minutely rufous-sericeous, afterwards dark-coloured and glabrous. *Leaves* coriaceous, elliptic to elliptic-oblong, acute or shortly acuminate, the edges slightly recurved when dry, the base rounded or slightly cuneate; upper surface glabrous, the midrib puberulous; the lower paler, sub-glaucous, puberulous or glabrescent; main nerves 7 to 9 pairs, ascending, prominent beneath; length 3·5 to 7·5 in., breadth 2 to 3·5 in.; petiole ·2 to ·4 in. *Flowers* shortly pedicelled, solitary, extra-axillary, 1 to 1·15 in. long; pedicels ·4 in. long (elongating in fruit), angled, slender, with 1 subulate bracteole. *Sepals* fleshy, ovate, much acuminate, spreading or reflexed, adpressed, rusty-puberulous. *Petals* fleshy, yellow, very unequal, the outer lanceolate-oblong, obtuse, expanded and concave in the lower third, rusty-adpressed pubescent; the midrib prominent, sub-glabrous inside; the inner only as large as the sepals, with broad bases (cleft in the middle) and long acuminate points. *Ripe carpels* oblong-ovoid, blunt at each end or slightly apiculate at the apex, yellow when ripe, puberulous or glabrous, ·75 in. long; stalks ·5 in. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 100.—Polyalthia biglandulosa, *Hook. fil. Fl. Br. Ind.* i. 65.—Guatteria biglandulosa, *Blume Fl. Javæ Anon.* 102, *t.* 51; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 48; *Hook. fil. & Thoms. Fl. Ind.* 143.

Malacca,—*Griffith, Maingay* (*Kew Distrib.*) No. 49. Selangor,—*Ridley.* Perak,—*King's Collector.* Distrib.—Malayan Archipelago.

The structure of the flowers of this species appears to me to be that of an *Oxymitra* rather than of a *Polyalthia* or *Guatteria,* and therefore I have transferred it to this genus.

PLATE 170. Oxymitra biglandulosa, *Scheff.* 1, Flowering branch; 2 & 3, flowers dissected; 4, ripe carpels with mammillate apices; 5, ripe carpels with blunt apices—*of natural size;* 6 & 7, anthers—*enlarged.*

8. OXYMITRA GLAUCA, *H. f. & Th. Fl. Ind.* 146; *Hook. fil. Fl. Br. Ind.* i. 71. A slender woody climber; young branches slightly tomentose, soon becoming glabrous. *Leaves* thinly coriaceous, elliptic, elliptic-lanceolate to lanceolate, obtuse, acute or shortly acuminate; the base rounded, sometimes slightly narrowed; upper surface glabrous, the midrib and sometimes the nerves pubescent; the lower very pale, glaucous, glabrous or sparsely puberulous; the midrib pubescent; main nerves 8 to 12 pairs, spreading, prominent beneath; length 4 to 6 in., breadth 1·5 to 2 in.; petiole ·2 in., pubescent. *Flowers* solitary, extra-axillary, narrow and elongate; pedicels slender, ·5 in. long, with a median subulate bract, longer in fruit. *Sepals* connate at the base, broadly ovate, much acuminate, adpressed-pubescent, ·25 in. long. *Petals* very unequal; the outer thickly coriaceous, linear-lanceolate, sub-acute, slightly expanded and sub-concave at the base, outside minutely pubescent; inside glabrous, the midrib prominent; inner petals with sub-orbicular bases (cleft in the middle) and long acuminate points, glabrous, only about one-fifth as long as the outer. *Ovaries* hairy; ovule solitary. *Carpels* many, ovoid, slightly apiculate, ·4 in. long and ·25 in. in diam., minutely tomentose; stalks slender, ·75 in. long. *Miq. Fl. Ind. Bat.* i. *pt.* 2, 50; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 100.

Penang. Malacca,—*Maingay* (*Kew Distrib.*) No. 58. Perak; common at low elevations. Distrib.—Sumatra,—*Beccari* No. 626.

PLATE 171A. Oxymitra glauca, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, flower dissected; 4, sepals and andro-gynœcium—*of natural size;* 5, anthers—*enlarged.*

9. OXYMITRA UNONÆFOLIA, *H. f. & Th. Fl. Ind.* 146. A woody, glabrous climber; the leaf-buds with adpressed golden pubescence. *Leaves* oblong, abruptly caudate-acuminate, the base rounded or sub-acute; upper surface shining, the lower very glaucous; length 5 to 7 in., breadth 2 to 3 in.; petiole ·25 to ·35 in. *Flowers* pedicelled, extra-axillary. *Sepals* persistent, broadly ovate, brown pubescent. *Carpels* 5 or 6, oblong, apiculate, glabrous, dark brown; stalk ·25 in. *Hook. fil. Fl. Br. Ind.* i. 71; *Kurz For. Fl. Burm.* i. 4; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 50.—Guatteria unonæfolia, *DC. Mem. Anon.* 41; *Wall. Cat.* 6435.

Burmah: at Tavoy (province Tenasserim),—*Wallich.*

This has not been collected since Wallich's time, and his specimens are very imperfect. The above description is entirely made up from Sir Joseph Hooker (*F. B. I. l. c.*)

PLATE 169 BIS. Oxymitra unonæfolia, *H. f. & Th.* 1, Branch with flower-bud and immature fruit; 2, ripe carpel; 3, section of ripe seed—*of natural size.* (*Drawn from Wallich's specimen Cat.* No. 6435.)

NOTE.—A specimen in Maingay's Herbarium (Kew Distrib. No. 61) is apparently a new species of *Melodorum;* but as it is in fruit only, I cannot venture to describe it.

20. Melodorum, *Dunal.*

Climbing shrubs. *Flowers* terminal, axillary and leaf-opposed, fascicled or panicled; buds triquetrous. *Sepals* 3, small, valvate, connate below. *Petals* 6, valvate, in two rows; outer plano-convex or trigonous; inner triquetrous above, hollowed below on the inner face. *Stamens* many; anther-cells dorsal, contiguous; top of connective more or less flattened, triangular, quadrate or orbicular. *Pistils* many, free; style oblong; ovules 2 or more. *Ripe carpels* berried.

Distrib.—Species about 35. Tropical Asia and Africa; Australia.

Sect. I.—Melodorum proper. *Outer petals* oblong-ovate. *Ovaries* hairy; ovules usually more than 4. *Seeds* smooth (unknown in *M. litseæfolium*).

Flowers not more than ·4 in. long (often ·5 in. long in *M. fulgens*); flower-buds broadly pyramidal.

- Flowers minute, cymose; leaves glabrous above, glaucous and minutely pubescent beneath . . . . . 1. *M. rufinerve.*
- Flowers ·4 in. long in leaf-opposed cymes; leaves minutely pubescent above, sparsely adpressed-pubescent beneath . . . . . 2. *M. polyanthum.*
- Leaves glabrous (except the midrib) on the upper surface.
  - Flowers ·35 in. long in leaf-opposed racemes; lower surface of leaves sparsely adpressed-pubescent . . . . . 3. *M. Griffithii.*
  - Flowers ·2 to ·25 in. long in few-flowered, lax, axillary racemes; leaves beneath hoary-pubescent, with a superficial layer of flexuose hairs; ovules 4 . . . . . 4. *M. litseæfolium.*
  - Flowers ·4 to ·5 in. long, solitary or in few-flowered terminal or leaf-opposed cymes; leaves beneath sparsely and minutely strigose; ovules 4 . . . . . 5. *M. fulgens.*

Flowers ·5 in. or more in length (see also *M. fulgens*).

- Flower-buds broadly pyramidal.
  - Flowers solitary or in fascicles of 2 or 3; leaves glabrous above except the midrib, sparsely adpressed-pubescent beneath; ripe carpels ovoid, minutely adpressed-pubescent, 1·1 in. long; their stalks 1·25 to 1·4 in. . . . . 6. *M. Wallichii.*
  - Flowers solitary or 2 or 3 in a raceme; leaves glabrous above, except the midrib, beneath with sparsely adpressed flexuose hairs; ripe carpels globose, 1 in. in diam.; their stalks only ·25 to ·35 in. 7. *M. bicolor.*
  - Flowers racemose, rarely solitary; leaves glabrous above except the midrib, beneath densely golden-brown sericeous; ripe carpels ovoid-globose, 1·25 in. long; their stalks 2 to 3 in. long . . 8. *M. manubriatum.*
  - Flowers in leaf-opposed or terminal panicles; leaves much reticulate and glabrous except the midrib above; beneath slightly pubescent, becoming glabrous when old; ripe carpels sub-globose, 1·5 to 2 in. in diam., warted . . . . . 9. *M. verrucosum.*
  - Flowers in axillary or terminal panicles; leaves minutely pubescent above, softly brown tomentose beneath; ripe carpels globose to ovoid, velvety-tomentose, 1 to 2·25 in. long; stalks ·75 to 1·75 in. . . . . 10. *M. latifolium.*

Flowers always solitary and axillary; ripe carpels cylindric, subtubercular, 1 to 1·75 in. long . . . . . 11. *M. cylindricum.*

Flower-buds narrowly pyramidal, racemose or paniculate.

Leaves glabrous above except the midrib; beneath glaucous, hoary, puberulous; ripe carpels globose or ovoid-globose, tubercled, 1 in. long; their stalks 1 in. . . . . 12. *M. hypoglaucum.*

Leaves glabrescent or glabrous above, except the midrib, beneath softly rufous-pubescent; ripe carpels globular, densely and minutely dark brown-tomentose, ·8 in. in diam.; the stalks slightly longer . . . . . 13. *M. parviflorum.*

Leaves harshly pubescent above, uniformly and softly pubescent beneath; ripe carpels globose, harshly and minutely pubescent, 1·1 in. in diam.; stalks slender, twice as long . . . . . 14. *M. sphærocarpum.*

Sect. II.—Pyramidanthe. *Outer petals* very long, linear-lanceolate, 1·2 to 5 in. long. *Flowers* solitary or in pairs, axillary, rarely leaf-opposed (cymose in *M. lanuginosum* and *M. rubiginosum*); ovules more than 4.

Flowers 1·25 to 1·5 in. long; outer petals rufous-lanate externally; ripe carpels sub-globose, ·75 in. in diam. . . . . 15. *M. lanuginosum.*

Flowers 1·2 to 1·4 in. long; outer petals yellowish-tomentose externally; ripe carpels ovoid-globose, 1 to 1·25 in. long . . . . . 16. *M. rubiginosum.*

Flowers 1·25 to 1·5 in. long; outer petals minutely rufous-tomentose externally; ripe carpels oblong, tapering to both ends, 1·5 to 2 in. long . 17. *M. Maingayi.*

Flowers 1·5 to 2 in. long; outer petals minutely rufous-tomentose outside; ripe carpels ovoid, tuberculate, 1·4 in. long; ovules 4 . . . 18. *M. prismaticum.*

Flowers 3 to 5 in. long; outer petals adpressed-puberulous externally . . 19. *M. macranthum.*

Sect. III.—Kentia. *Outer petals* not much longer than broad, broadly ovate or sub-orbicular, with broad thick margins. *Flowers* axillary. *Ovaries* glabrous, 2- to 8-ovuled. *Seeds* pitted.

Ovules about 8; ripe carpels ovoid or ovoid-globose; leaves oblong-lanceolate 20. *M. elegans.*

Ovules 2; ripe carpels globular; leaves elliptic or elliptic-oblong, sometimes obovate . . . . . 21. *M. pisocarpum.*

1. Melodorum rufinerve, *Hook. fil. & Thoms. Fl. Ind.* 121. A large climber; young branches slender, glabrous, dark-coloured, buds golden-pubescent. *Leaves* thinly coriaceous, narrowly elliptic, tapering, obtuse or slightly acute, the base rounded; upper surface glabrous; the lower glaucous, minutely pubescent; main nerves about 12 pairs, spreading, faint; length 5·5 to 9 in., breadth 2·5 to 4 in.; petiole ·5 to ·65 in., glabrous. *Flowers* minute, in pubescent leaf-opposed cymes; pedicels ·25 in. long, with a small median bracteole. The rest unknown. *Hook. fil. Fl. Br. Ind.* i. 81.

Forests between Sylhet and Cachar,—*J. D. Hooker.*

A species known only by the imperfect specimens collected by Sir J. D. Hooker many years ago; but well distinct by its large, nearly glabrous, few-nerved leaves and small flowers. . . . . .

PLATE 171B. Melodorum rufinerve, *H. f. & Th.* 1, Flowering branch—*of natural size;* 2, flower-bud with its peduncle and bracteole; 3, the same with sepals and an outer petal removed; 4, section of the same to show andro-gynœcium—*enlarged.*

2. MELODORUM POLYANTHUM, *Hook. fil. & Thoms. Fl. Ind.* 121. A large climber; young branches glabrous, dark-coloured. *Leaves* thinly coriaceous, oblong or oblong-lanceolate (broadly elliptic in var.), acute or shortly acuminate, the base rounded or sub-cuneate; upper surface minutely pubescent, the midrib rather coarsely so; lower surface paler, sparsely adpressed-pubescent; main nerves 16 to 18 pairs, oblique, curving very slightly and not inter-arching (26 pairs spreading and inter-arching in var.); length 3·5 to 7 in. (7 to 10 in. in var.), breadth 1·5 to 2·1 in. (3·75 to 5·25 in. in var.); petiole ·3 in. (·5 or ·6 in. in var.) *Flowers* small (·4 in. long), in leaf-opposed cymes of 4 to 8; pedicels ·15 in., with a bract about the middle and a smaller at the base. *Sepals* broadly ovate, sub-acute, connate at the base, spreading, pubescent outside, puberulous within, ·15 in. long. *Petals* leathery, oblong, widened and concave at the base, sub-obtuse at the apex; the outer adpressed-cinereous-pubescent outside, glabrous inside, ·3 to ·4 in. long; the inner smaller, thicker, glabrous except the upper third outside. *Stamens* numerous, with short thick filaments. *Anthers* linear, lateral; apical appendage of connective short, bluntly conical. *Ovaries* short, oblong, oblique, curved, coarsely pubescent; style as long as the ovary, hairy. *Carpels* unknown. *Hook. fil. Fl. Br. Ind.* i. 81.—Uvaria polyantha, *Wall. Cat.* 6467.

Khasia Hills and Sylhet, Assam, and Chittagong Hills.

VAR. *elliptica.* Leaves broadly elliptic, 7 to 10 in. long and 3·75 to 5·25 in. broad; petiole ·5 or ·6 in.

Chittagong Hill Tracts,—*Lister, Gamble.*

This species agrees with *M. Wallichii*, H. f. & Th., in having short filaments to its stamens; but the flowers of this are more numerous and smaller and its leaves rather larger.

PLATE 172A. Melodorum polyanthum, *H. f. & Th.* 1, Flowering branch—*of natural size;* 2, flower dissected; 3 & 4, anthers; 5 & 6, pistils—*enlarged.*

3. MELODORUM GRIFFITHII, *Hook. fil. & Thoms. Fl. Ind.* 120. A climber; young branches slender, rusty-tomentose, speedily glabrous, dark grey, lenticellate. *Leaves* oblong-lanceolate to ovate-lanceolate, acute or obtuse, the base rounded or slightly narrowed; upper surface glabrous except the slightly puberulous midrib; under-surface sparsely adpressed-pubescent; main nerves 7 to 10 pairs, ascending, curving, rather prominent beneath; length 3 to 5 in., breadth 1·25 to 1·75 in.; petiole ·25 in. *Flowers* ·35 in. long, in few-flowered short leaf-opposed racemes; pedicels about ·2 in. long, rusty tomentose; the bracteole orbicular, median. *Sepals* orbicular, pointed, rusty-pubescent outside, glabrous and slightly granular within like the outer petals. *Petals* leathery, ovate-oblong, obtuse; the outer about ·35 in. long; the inner smaller and more concave at the base, glabrous and granular except a patch along the midrib in its upper half outside. *Stamens* numerous; the apical process of the connective large, glabrous, triangular. *Ovaries* obliquely ovoid, densely sericeous, with 8 to 10 ovules

in two rows; style short, glabrous; stigma slightly bifid. *Carpels* (immature) obliquely ovoid, blunt, densely and softly yellowish-tomentose; stalks longer than the carpel. *Hook. fil. Fl. Br. Ind.* i. 80; *Kurz For. Fl. Burm.* i. 43.—Fissistigma scandens, *Griff. Nat.* iv. 706.

Burmah: Province Tenasserim, at Mergui,—*Griffith.*

On this plant Griffith founded his genus *Fissistigma;* the division of the stigma is, however, very slightly marked in the only specimen I have seen. The plant is very badly represented in collections. As Sir Joseph Hooker points out (*Fl. Br. Ind.* i. 80), it must be very near *Melodorum sphœnocarpum* (*Uvaria sphœnocarpa*, Blume). In *M. verrucosa* the stigma is very distinctly divided.

Plate 172B. Melodorum Griffithii, *H. f. & Th.* 1, Flowering branch; 2, unripe carpel; 3, flower dissected—*of natural size;* 4 & 5, anthers; 6, pistil; 7, section of pistil—*enlarged.*

4. Melodorum litseæfolium, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 103. A powerful climber; young branches densely but minutely rusty-tomentose, afterwards tuberculate and sub-glabrous. *Leaves* coriaceous, oblong-ovate to oblong, acute, the base rounded or slightly cuneate; upper surface greenish when dry, glabrous, shining, except the rufous-pubescent midrib; lower reticulate, uniformly hoary-pubescent, with a superficial layer of deciduous yellowish or reddish flexuose hairs; main nerves 8 to 10 pairs, oblique, curving, prominent beneath; length 2·75 to 4·25 in., breadth 1·35 to 1·6 in. *Flowers* ·2 to ·25 in. long, in few-flowered, lax, axillary, rufous-tomentose racemes or in terminal panicles; pedicels ·25 to ·35 in. long with a single small median bracteole. *Sepals* broadly ovate-acute, concave, connate at the base, spreading, ·1 in. long. *Petals* broadly ovate-oblong, acute, leathery; outer ·3 in. long, slightly concave and glabrous at the base, otherwise puberulous inside, rufous-tomentose outside; the inner petals much smaller, hoary-puberulous, except the pitted glabrous concavity at the base inside. *Stamens* numerous; apical process of the connective broadly and bluntly triangular; filaments short. *Ovaries* few, oblong, oblique, rufous-pubescent, 4-ovuled; stigma lateral, oblong. *Ripe carpels* unknown.

Perak,—*King's Collector* Nos. 4063 and 4986.

The flowers of this resemble those of *M. fulgens*, H. f. & Th., but they are smaller and more numerous than those of *M. fulgens;* the petals of this species also are thinner and the apical process of the anthers is broader and blunter. The leaves too of this are broader, and in the indumentum on their lower surface they differ considerably from those of *M. fulgens.* Fruit of this species is as yet unknown. The ovaries have only 4 ovules. *M. glaucescens*, Hance, resembles this in foliage.

Plate 173. Melodorum litseæfolium, *King.* 1, Flowering branch; 2, flowers dissected—*of natural size;* 3, stamens; 4, pistils—*enlarged.*

5. Melodorum fulgens, *Hook. fil. Fl. Br. Ind.* 120. A large climber; young branches minutely tawny-pubescent, speedily becoming glabrous and dark-coloured. *Leaves* oblong-lanceolate, acuminate, the base rounded or sub-acute; upper surface pale olivaceous when dry, glabrous, the midrib strigose; under-surface brown when dry, sparsely and minutely strigose, especially on the midrib; main nerves 18 to 13 pairs, oblique, curving; length 3 to 4·5 in., breadth 1·2 to 1·5 in.; petiole ·25 to ·4 in., pubescent. *Flowers* ·4 to ·5 in. long,

solitary, or in terminal or leaf-opposed few-flowered cymes; pedicels ·3 to ·4 in. long, adpressed, tawny-pubescent with one sub-medial and one basal bracteole. *Sepals* broadly ovate, sub-acute, connate at the base, spreading, ·1 in. long, pubescent outside, glabrous inside. *Petals* thick; the outer flat, ovate-oblong, sub-acute, tawny-pubescent outside, glabrous at the base inside, ·5 in. long; inner petals like the outer but concave at the base, only ·3 in. long and glabrous, except near the apex, outside. *Stamens* numerous; apical process of connective of the outer lanceolate and as long as the anthers, that of the inner shorter. *Ovaries* narrowly oblong, oblique, curved, minutely pubescent, with 4 ovules in two rows; style lateral, half as long as the ovary; stigma small. *Ripe carpels* ovoid-globose, densely and minutely silky-tawny-tomentose like the stalks, 1 to 1·5 in. long and ·9 in. in diam.; stalks ·85 to 1·5 in. long, stout. *Seeds* oblong, plano-convex, brown, shining. *Hook. fil. Fl. Br. Ind.* i. 82; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 35; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 104.—Uvaria fulgens and Myristica Finlaysoniana, *Wall. Cat.* 6482 and 6793.

Malacca, Perak, Singapore. Distrib.—Borneo, Phillipines. Very common.

Plate 174. Melodorum fulgens, *H. f. & Th.* 1, Flowering branch; 2 & 3, ripe carpels; 4, section of ripe carpel; 5, seed; 6, flower dissected—*of natural size;* 7, anthers; 8, pistils—*enlarged.*

6. Melodorum Wallichii, *Hook. fil. & Thoms. Fl. Ind.* 118. A large climber; young branches sparsely yellowish-pubescent. *Leaves* thinly coriaceous, oblong-lanceolate, acute or acuminate, the base rounded or slightly cuneate; upper surface glabrous, the lower sparsely adpressed-pubescent; main nerves about 10 to 14 pairs, oblique, rather straight; length 3·5 to 5·5 in., breadth ·9 to 1·3 in.; petiole ·2 in. *Flowers* ·65 in. long, leaf-opposed or terminal, solitary or in fascicles of 2 or 3; pedicels ·3 in. (longer in fruit); bracteoles 1 or 2, oval, basal. *Sepals* ovate, acute, connate only at the base, spreading, puberulous on both surfaces, ·25 in. long. *Petals* leathery; the outer ovate-oblong, sub-acute, adpressed-rufous-pubescent outside, glabrous inside, ·65 in. long; the inner rather smaller but thicker and tubercular inside, glabrous, except the upper half, outside. *Stamens* numerous with short thick filaments. *Anthers* linear; the connective with short conical apiculus. *Ovaries* oblong, oblique, pubescent; stigma shorter, glabrous, cylindric. *Ripe carpels* ovoid, slightly apiculate, sub-tubercular and minutely adpressed-pubescent, 1·1 in. long. and ·7 in. in diam.; stalks 1·25 to 1·4 in. *Hook. fil. Fl. Br. Ind.* i.—Uvaria bicolor, *Wall. Cat.* 6466 (*not of Roxb.*)

Assam, Khasia, and Sylhet.

Plate 175A. Melodorum Wallichii, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, flower dissected—*of natural size;* 4 & 5, stamens; 6 & 7, pistils—*enlarged.*

7. Melodorum bicolor, *Hook. fil. Fl. Ind.* 119. A large climber; young branches rufous-tomentose. *Leaves* thinly coriaceous, oblong or elliptic-oblong, the older obtuse, the younger acute, the base rounded; upper surface glabrous; the midrib coarsely, the nerves finely, pubescent; under-surface sparsely covered with long adpressed flexuose hairs; main nerves 16 to 20 pairs, oblique, slightly curving, not inter-arching, prominent beneath; the reticulations open, distinct; length 4 to 6 in., breadth 1·8 to 2·5 in.; petiole ·35 in., tomentose. *Flowers* ·7 to 1 in. long, leaf-opposed or extra-axillary, solitary or 2

or 3 from a rufous-tomentose peduncle bracteate at the base; pedicels very short. *Sepals* ovate-acute, spreading. *Petals* leathery, ovate-lanceolate; the outer densely rufous-sericeous outside, glabrous inside, ·8 in. long; the inner smaller, glabrous. *Stamens* numerous; the apex of the connective obliquely triangular. *Ovaries* oblong, densely rufous-sericeous; style short; stigma deeply bifid. *Carpels* globose, pubescent, mucronate, 1 in. in diam.; stalk ·25 to ·35 in. *Hook. fil. Fl. Br. Ind.* i. 80; *Kurz For. Fl. Burm.* i. 43.—Uvaria bicolor, *Roxb. Fl. Ind.* ii. 662; *Wall. Cat.* 6466A (*in part*).

From the base of the E. Himalaya through the hill ranges of Assam to Burmah: at low elevations.

PLATE 175B. Melodorum bicolor, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, flower—*of natural size;* 4 & 5, ovaries—*enlarged.*

8. MELODORUM MANUBRIATUM, *Hook. fil. & Thoms. Fl. Ind.* 118. A large creeper; young branches minutely rufous-pubescent. *Leaves* thinly coriaceous, oblong-lanceolate, acuminate, the base rounded or slightly narrowed; upper surface olivaceous when dry, glabrous, the midrib rufous-pubescent; lower uniformly covered with rather thin, brown or golden, sericeous tomentum; main nerves 12 to 18 pairs, oblique, slightly curved, rather prominent beneath; length ·2 to 4·5 in., breadth ·75 to 1·5 in.; petiole ·3 in., tomentose. *Flowers* ·6 to ·75 in. long, leaf-opposed or extra-axillary, in short racemes, rarely solitary; pedicels ·25 to ·75 in., softly pale rufous-tomentose, with one broad clasping bracteole near the base. *Sepals* broadly ovate, shortly sub-acuminate, spreading, connate at the base, sericeous outside, glabrous inside. *Petals* leathery, ovate-lanceolate, sub-acuminate, concave; the outer ·6 to ·75 in. long, outside sericeous, inside puberulous in the upper half, glabrous in the lower; the inner petals smaller, minutely pubescent in the upper half outside and near the apex inside, otherwise glabrous; the base very concave. *Stamens* numerous; the connective bluntly triangular at the apex. *Ovaries* numerous, oblong, densely sericeous; ovules 8, in two rows; stigma sessile, glabrous, bifid. *Ripe carpels* numerous, ovoid-globose, with thick pericarp, about 1·25 in. long, densely rufous-tomentose; stalks 2 or 3 in. long. *Seeds* about 8, in two rows. *Hook. fil. Fl. Br. Ind.* i. 79; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 35; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 104.—Melodorum bancanum, *Scheff. Nat. Tijds.* xxxi. 343.—Uvaria manubriata, *Wall. Cat.* 6456.

Penang, Malacca, Singapore. Perak; very common. Distrib.—Bangka.

PLATE 176. Melodorum manubriatum, *H. f. & Th.* 1, Flowering branch; 2, young carpels; 3, ripe carpels—*of natural size;* 4, anthers; 5, pistils—*enlarged.*

9. MELODORUM VERRUCOSUM, *Hook. fil. & Thoms. Fl. Ind.* 119. A strong climber; young branches minutely rusty-tomentose, speedily glabrous; the bark dark-coloured, rugose, and lenticellate. *Leaves* thinly coriaceous, oblong or oblong-lanceolate, acute, the base rounded or slightly cuneate; upper surface finely reticulate, glabrous, except the puberulous midrib; lower surface softly pubescent, becoming almost glabrous when old; main nerves 12 to 18 pairs, oblique, inter-arching near the edge, bold and prominent beneath, the transverse veins oblique, distinct; length 4 to 6·5 in., breadth 1·2 to 2·2 in.; petiole ·3 to ·4 in., rufous-pubescent. *Flowers* ·5 in. long, leaf-opposed or terminal, solitary; peduncles ·6 to 1 in. long, minutely tomentose, with 1 or 2

small bracteoles about the middle. *Sepals* broadly ovate, triangular, connate at the base, spreading, tomentose outside, glabrous inside, ·2 to ·25 in. long. *Petals* leathery, ovate-lanceolate; the outer ·5 in. long, minutely tomentose outside; the inner puberulous on the outer, glabrous on the inner, surface. *Stamens* numerous, short; the connective broadly and obliquely triangular at the apex. *Ovaries* oblong, curved, densely sericeous; style glabrous; stigma small. *Carpels* sub-globose, densely and boldly warted, puberulous, 1·5 or even 2 in. in diam.; stalks 4 to 8 in. long. *Hook. fil. Fl. Br. Ind.* i. 80; *Kurz For. Fl Burm.* i. 43.

Khasia Hills; elevat. 1,000 to 5,000 feet. Yunan.

PLATE 177A. Melodorum verrucosum, *H. f. & Th.* 1, Flowering branch; 2, ripe carpel—*of natural size;* 3, flower dissected; 4, anthers; 5, pistils—*enlarged.*

10. MELODORUM LATIFOLIUM, *Hook. fil. & Thoms. Fl. Ind.* 116. A large climber; young shoots velvety-rufous-tomentose. *Leaves* coriaceous, oblong or narrowly elliptic, sub-acute or obtuse, the base rounded; upper surface minutely pubescent, the midrib tomentose; lower surface uniformly covered with short soft brown tomentum; main nerves 16 to 24 pairs, spreading, bold, not inter-arching; length 3 to 7·5 in., breadth 1·75 to 2·5 in.; petiole ·4 to ·7 in., stout, channelled, tomentose. *Flowers* from ·6 to 1·25 in. in diam. when expanded, brown, in lax axillary or terminal racemes or panicles; pedicels ·35 to ·5 in. with bracteole at the base. *Sepals* broadly ovate, blunt, connate into a flat triangular cup, ·25 in. wide, tomentose outside, glabrous within like the outer petals. *Petals* thick, fleshy, ovate, acuminate, ·4 to ·7 in. long; the inner much smaller. *Stamens* very numerous; the apex of the connective triangular, acute; anther-cells linear, lateral. *Ovaries* about 6, obliquely oblong, densely sericeous, 6- to 8-ovuled; stigma small, sessile. *Ripe carpels* globose to ovoid, slightly apiculate and slightly tapering to the base, densely velvety and minutely tomentose, 1 to 2·25 in. long and 1 to 1·2 in. in diam.; stalks stout, velvety, ·75 to 1·75 in. long; *Hook. fil. Fl. Br. Ind.* i. 79; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 35; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 105; *Wall. Cat.* 9411.—M. mollissimum, *Miq. Fl. Ind. Bat. Suppl.* 374.—Uvaria latifolia, *Blume Fl. Jav. Anon., t.* 15.—Unona latifolia, *Dunal Anon.* 115.—Uvaria longifolia, *Bl. Bijdr.* 13.

Malacca,—*Griffith.* Singapore,—*Maingay, Hullett.* Perak; very common. Distrib.—Sumatra, Java, Phillipines.

Uvaria latifolia, *Blume,* as described and figured by that author, has larger flowers than the common Perak plant, and its carpels are globular, whereas those of the Perak plant are ovoid and apiculate. The plant figured by Blume does, however, occur there but it is not common. The forms may be characterised thus:—

VAR. *typica.* Flowers ·7 in. long; fruit globular, not apiculate, 1 in. in diam. Uvaria latifolia, *Blume l. c. t.* 15. Perak, Java.

VAR. *ovoidea.* Flowers ·5 in. long, fruit ovoid; slightly apiculate, often oblique, as much as 2·25 in. long, very oblique and warted when young. M. latifolium, *H. f. & Th. Fl. Br. Ind.* 79. Malacca, Perak, Singapore. The common form in the Malay Peninsula.

PLATE 178. Melodorum latifolium, *H. f. & Th.* 1, Flowering branch; 2, flower dissected; 3, ripe carpels—*of natural size;* 4, anthers; 5, pistils—*of natural size.*

PLATE 179. Melodorum latifolium, *H. f. & Th.*, VAR. ovoidea, *King*. 1, Flowering branch; 2, young carpels; 3, ripe carpels; 4, flower dissected—*of natural size;* 5, anthers; 6, pistils—*enlarged.*

11. MELODORUM CYLINDRICUM, *Maingay in Hook. fil. Fl. Br. Ind.* i. 80. A climber; young branches minutely rusty-pubescent, speedily glabrous and dark-coloured. *Leaves* coriaceous, elliptic-oblong, brownish when dry, acute or acuminate, the base rounded or slightly narrowed; upper surface quite glabrous; the lower pa'er, minutely pubescent; main nerves 8 to 10 pairs, spreading, very faint; length 2·5 to 4·25 in., breadth 1·6 to 1·8 in.; petiole ·5 in. *Flowers* ·5 in. long, solitary, axillary, drooping; buds short, pyramidal, adpressed-brown-pubescent; pedicel short, stout, with minute bracteole. *Sepals* small, triangular, connate, forming a flat spreading cup. *Outer petals* triangular-ovate, triquetrous with an excavated base; the inner very small, triangular, glabrous. *Stamens* numerous; the apex of the connective orbicular. *Ovaries* 4 to 6, sericeous. *Ripe carpels* cylindric, curved, both ends obtuse, sub-tubercular, minutely brown-pubescent, 1 to 1·75 in. long and ·35 to ·75 in. in diam.; pericarp thin; stalk ·5 in. long, stout. *Seeds* many, horizontal, in two series, compressed, ·65 in. long, shining, with a small cartilaginous arillus. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 106

Malacca,—*Maingay* (*Kew Distrib.*) No. 78. Singapore, *Ridley* No. 2115.

PLATE 177B. Melodorum cylindricum, *Maing.* 1, Flowering branch; 2, ripe fruit; 3, flower—*of natural size;* 4, flower dissected; 5 & 6, anthers; 7 & 8, pistils—*enlarged.*

12. MELODORUM HYPOGLAUCUM, *Miq. in Ann. Mus. Lugd. Bat.* ii. 37. A strong creeper; young branches minutely rufous-pubescent, ultimately glabrous, rather pale and much tubercled. *Leaves* thinly coriaceous, oblong-lanceolate to oblong-elliptic, acute or shortly acuminate, the base rounded or cuneate; upper surface glabrous, except the rufous-puberulous midrib; lower minutely hoary-puberulous, the 10 or 12 pairs of bold, oblique, curving main nerves ultimately glabrous and darker-coloured; length 3 to 5·5 in., breadth 1·35 to 2·2 in.; petiole ·25 in. *Flowers* ·5 to ·8 in. long, in lax, 2- to 3-flowered, axillary racemes or (by abortion of the leaves) in lax, terminal, 10- to 12-flowered panicles; pedicels as long as the flowers, slender; bracteoles 1 or 2, minute. *Sepals* ovate, acute, concave, conjoined only at the base, rufous-pubescent outside, puberulous within. *Petals* leathery, linear-lanceolate; the base expanded and concave; the outer minutely rufous-tomentose on the external surface, paler and pubescent on the internal, ·5 to ·8 in. long, concave for their whole length; the inner one-third shorter with a glabrous concavity at the base only, the rest triquetrous and puberulous. *Stamens* numerous; apical process of connective large, broader than the anther-cells, sub-globular. *Ovaries* about 12, oblong, golden-silky, with 4 to 6 ovules in two rows; stigma large, sub-capitate; style short. *Ripe carpels* globose or ovoid-globose, tubercled, puberulous or glabrescent, 1 in. long; stalks about the same length, striate. *Seeds* about 4 or 5, oval, compressed, smooth, brown, shining. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 106.

Perak,—*Scortechini, King's Collector.*

The plant described above agrees fairly well with the only specimens of *Melodorum hypoglaucum*, Miq., which I have been able to consult. It also agrees fairly with

Miquel's description of that species. But its petals and stamens, and its ovaries externally, are rather those of *Xylopia* than of *Melodorum;* although its habit, its torus and carpels are emphatically those of the latter genus. In the number of ovules it agrees with the majority of the species of *Melodorum*. It thus forms a connecting link between the two genera.

PLATE 180A. Melodorum hypoglaucum, *Miq.* 1, Flowering branch; 2, ripe carpels; 3, section of a ripe carpel—*of natural size;* 4, flower dissected—*slightly enlarged;* 5 & 6, anthers; 7 & 8, pistils—*much enlarged.*

13. MELODORUM PARVIFLORUM, *Scheffer in Nat. Tijdsch. Ned. Ind.* xxxi. 344. A powerful climber; young shoots minutely rusty-tomentose, the bark dark-coloured. *Leaves* coriaceous, more or less broadly elliptic, abruptly acute, the base broad, rounded; upper surface pale yellowish-green when dry, when young minutely stellate-pubescent, when old glabrescent or quite glabrous, the midrib always tomentose; under-surface softly rufous-pubescent, the nervation and venation very prominent; main nerves 13 to 15 pairs, oblique, curving, inter-arching close to the edge; length 3 to 6 in., breadth 2·25 to 3·25 in.; petiole ·4 in. *Flowers* ·5 in. long, in lax axillary or terminal rusty racemes often more than half as long as the leaves; pedicels ·4 to ·6 in. long with 1 or 2 small bracteoles. *Sepals* triangular, spreading, connate at the base, rusty-tomentose outside, glabrescent inside like the petals, ·1 in. long. *Petals* thick, leathery, oblong-lanceolate, with broad bases; the outer ·5 in. long; the inner smaller, concave at the base, triquetrous in the upper half. *Stamens* numerous; the connective with compressed sub-quadrate apical appendage. *Ovaries* narrow, elongate, densely sericeous, 6 to 8-ovuled. *Ripe carpels* globular, sometimes very slightly apiculate, densely but minutely dark-brown tomentose, ·8 in. in diam.; stalks rather longer, slender, tomentose. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 107.

Perak,—*King's Collector.* Distrib.—Bangka.

A species closely allied to *M. sphærocarpum*, Blume. The leaves of this are however larger, the upper surface is stellate-tomentose when young and dries a pale yellowish-green; the racemes are much longer and laxer, and the flowers larger.

PLATE 181. Melodorum parviflorum, *Scheff.* 1, Flowering branch; 2, 3 & 4, flowers, dissected; 5, carpels—*of natural size;* 6, anthers; 7, ovaries—*enlarged.*

14. MELODORUM SPHÆROCARPUM, *Miq. Fl. Ind. Bat.* i. *pt.* 2, 35. A strong climber; young branches and all other parts more or less dark rusty-velvety-tomentose. *Leaves* elliptic-oblong, obtuse and very slightly apiculate, slightly narrowed to the rounded base; upper surface with harsh short pubescence, the midrib tomentose; lower surface uniformly and minutely soft-pubescent; main nerves 8 to 12 pairs, oblique, not inter-arching at the tips, prominent beneath; the connecting veins transverse, oblique, rather prominent; length 2·5 to 4·5 in., breadth 1·25 to 2 in.; petiole ·35 in. *Flowers* ·6 or ·7 in. in diam., in axillary or terminal racemes or panicles; pedicels ·35 to ·5 in. long with a small supra-basal bracteole. *Sepals* ovate-acuminate, connate at the base, spreading, minutely tomentose outside, glabrescent inside. *Petals* thick, leathery, brown outside, pink within, ovate, acuminate, slightly pouched at the base; the outer ·3 to ·35 in. long, tomentose outside, puberulous within; the inner smaller than the outer,

more concave at the base, glabrous or glabrescent, the upper part very thick. *Stamens* numerous; the apex of the connective thick, obliquely triangular; anther-cells linear, lateral. *Ovaries* about 6, elongate, oblique, pubescent, with 6 to 8 ovules; style short, glabrous; stigma small. *Ripe carpels* globular, harshly and minutely pubescent, 1·1 in. in diam.; stalks rather slender, about twice as long. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 108.—Unona sphærocarpa, *Blume Bijdr.* 12; *Fl. Javæ Anon.* 79, *t.* 16.

Perak,—*King's Collector.* Distrib.—Java.

This is allied to *M. latifolium*, but has smaller leaves with fewer nerves; its pubescence is very dark rusty, not tawny; and the apices of the anthers are truncate, not bearing a broad triangular acute point. It is also allied to *M. parviflorum*, Scheff.

PLATE 180B. Melodorum sphærocarpum, *Miq.* 1, Flowering branch; 2, ripe carpels; 3, flower dissected—*of natural size;* 4, anthers; 5, pistils—*enlarged.*

15. MELODORUM LANUGINOSUM, *Hook. fil. & Thoms. Fl. Ind.* 117. A strong creeper; young branches softly rufous-tomentose. *Leaves* coriaceous, oblong, sometimes sub-obovate-oblong, abruptly acute or shortly acuminate, rarely obtuse, the base rounded; upper surface glabrous, the midrib rufous-tomentose, olivaceous when dry; lower surface densely rufous-lanate; main nerves 12 to 20 pairs, oblique, curving, inter-arching close to the edge, prominent beneath; length 3·5 to 9 in., breadth 1·9 to 3·5 in.; petiole ·4 to ·6 in., stout, tomentose. *Flowers* 1·25 to 1·5 in. long, axillary or leaf-opposed, solitary, or in short 2- to 4-flowered cymes; pedicels stout, lanate, ·5 in. long, with a single basal bracteole. *Sepals* ovate, spreading, slightly connate, golden or rufous-lanate outside, glabrous inside like the outer petals. *Petals* thick, leathery, oblong-lanceolate from a broad base, sub-acute; the outer 1·25 to 1·5 in. long; the inner smaller glabrescent or glabrous, concave at the base. *Stamens* numerous; the connective obliquely triangular at the apex; the anther-cells very narrow, lateral. *Ovaries* obovoid, oblique, curved, densely sericeous, 4- to 6-ovuled; style glabrous. *Ripe carpels* sessile, shortly stalked, sub-globose, narrowed to the base, densely and softly rufous-tomentose, about ·75 in. in diam. when ripe. *Seeds* about 4. *Miq. Fl. Ind. Bat.* i. *pt.* 2, 35; *Hook. fil. Fl. Br. Ind.* i. 79; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 108. Uvaria tomentosa, *Wall. Cat.* 6454.

Penang,—*Wallich, Curtis.* Singapore,—*Wallich.* Pangkore,—*Curtis.* Penang,—*Scortechini, Wray, King's Collector.*

At once distinguished by its large flowers, lanate leaves and sessile, or shortly-stalked rufous-tomentose fruit.

PLATE 182. Melodorum lanuginosum, *H. f. & Th.* 1, Flowering branch; 2, flower dissected; 3, cone of inner petals undetached; 4 & 5, young carpels; 6, carpels some of which are ripe—*of natural size;* 7, anthers; 8, ovaries—*enlarged.*

16. MELODORUM RUBIGINOSUM, *Hook. fil. & Thoms. Fl. Ind.* 116. A large climber; young branches rusty-tomentose. *Leaves* thinly coriaceous, almost membranous, oblong to elliptic, obtuse, abruptly and minutely cuspidate or acute; the base rounded or sub-cordate; upper surface at first puberulous, afterwards glabrous except the tomentose midrib and nerves; lower surface pubescent; main nerves 13 to 22 pairs, spreading, curving, prominent beneath, veins obliquely transverse; length 3 to 9 in., breadtn 1·25 to 4 in.;

petiole ·35 to ·6 in., stout, minutely rusty; tomentose. *Flowers* axillary, solitary or in pairs or (by the fall of the leaves) in terminal 4- to 5-flowered leafless cymes, 1·2 to 1·4 in. long; pedicels stout, ·6 to ·8 in. long; rusty or yellowish-tomentose with 1 or 2 bracteoles near the base. *Sepals* ·1 in. long; semi-orbicular, connate at the base, spreading. *Outer petals* thick, elongate-lanceolate, yellowish-tomentose outside, glabrous inside, slightly concave, especially at the expanded base; inner petals like the outer, but shorter and narrower, sub-triquetrous, puberulous outside. *Stamens* very numerous; the connective with a large, compressed, sub-acute, apical process; the anthers linear, lateral. *Ovaries* several, narrowly oblong, densely sericeous; ovules numerous, in two rows; style short, thick, pubescent; stigma flat. *Carpels* obliquely ovoid-globose, 1 to 1·25 in. long when ripe, tomentose; the stalks as long or longer. *Hook. fil. Fl. Br. Ind.* i. 79; *Kurz For. Fl. Burm.* i. 43.—Uvaria rubiginosa, *A. DC. Mem. Anon.* 26; *Wall. Cat.* 6465.—U. nervosa and U. fulva, *Wall. Cat.* 6479, 6427.

From Sylhet to Chittagong; Tenasserim.

VAR. oblonga, *King.* Ripe carpels oblong, blunt, tapering to the base, 1·3 in. long, the stalks nearly 1 in., deciduously rufous-pubescent.

Penang,—*Curtis* No. 843.

PLATE 183. Melodorum rubiginosum, *H. f. & Th.*, VAR. oblonga, *King.* 1, Flowering twig; 2, fruiting twig with ripe carpels; 3, flower dissected; 4, section of a ripe carpel—*of natural size;* 5 & 6, anthers; 7 & 8, pistils—*enlarged;* 9, young carpels of the typical form—*of natural size.*

17. MELODORUM MAINGAYI, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 80. A climber; young branches pubescent, dark-coloured. *Leaves* coriaceous, reddish-brown when dry, broadly elliptic or oblong, rounded at both ends, the tip sometimes minutely apiculate; upper surface glabrous, except the puberulous midrib; lower glaucous and finely pubescent; main nerves 14 to 16 pairs, spreading, slightly prominent and dark-coloured beneath; length 3 to 6 in., breadth 1·5 to 2·35 in.; petiole ·6 in. *Flowers* 1·25 to 1·5 in. long, solitary, axillary; buds swollen at the base, narrowed and triquetrous above; pedicels ·25 to ·5 in., stout; bracteoles several, small. *Sepals* orbicular, sub-acute, quite connate into a disk, ·35 in. in diam. *Petals* leathery; the outer oblong-lanceolate, with broad base, flat but keeled down the middle inside; outside minutely rufous-tomentose, inside hoary-pubescent; inner very small, triangular-ovate, glabrous. *Stamens* numerous, small, with a broad rounded apical process, convex. *Ovaries* about 6, sericeous on one side; stigma sub-sessile. *Ripe carpels* oblong, tapering to each end; the apex shortly beaked, rusty-puberulous; the pericarp thick, 1·5 to 2 in. long and ·75 in. in diam.; stalks ·5 in. long, stout. *Seeds* many, in horizontal rows, ·5 in. long, testa shining, not margined. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 109.

Penang,—*Maingay* (*Kew Distrib.*) No. 108; *Curtis* No. 1046. Perak,—*Wray* No. 1112.

PLATE 184A. Melodorum Maingayi, *H. f. & Th.* 1, Flowering branch; 2, unripe carpels; 3, ripe carpels—*of natural size;* 9, flower dissected, all the parts enlarged and one of the outer petals (4) very much so; 5 & 6, anthers; 7 & 8, pistils—*much enlarged.*

18. Melodorum prismaticum, *Hook. fil. & Thoms. Flora Ind.* 121. A large creeper; young branches glabrous, dark-coloured. *Leaves* coriaceous, oblong, elliptic-oblong, rarely obovate-oblong, abruptly and shortly acuminate; the base broad, rounded; upper surface glabrous except the minutely puberulous midrib; lower surface glaucous, reticulate, finely pubescent, especially on the midrib; main nerves 12 to 18 pairs, spreading, faint especially near the tip, the secondary nerves prominent; length 4·5 to 8·5 in., breadth 2·3 to 3·3 in.; petiole ·5 to ·7 in. *Flowers* 1·5 to 2 in. long, axillary, solitary; pedicels ·3 to ·6 in. long, rufous-tomentose, with 1 large bracteole above the middle and several smaller near the base. *Sepals* quite connate into a flat obtusely 3-angled disk, ·3 in. broad, pubescent outside, glabrous and tubercled inside. *Petals* very thick; the outer linear-lanceolate, 1·5 to 2 in. long, triquetrous, rufous-tomentose outside, puberulous inside; the inner thinner and only about ·3 in. long, triangular, ridged outside, much excavated and glabrous at the base inside; otherwise puberulous. *Stamens* numerous, with very short filaments; anthers linear; apex of connective obliquely triangular. *Ovaries* elongate, oblong, tapering to the apex, shortly pubescent; ovules about 14, in two rows; style short, lateral; stigma sub-capitate, lobulate. *Ripe carpels* ovoid, blunt, tuberculate, puberulous, becoming sub-glabrous, 1·4 in. long and ·8 in. in diam.; stalks ·8 to 1 in., stout. *Seeds* in two rows, horizontal, compressed, oval, black, shining. *Hook. fil. Fl. Br. Ind.* i. 81; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 36; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 109.—Pyramidanthe rufa, *Miq. Ann. Mus. Lugd. Bat.* ii. 39.—Uvaria rufa, *Wall. Cat.* 6455.—Oxymitra bassiæfolia, *Teysm. and Binnin. in Tijdsch. Ned. Ind.* xxv. (1863) 419.

Penang, Malacca, Perak, Singapore: common. Distrib.—Borneo.

Authentic specimens both of *Pyramidanthe rufa* and of *Oxymitra bassiæfolia*, T. and B., show that they unmistakably belong to this species. Specimens of the former from Bangka and from the Buitenzorg Botanic Garden have, however, their leaves rather more hairy beneath than is usual in Perak specimens, and their flowers are also rather longer.

Plate 185. Melodorum prismaticum, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, flower dissected—*of natural size;* 4 & 5 anthers; 6 & 7 pistils—*enlarged.*

19. Melodorum macranthum, *Kurz in Journ. As. Soc. Bengal* 1872, *pt.* ii. 291; 1874, *pt.* ii. 56; *For. Fl. Burm.* i. 42. A small tree; all parts, except the young leaf-buds and the flowers, glabrous; young branches dark-coloured, rather slender. *Leaves* membranous, elliptic-oblong, sometimes slightly obovate, shortly and abruptly acuminate, the base cuneate; upper surface shining, the lower dull; main nerves 12 to 16 pairs, faint and much more prominent than the secondary, forming a double set of intra-marginal arches; length 6 to 8 in., breadth 2·5 to 3·5 in.; petiole ·3 to ·4 in. *Flowers* solitary, axillary or from the branches below the leaves, 3 to 5 in. long, drooping; pedicels ·5 to ·75 in. long, obscurely bracteolate at the base only. *Sepals* broadly ovate, sub-acute, coriaceous, pubescent at the edges inside, glabrous outside, connate for half their length, ·45 in. long. *Petals* greenish-white, becoming yellowish, coriaceous, narrowly lincar-lanceolate, acuminate; the outer row flat, adpressed-puberulous with a glabrous patch at the base inside, 3 to 5 in. long; the inner row only 1 to 1·25 in. long, cohering by their edges, vaulted at the base and with a glabrous patch; the limb keeled inside,

puberulous on both surfaces. *Stamens* numerous; the anther-cells linear, elongate; apical process of connective narrowly triangular, pointed. *Ovaries* numerous, narrowly oblong, adpressed-rufous-pubescent, 4-ovuled; style nearly as long as the ovary, cylindric, bent outwards, glabrous; stigma small, slightly bifid. *Ripe carpels* oblong, blunt, tapering at the base, slightly rugose, glabrous, 1·25 to 1·5 in. long and about ·5 or ·6 in. in diam.; stalk ·4 to ·5 in. *Seeds* 1 or 2, compressed, ovoid, smooth. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 110.—Unona macrantha, *Kurz in Andam. Report, Ed.* 1, *App. B. I.*—Pyramidanthe macrantha, *Kurz l. c. Ed.* 2, *p.* 29.

S. Andaman,—*Kurz, King's Collector.*

In some of its characters (*e.g.*, the erect habit, the fewness of the ovules, and the thin texture and flatness of the much elongated outer petals) this does not quite conform to the characters of typical *Melodorum*. By its thin elongated outer petals, it approaches the *Dasymaschalon* section of *Unona;* but the fewness of its ovules excludes it therefrom. From *Xylopia*, which it in some respects resembles, it is chiefly excluded by the very convex torus of its flowers, and by the very pointed apical appendage of its stamens. The stamens, on the other hand, are those of *Melodorum*, and the petals resemble those of *M. prismaticum* (*Pyramidanthe rufa*, Miq.) On the whole, therefore, I think it best to leave this plant in the genus to which Kurz finally referred it.

Plate 186. Melodorum macranthum, *Kurz*. 1, Leaf-twig; 2, flowers; 3, fruit nearly ripe; 4, seed; 5, inner surface of outer petal; 6, inner petals cohering into a cone; 7, sepals and andro-gynœcium—*of natural size;* 8 & 9, anthers; 10 & 11, pistils—*enlarged.*

20. Melodorum elegans, *Hook. fil. & Thoms. Fl. Ind.* 122. A large climber; young branches slender, puberulous at first, ultimately glabrous, dark-coloured. *Leaves* thinly coriaceous, oblong-lanceolate, acuminate, slightly narrowed to the rounded base; upper surface olivaceous when dry, glabrous; lower paler, puberulous, minutely reticulate, the 12 or 13 pairs of main nerves spreading, faint; length 2·5 to 3·5 in., breadth 1 to 1·25 in.; petiole ·25 to ·35 in. *Flowers* axillary, solitary or 2 or 3 in a fascicle, ·35 to ·65 in. long; pedicels slender, ·35 to ·6 in. long, often deflexed, with 2 or 3 minute basal bracteoles. *Sepals* ovate, acute, united at the base only, spreading, outside tubercular and pubescent, inside glabrous and concave, ·1 in. long. *Petals* leathery, the outer broadly ovate, sometimes minutely ovate-oblong, silky, rufous-tomentose outside, hoary-puberulous within, with a perfectly glabrous patch at the concave base, ·35 to ·6 in. long; inner petals only ·25 in. long, very thick, triquetrous and puberulous above, concave and glabrous at the base inside. *Stamens* numerous, with filaments half as long as the anther-cells; apical process of connective short, thick, obliquely triangular. *Ovaries* narrowly oblong, glabrous, with 8 ovules in two rows; style short, lateral. *Ripe carpels* ovoid or ovoid-globose, blunt at each end, glabrous, ·35 to ·5 in. long; stalks slender, ·25 in. long, compressed, black, shining, pitted. *Hook. fil. Fl. Br. Ind.* i. 82; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 36; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 111.—Uvaria elegans, *Wall. Cat.* 6474A.

This is closely allied to *M. fulgens*, H. f. & T., but its flowers have more slender and usually longer pedicels; the ovary of this is moreover glabrous, while that of *M. fulgens* is pubescent, and the carpels of this are under half an inch in length, while

those of *M. fulgens* are three times as long. This is also allied to *M. Kentii*, H. f. & Th., the ovaries of which have, however, never more than two ovules.

Penang,—*Wallich.* Malacca,—*Maingay* (*Kew Distrib.* No. 75). Perak,—*King's Collector, Wray, Scortechini.*

PLATE 184B. Melodorum elegans, *H. f. & Th.* 1, Flowering branch; 2, flower opened up; 3, ripe carpels—*of natural size;* 4, flower dissected—*slightly enlarged;* 5 & 6, anthers; 7 & 8, pistils—*much enlarged.*

21. MELODORUM PISOCARPUM, *Hook. fil. & Thoms. Fl. Ind.* 123. A powerful climber; young branches glabrous, black. *Leaves* coriaceous, elliptic or elliptic-oblong, sometimes obovate-elliptic, shortly and abruptly acuminate, the base rounded or sub-cuneate; upper surface olivaceous when dry, glabrous, shining; the lower glaucous, slightly puberulous when young; main nerves 10 to 12 pairs, spreading, very indistinct; length 2·5 to 4 in., breadth 1·25 to 1·8 in.; petiole ·35 in. *Flowers* ·3 to ·65 in. long, axillary, solitary or in pairs; pedicels rather stout, deflexed, rufous-puberulous, bi-bracteolate at the base, ·25 to ·35 in. long. *Sepals* broadly ovate, acute, concave, connate into a triangular cup, rufous-puberulous outside, glabrous inside, persistent. *Petals* thick; the outer flat, oblong-ovate, acute, minutely silky, rufous-tomentose outside, hoary pubescent inside, except on the glabrous basal excavation, ·3 to ·65 in. long; *inner petals* less than half as long, with a large glabrous basal concavity and a short, thick, triquetrous point, hoary-puberulous. *Stamens* numerous, filament very short; apical process of connective orbicular. *Ovaries* narrowly oblong, glabrous, pitted, 2-ovuled; style lateral, nearly as long as the ovary. *Ripe carpels* globular, slightly tubercled, glabrous, ·25 in. in diam.; stalks about as long. *Seeds* 2, plano-convex, dark-brown, shining, pitted. *Hook. fil. Fl. Br. Ind.* i. 82; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 37; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 112.—M. pyramidale, *Maingay* MSS.—Uvaria mabiformis, *Griff. Notulæ* iv. 709.

Malacca,—*Griffith* Nos. 389 and 442; *Maingay* (*Kew Distrib.*) Nos. 76 and 77. Singapore,—*Ridley.* Penang,—*Curtis.* Perak; common. Distrib.—Sumatra,—*Forbes* No. 2182.

Only two species of *Melodorum* besides this have glabrous ovaries (*M. Kentii* and *M. elegans*); but whereas those of this and *M. Kentii* are 2-ovuled, the ovaries of *M. elegans* have 8, or, according to Sir Joseph Hooker, sometimes 10 ovules. This species has, however, different leaves from the two above mentioned, and its carpels are much smaller and quite globular. In this, as in other species of *Melodorum*, there is considerable variability in the size of the flowers.

PLATE 187A. Melodorum pisocarpum, *H. f. & Th.* 1, Flowering and fruiting branch; 2, ripe carpels from another specimen; 3, outer and inner petals—*of natural size;* 4 & 5, anthers; 6 & 7, pistils—*much enlarged.*

21. Xylopia, *Linn.*

Trees or shrubs. *Leaves* coriaceous. *Flowers* axillary, solitary, cymose or fascicled; buds triquetrous, conic, often slender. *Sepals* 3, valvate, connate. *Petals* 6, elongate, valvate, in 2 series; outer flat or concave; inner nearly as long, trigonous, concave

at the base only. *Torus* flat, or hollow and enclosing the carpels. *Stamens* oblong, truncate or connective produced; anther-cells remote or contiguous, often septate and with a large pollen-grain in each cellule. *Ovaries* 1 or more; style long, clavate; ovules 2—6 or more, 1- to 2-seriate. *Ripe carpels* long or short, continuous or moniliform, usually several-seeded. Distrib.—Tropics generally; species 60 to 70.—Closely allied to *Melodorum*, but very different in habit.

Leaves quite glabrous.
Leaves 6 or 7 in. long . . . . . 1. *X. oxyantha.*

Leaves between 3 and 5 in. long.
Ripe carpels cylindric.
Ripe carpels boldly tubercled . . . . . 2. *X. dicarpa.*
Ripe carpels smooth . . . . . 3. *X. Malayana.*
Ripe carpels obovoid, smooth . . . . . 4. *X. parvifolia.*

Leaves between 2 and 3 in. long.
Flowers always solitary; pedicels with 2 or 3 orbicular bracteoles; apical process of stamens rounded; anther-cells septate . . . . . 5. *X. Maingayi.*
Flowers solitary or in pairs, ·5 in. long; pedicels with orbicular basal bracteoles; apical process of stamens rounded; anther-cells septate . . . . . 6. *X. pustulata.*
Flowers in fascicles or solitary, ·75 in. long; pedicels ebracteolate; apical process of stamens oblong; anther-cells not septate . . . . . 7. *X. fusca.*
Leaves glabrous on both surfaces, the midrib alone pubescent in its lower half on the upper surface; length 5·5 to 9·5 in. . . . . 8. *X. Curtisii.*

Leaves glabrous on the upper surface (the midrib pubescent in *caudata*); the lower slightly pubescent or puberulous.
Leaves more or less lanceolate, acute or acuminate, not at all obovate.
Leaves 2 or 3 in. long.
Leaves not glaucous beneath.
Flowers 1 in. long, in 3- to 5-flowered racemes, axillary . . . . . 9. *X. nigricans.*
Flowers ·5 to ·75 in. long, solitary, axillary . . 10. *X. elliptica.*
Flowers ·2 to ·25 in. long, in axillary clusters of 1 to 3 . . . . . 11. *X. caudata.*
Leaves glaucous beneath . . . . . 12. *X. stenopetala.*

Leaves 3·5 to 5·5 in. long.
Leaves not glaucous beneath; petals oblong . . . 13. *X. Championii.*
Leaves glaucous beneath; petals linear, very narrow . 12. *X. stenopetala.*

Leaves more or less obovate or oblanceolate, 4 to 7 in. long.
Leaves 1·75 to 4 in. broad; flower pedicels ·2 to ·25 in. long; ripe carpels broadly ovoid, blunt, sub-glabrous . 14. *X. Scortechinii.*

Leaves 1·75 to 2·5 in. broad; flower pedicels ·5 to ·8 in. long; ripe carpels globular, densely and minutely yellowish-tomentose . . . . . 15. *X. olivacea.*

Upper surfaces of leaves glabrous (the midrib alone pubescent in some); under-surfaces uniformly pubescent.

Under-surface of leaves adpressed-rufous-sericeous; length 2 to 3 in. . . . . 16. *X. obtusifolia.*

Under-surface of leaves deep brown, the pubescence slightly paler; length ·3 to 4·5 in.; ripe carpels obovoid, oblong, blunt . . . . . 17. *X. magna.*

Under-surface of leaves purplish-brown, pubescent; length 3·5 to 5·5 in.; main nerves 10 to 12 pairs; ripe carpels much elongate, cylindric, many-seeded . . . . . 18. *X. ferruginea.*

Under-surface of leaves brownish-tomentose; length 6·5 to 8·5 in.; nerves 12 to 14 pairs . . . . . 19. *X. Ridleyi.*

1. Xylopia oxyantha, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 85. A tree; young parts puberulous; the branchlets rather stout, striate. *Leaves* coriaceous, ovate or oblong, abruptly and shortly acuminate, glabrous, glaucous on the lower surface; main nerves 12 to 15 pairs, spreading, thin; length 6 to 7 in., breadth 2·5 to 3 in.; petiole ·35 in. *Peduncles* axillary, in fascicles, ·35 to ·5 in. long, adpressed-pubescent. *Sepals* broadly ovate. *Outer petals* narrowly linear, tapering at the apex, yellowish pubescent, slightly keeled at the back, 1·25 to 1·5 in. long. *Stamens* and *ovaries* as in *X. ferruginea*. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 114.—Habzelia oxyantha, *Hook. fil. & Th. Fl. Ind.* 124; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 37.—Uvaria oxyantha, *Wall. Cat.* 6478.

Singapore,—*Wallich.*

Plate 188. Xylopia oxyantha, *H. f. & Th.* 1 & 2, Leaves; 3, twig with one imperfect flower; 4, flower—*of natural size;* 5, flower; 6, flower with the outer petals removed; 7, inner petal, front view; 8, anther, side view; 9, anther, back view; 10, pistil; 11, section of ovary—*enlarged.*

2. Xylopia dicarpa, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 85. A tree 20 to 25 feet high; branches glabrous, dark-coloured, minutely dotted. *Leaves* coriaceous, elliptic-lanceolate, acute or acuminate, the base acute; both surfaces glabrous, minutely reticulate; main nerves about 10 pairs, spreading, very faint, the secondary nerves almost as distinct; length 3 to 4·5 in., breadth 1·5 to 1·75 in.; petiole ·25 in. *Flowers* solitary or in pairs, pendent, 1·5 in. long; pedicel very short with 1 to 3 orbicular, amplexicaul, glabrous bracteoles. *Sepals* ovate, obtuse, tubercled, connate to the middle. *Petals* linear-oblong. slightly expanded and concave at the base, hoary-pubescent; the inner narrower and shorter than the outer, sub-trigonous. *Stamens* numerous, the inner rudimentary; apical process rounded. *Anthers* linear, septate. *Ovaries* 2 to 4, pilose, multi-ovular; style short. *Ripe carpels* cylindric, blunt at each end, much tubercled, puberulous, 1·5 in. long and about ·75 in. in diam. *Seeds* 7 or 8, compressed; the testa pale, scaly. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 114.

Singapore,—*Maingay* [*Kew Distrib.* (*in part*) No. 84]. *King's Collector* No. 7079.

Plate 189A. Xylopia dicarpa, *H. f. & Th.* 1, Branch with ripe carpels; 2, section of a ripe carpel—*of natural size.*

3. Xylopia Malayana, *Hook. fil. & Thoms. Fl. Ind.* 125. A slender tree; young branches thin, glabrous, the buds pubescent. *Leaves* thinly coriaceous, shortly and bluntly acuminate, the base cuneate; both surfaces glabrous; main nerves about 8 pairs, faint, spreading; length 3·5 to 5 in., breadth 1·5 to 2 in.; petiole ·2 in. *Flowers* ·6 to ·9 in. long, solitary or in pairs, axillary; pedicels rufous-pubescent, ·1 in. long, with several bracteoles at the base. *Sepals* broadly ovate, sub-acute, puberulous outside and on the edges, glabrous inside, ·15 in. long and as broad. *Petals* linear-oblong, tapering to the apex, concave and glabrous at the slightly expanded base, densely pubescent elsewhere; the inner slightly narrower and shorter than the outer and more concave at the base. *Stamens* numerous; the apices rhomboid, papillose; the anthers long, lateral, with transverse divisions. *Pistils* about 6; the ovaries oblong, densely pale-hirsute, about as long as the stamens, 2-ovuled; styles about as long as the ovaries and projecting far above the stamens, glabrous, sub-cylindric, clavate. *Ripe carpels* (*fide* Maingay) ·35 to 1 in., several-seeded; stalk short, thick. *Hook. fil. & Thoms. Fl. Br. Ind.* i. 85; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 38; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 115.—Parartabotrys sumatrana, *Miq. Fl. Ind. Bat. Suppl.* 374; *Scheffer in Nat. Tijdsch. Ned. Ind.* xxxi. 15.

Malacca,—*Griffith, Derry, Maingay* (*Kew Distrib.*) Nos. 81, 84 (*in part*). Singapore,—*Ridley*. Perak,—*Scortechini*. Distrib.—Sumatra.

Plate 187B. Xylopia Malayana, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels —*of natural size;* 3, flower dissected; 4 & 5, anthers; 6 & 7, pistils—*enlarged.*

4. Xylopia parvifolia, *Hook. fil. & Thoms. Fl. Ind.* 125. A tree; young branches brown-pubescent, rather stout. *Leaves* coriaceous, oblong-lanceolate, acuminate, the base cuneate; both surfaces reticulate, shining, glabrous; the lower dark when dry and the upper pale; main nerves about 9 pairs, spreading, slender; length 2·5 to 3·5 in., breadth 1 to 1·25 in.; petiole ·3 in., slender. *Flowers* ·5 to ·6 in. long, yellow, in axillary 3- to 5-flowered sub-sessile fascicles; pedicels short, pubescent, with several large sub-orbicular bracteoles. *Sepals* ovate, acute, united above the middle into a 3-toothed cup. *Petals* narrowly linear, tapering to the apex, the base wider; the inner narrower, shorter and paler than the outer; all minutely pubescent with a glabrous spot inside at the sub-concave base. *Stamens* with a broad flat apiculus; the anthers elongate, lateral, not septate. *Ovaries* about 5, oblong, tapering, pubescent, 4- to 6-ovuled; style as long as the ovary; stigma as long as both, falciform. *Ripe carpels* obovoid, blunt, tapering to the base, pubescent, 1 to 1·5 in. long and ·75 in. in diam. *Seeds* oblong, smooth and embedded in pulp. *Hook. fil. Fl. Br. Ind.* i. 84 (*excl. syn.* Patonia parvifolia); *Thwaites' Enum. Pl. Ceyl.* 9; *Beddome Ic. Pl. Ind. Or., t.* 43; *Bedd. Flora Sylvatica, t.* 272.

Ceylon: in the south of the island. Travancore,—*Beddome.*

Plate 190A. Xylopia parvifolia, *H. f. & Th.* 1, Flowering branch; 2, carpels; 3, section of carpel; 3,* seed—*of natural size;* 4, flowers; 5, sepals and andro-gynœcium; 6, section through flower, the petals having been removed; 7, anther; 8, pistil; 9 & 10, sections of ovaries—*enlarged.* (*Nos. 2 to 10 copied from a drawing made in the Peradeniya Herbarium and lent by Dr. H. Trimen,* F.R.S.)

5. Xylopia Maingayi, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 85. A tree? Young branches rusty-pubescent, afterwards glabrous and with white dots. *Leaves* small, coriaceous, elliptic or elliptic-oblong, sub-acute or obtusely acuminate, the base sub-cuneate; both surfaces glabrous and reticulate; the upper pale, the lower dark; main nerves slender; length 2 to 3 in., breadth 1 to 1·25 in.; petiole ·25 to ·3 in. *Flowers* solitary, pendent, pale-orange; pedicels very short, stout, curved; bracteoles 2 or 3, orbicular, rusty-tomentose. *Sepals* broadly ovate, connate to the middle, rusty-tomentose. *Petals* flat, linear-oblong, sub-acute, softly tomentose except the glabrous concave base; the inner narrower, almost as long, trigonous. *Stamens* with rounded apiculus; the anthers narrow, septate. *Ovaries* about 9, with 6 ovules; style glabrate. *Ripe carpels* oblong-ovoid, blunt, glabrescent, 1·5 in. long and 1·2 in. in diam. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 115.

Malacca,—*Maingay* (*Kew Distrib.*) No. 81 (*in part*).

Plate 191A. Xylopia Maingayi, *H. f. & Th.* 1, Flowering branch; 2, ripe carpel —*of natural size;* 3, calyx and andro-gynœcium; 4, outer petal; 5, inner petals; 6, anther; 7, pistil—*enlarged.*

6. Xylopia pustulata, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 85. A tree; young branches pale, glabrous, minutely white-dotted. *Leaves* coriaceous, small, elliptic, sub-obtuse, the base acute; both surfaces glabrous, the lower reddish-brown and reticulate; main nerves faint, not more prominent than the secondary. *Flowers* solitary or in pairs, axillary, ·5 in. long, pendent; pedicels very short, with orbicular, ciliate, deciduous basal bracteoles. *Sepals* short, ovate, sub-acute, rusty-pubescent, united to the middle. *Petals* linear, sub-acute, densely adpressed-pubescent; the outer obtuse with a rather broad concave base; the inner shorter and much narrower with a broader concave base. *Stamens* linear with rounded apiculus; the anthers long, septate. *Ovaries* 5 to 8, hirsute; the style slender with clavate stigma; ovules several. *Ripe carpels* unknown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 116.

Malacca,—*Maingay* (*Kew Distrib.*) No. 82[2].

Plate 191B. Xylopia pustulata, *H. f. & Th.* 1, Flowering branch—*of natural size;* 2, section of flower; 3, flower with its pedicel and bracteoles; 4, outer petal; 5, inner petal; 6, andro-gynœcium; 7, anther, back view; 8, pistil; 9, section of ovary—*enlarged.*

7. Xylopia fusca, *Maingay ex Hook. fil. Fl. Br. Ind.* i. 85. A tree; young branches rather stout, glabrous, black; buds silky. *Leaves* coriaceous, oblong, obtuse, the base cuneate; upper surface glabrous, shining; the lower dull, dark, reticulate; main nerves 8 or 9 pairs, very faint; length 2 to 3 in., breadth ·75 to 1 in.; petiole ·2 in., stout. *Flowers* ·75 in. long, supra-axillary, solitary, racemed, or fascicled; peduncle ·25 to ·75 in. with several bracts; pedicels ·25 in., puberulous, ebracteolate. *Sepals* ovate, acute, connate into a cup with 3 spreading acute teeth, puberulous outside. *Petals* linear-oblong, tapering to the sub-acute apex; the outer adpressed golden-sericeous outside; the inner narrower and shorter, concave at the base. *Stamens* with an oblong apical process. *Anthers* linear, lateral, not septate. *Ovaries* 4 or 5, cohering into a cone, golden-silky; ovules 10 to 16, in two rows. *Ripe carpels* unknown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 116.

Malacca,—*Maingay* (*Kew Distrib.*) No. 86.

PLATE 190B. Xylopia fusca, *H. f. & Th.* 1, Flowering branch—*of natural size;* 2, flower from which the petals have been removed; 3, outer petal; 4 & 5, anthers; 6, pistil; 7, section of pistil—*enlarged.*

8. XYLOPIA CURTISII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 116. A tree 30 feet high; young branches stout, glabrous, striate, dark-coloured. *Leaves* very coriaceous, oblong, acute or shortly acuminate; the base cuneate, slightly oblique; upper surface glabrous, shining; the lower dull, darker (when dry), puberulous on the midrib near the base; main nerves 12 to 20 pairs, very prominent beneath and connected by straight transverse veins; length 5·5 to 9·5 in., breadth 2 to 3 in.; petiole ·35 in., stout. *Flowers* 1 or 2, on stout, woody, extra-axillary peduncles; pedicels ·2 in. long, rufous-pubescent, with a single large bracteole. *Sepals* thick, spreading, broadly ovate, sub-acute, minutely tomentose on both surfaces, but especially on the outer. *Petals* thick, sub-equal, linear-oblong, obtuse, keeled outside; the claw orbicular, vaulted over the andro-gynœcium and glabrous inside; otherwise minutely tomentose, ·75 in. long. *Stamens* numerous, the heads obliquely truncate and concealing the linear lateral anthers. *Ovary* solitary, cylindric, fluted, glabrous, multi-ovulate. *Ripe carpel* ovoid, compressed, silvery-grey, many-seeded, 3 in. long and 2·5 in. in diam.

Penang,—*Curtis* No. 1569.

PLATE 192A. Xylopia Curtisii, *King.* 1, Flowering branch; 2, ripe carpel; 3, flower dissected—*of natural size;* 4 & 5, anthers; 6, ovary—*enlarged.*

9. XYLOPIA NIGRICANS, *Hook. fil. & Thoms. Fl. Ind.* 125. A tree; young branches slender, puberulous, ultimately glabrous and cinereous. *Leaves* coriaceous, ovate-lanceolate, shortly and obtusely acuminate, the base cuneate; upper surface glabrous, shining, the lower minutely puberulous; main nerves about 9 pairs, spreading, faint; length 2 to 3 in., breadth ·8 to 1 in.; petiole ·2 in. *Racemes* short, 3- to 5-flowered, extra-axillary, densely and minutely pubescent; pedicels about ·15 in. long, with a single large sub-rotund obtuse bracteole. *Flowers* 1 in. long; petals linear-oblong, thick, concave at the base, ochreous-pubescent; the inner shorter and narrower than the outer. *Stamens* numerous, with orbicular convex apices; the anthers lateral. *Ovaries* 4 or 5, oblong, tapering, oblique, pubescent, 8- or 9-ovuled; style nearly as long as the ovary, cylindric; stigma clavate-rhomboid. *Ripe carpels* sessile, obovoid, glabrous. *Seeds* embedded in pulp, in two rows, obovoid, dark-coloured. *Hook. fil. Fl. Br. Ind.* i. 84; *Thwaites' Enum. Pl. Ceyl.* 9, 398; *Beddome Ic. Pl. Ind. Or., t.* 44.

Ceylon; in the northern part of the island.

PLATE 192B. Xylopia nigricans, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3, section of a carpel; 4, seed—*of natural size;* 5, sepals and andro-gynœcium; 6, sepals and pistils; 7, outer petal; 8, inner petals; 9 & 10, anthers; 11, style, stigma and section of ovary; 12, transverse section of ovary—*enlarged.*

10. XYLOPIA ELLIPTICA, *Maingay ex Hook. fil. Fl. Br. Ind.* i. 86. A tall tree; young branches dark-coloured, glabrous, the youngest pubescent. *Leaves* membranous, small, elliptic, obtusely acuminate, the base rounded or acute; upper surface glabrous, pale; the

lower brown, minutely adpressed-pubescent, both reticulate; main nerves 6 or 7 pairs, oblique, very faint; length 1·5 to 2 in., breadth 1 to 1·25 in.; petiole ·2 in., slender. *Flowers* solitary, erect, axillary, ·5 to ·75 in. long; peduncle about half as long, rusty-pubescent like the calyx; bracteoles minute. *Sepals* ovate, sub-acute, united to the middle. *Petals* pale brownish-tomentose; the outer linear-subulate with a broader concave base; the inner trigonous, shorter and narrower than the outer. *Stamens* numerous, minute, the apex rounded; anthers linear. *Ovaries* 1 to 3, densely hairy, 4- to 6-ovuled. *Ripe carpels* unknown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 117.

Malacca,—*Maingay* (*Kew Distrib.*) No. 82. Perak,—*Wray* No. 3562. Penang,—*Curtis* No. 2482.

Plate 193A. Xylopia elliptica, *Maing.* 1, Flowering branch—*of natural size;* 2, flower dissected—*slightly enlarged;* 3 & 4, anthers; 5, pistil; 6, section of pistil—*much enlarged.*

11. Xylopia caudata, *Hook. fil. & Thoms. Fl. Ind.* 125. A shrub or small tree; young branches very slender, minutely pubescent. *Leaves* thinly coriaceous, lanceolate, much and obtusely acuminate, the base cuneate; upper surface glabrous except the pubescent midrib; the lower sparsely adpressed-sericeous; main nerves about 10 pairs, spreading, faint; length 2 to 2·25 in., breadth ·6 to ·8 in.; petiole ·1 in., slender. *Peduncles* 1 to 3, axillary, very short, minutely bracteolate at base and apex. *Flowers* ·2 to ·3 in. long. *Sepals* ovate, sub-acute, connate at the base, adpressed-pubescent outside, glabrous inside. *Petals* linear-oblong, obtuse, pubescent except a small glabrous concave spot at the base; the inner about as long as, but narrower than, the outer. *Anthers* rather numerous, compressed; the apical process narrow. *Ovaries* 2, elongate, sericeous, 2-ovuled; style long, pointed, glabrous, exserted. *Ripe carpels* (*fide* Hooker) 2 or 3, sub-globose or ovoid, pubescent, ·5 in. long, 2-seeded. *Hook. fil. Fl. Br. Ind.* i. 85; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 38; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 117.—Guatteria (?) caudata, *Wall. Cat.* 6452.

Singapore,—*Wallich, Maingay* (*Kew Distrib.*) No. 79. Malacca,—*Griffith.*

Plate 193B. Xylopia caudata, *H. f. & Th.* 1, Flowering branch—*of natural size;* 2, flower dissected—*enlarged;* 3 & 4, anthers; 5 & 6, pistils—*much enlarged.*

12. Xylopia stenopetala, *Oliver in Hook. Ic. Plantar., t.* 1563. A tree 50 to 60 feet high; young branches dark-coloured, glabrescent, minutely lenticellate. *Leaves* thinly coriaceous, elliptic-oblong, shortly and obtusely acuminate, the base sub-cuneate; upper surface glabrous, shining; the lower glaucous or glaucescent, sparsely adpressed-pubescent; both reticulate; main nerves 10 or 12 pairs, spreading, inter-arching close to the edge, faint; length 2·5 to 4·5 in., breadth 1·1 to 1·6 in.; petiole ·25 in. *Flowers* axillary, solitary or in fascicles of 2 to 5; pedicels slender, often decurved, puberulous, with one minute bracteole, ·5 to ·75 in. long. *Sepals* united to form a small puberulous cup with acute, spreading teeth. *Petals* fleshy, very narrow, slightly expanded and concave at the base, minutely tawny-pubescent; the inner slightly shorter and narrower. *Stamens* linear; the connective prolonged into a cylindro-conic apical appendage. *Anthers* fusiform, lateral. *Ovaries* numerous, elongate, pubescent, 6-ovuled; style filiform; stigma sub-clavate. *Ripe carpels* oblong, sub-terete, narrowed to the stalk, 2 to 2·5 in. long and ·5 in. diam.;

pericarp fleshy. *Seeds* 1 to 4; stalks thick, ·3 in. long. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 118.

Penang; on Government Hill at 600 feet,—*Curtis* Nos. 857 & 880.

PLATE 194A. Xylopia stenopetala, *Oliver.* 1, Leaf-twig; 2, fascicle of flowers; 3 & 5, inner petals; 4, outer petal—*of natural size;* 6, sepals and andro-gynœcium—*slightly enlarged;* 7 & 8 anthers; 9 & 10, pistils—*much enlarged.*

13. XYLOPIA CHAMPIONII, *Hook. fil. & Thoms. Fl. Ind.* 126. A tree; branches slender, rufous-tomentose, afterwards glabrous and dark-coloured. *Leaves* thinly coriaceous, lanceolate or oblong-lanceolate, the base sub-cuneate; both surfaces reticulate; the upper glabrous and shining, the lower sparsely puberulous; main nerves about 9 to 10 pairs, spreading, faint; length 3·5 to 5·5 in., breadth ·9 to 1·6 in.; petiole ·3 to ·4 in. *Flowers* yellowish, solitary, axillary, 1·1 in. long; pedicels stout, ·1 in. long, bracteolate at the base. *Sepals* thick, united into a cup with broadly ovate-acuminate spreading teeth. *Petals* very thick, narrowly-oblong, adpressed-rufous-pubescent outside, puberulous inside; the inner one-third shorter than the outer. *Stamens* with sub-quadrate apiculus. *Anthers* linear, lateral, not septate. *Pistil* usually solitary; ovary ovoid, conic, glabrous, 4-ovuled; style short. *Carpel* oblong, cylindric, apiculate, tapering to the base, 1·25 to 1·75 in. long. *Seeds* 3 or 4, surrounded by a little pulp. *Hook. fil. Fl. Br. Ind.* i. 84; *Thwaites' Enum. Pl. Ceyl.* 9; *Beddome Ic. Pl. Ind. Or., t.* 45.

Ceylon,—*Gardner, Thwaites.*

PLATE 194B. Xylopia Championii, *H. f. & Th.* 1, Flowering branch; 2, ripe carpel; 3, section of ripe carpel; 4 & 5, seeds—*of natural size;* 6, pedicel and calyx; 7, section through calyx to show the solitary pistil; 8, outer petal; 9, inner petal—*slightly enlarged;* 10, anther—*much enlarged.*

14. XYLOPIA SCORTECHINII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 118. A tree 50 to 60 feet high; young branches rusty-tomentose, ultimately glabrous, much striate and pale brown. *Leaves* coriaceous, obovate-elliptic to elliptic-oblong, very shortly and abruptly acuminate, slightly narrowed to the sub-cuneate rounded slightly oblique base; upper surface glabrous, the midrib slightly rufous-puberulous near the base; lower surface pale, sparsely rufous-pubescent especially on the midrib and 10 to 14 pairs of oblique, rather straight, prominently raised, main nerves; length 4 to 7 in., breadth 1·75 to 4 in.; petiole ·35 in., pubescent. *Flowers* rarely solitary, usually in fascicles of 2 to 5 on tubercles in the axils of leaves or of fallen leaves; pedicels short (·2 to ·25 in.), stout, rusty-tomentose with a sub-mesial bracteole. *Sepals* quite free, broadly ovate, blunt, pubescent outside, glabrous inside. *Petals* thickened, linear-obtuse with an orbicular concave claw vaulted over the stamens and pistils, 1·25 to 1·75 in. long, pubescent everywhere except on the glabrous concavity of the claw. *Stamens* numerous, with truncate 4- or 5-angled apices concealing the lateral anthers. *Ovaries* few, short, oblong, pubescent, 4- or 5-ovuled; stigma large, oblong. *Ripe carpels* broadly ovoid, blunt, rufous-pubescent when young, glabrescent when old, ·8 in. long and ·6 in. in diam. *Seeds* about 4, discoid, pale brown, shining. Drepananthus stenopetala, *Scortechini* MSS.

Perak,—*Scortechini* No. 1781, *King's Collector* No. 8241.

A species allied to *X. olivacea*, King; but with broader leaves, shorter flower-pedicels, narrower petals and ovoid sub-glabrous fruit.

PLATE 195. Xylopia Scortechinii, *King*. 1, Flowering branch; 2, ripe carpels; 3, flower dissected—*of natural size;* 4 & 5, anthers; 6 & 7, pistils—*enlarged*.

15. XYLOPIA OLIVACEA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 119. A shrub or small tree; young branches pubescent, ultimately brown striate and glabrous. *Leaves* thinly coriaceous, elliptic-oblong, sometimes slightly obovate, shortly and abruptly acuminate, the base cuneate; both surfaces dull olivaceous when dry; the upper glabrous; the lower paler, slightly scurfy; main nerves 6 to 8 pairs, oblique, curving, inter-arching boldly ·15 in. from the margin, prominent beneath; length 3·5 to ·7 in., breadth 1·75 to 2·5 in.; petiole ·25 in., swollen, puberulous, black when dry. *Flowers* solitary or in pairs, supra-axillary; pedicels rather stout, ·5 to ·8 in. long, cinereous-tomentose with an ovate-lanceolate mesial bracteole. *Sepals* thick, especially at the base, ovate, acute, connate below the middle, pale cinereous-puberulous on both surfaces. *Petals* sub-equal, fleshy, narrowly linear with a tapering limb and slightly expanded concave vaulted claw, densely and minutely cinereous-tomentose, 1 to 1·5 in. long; the inner shorter. *Stamens* short, cuneate, the broad oblique heads covering the apices of the linear anthers. *Ovaries* few, oblong, densely sericeous, 6- to 8-ovuled; style short, cylindric; stigma large, fleshy. *Ripe carpels* few, globular, with slightly flattened minutely apiculate apex, and an imperfect lateral ridge, densely and minutely yellowish-tomentose, ·6 in. in diam.; stalks very short. *Seeds* 4 or 5, discoid, smooth, pale brown, shining, separated from each other by imperfect dissepiments.

Perak; up to elevations of 3,000 or 4,000 feet, common,—*Scortechini, Wray, King's Collector*.

PLATE 196. Xylopia olivacea, *King*. 1, Flowering branch; 2 & 3, ripe carpels 4, flower dissected; 5, seed—*of natural size;* 6, anthers; 7, pistils—*enlarged*.

16. XYLOPIA OBTUSIFOLIA, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 85. A tree; young branches glabrous, dark-coloured, striate; buds silky. *Leaves* coriaceous, oblong, obtuse or retuse, the base cuneate; upper surface glabrous, shining; the lower adpressed-rufous-sericeous; main nerves 8 or 10 pairs, oblique, very faint; length 2 to 3 in., breadth 1 to 1·5 in.; petiole ·25 in. *Flowers* ·5 in. long, axillary, solitary or 2 or 3 in small sub-racemose cymes; pedicels ·2 to ·25 in., rufous-pubescent with a single bracteole. *Sepals* thick, broadly ovate, acute, united to the middle, pubescent outside, glabrous inside. *Petals* linear-oblong, tapering towards the blunt apex; the outer petals adpressed-rufous-pubescent outside, puberulous within, slightly concave and glabrous at the base; the inner smaller, more concave at the glabrous base, puberulous elsewhere. *Stamens* numerous, elongate, narrow, with an acute apiculus; the anther-cells linear, lateral. *Pistils* 1 or 2, conical, adpressed-pubescent; the style short, thin. *Ripe carpels* oblong, cylindric, sub-oblique, blunt, 1·25 in. long, ·7 in. in diam. *Seeds* 3 or 4, globular. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 119.

Malacca,—*Griffith* No. 386. Perak,—*King's Collector* No. 2816.

PLATE 197A. Xylopia obtusifolia, *H. f. & Th.* 1, Flowering branch; 2, ripe carpel—*of natural size;* 3, flower dissected; 4, sepals and andro-gynœcium; 5, inner petals; 6 & 7, anthers; 8, pistil—*enlarged*.

17. Xylopia magna, *Maingay ex Hook. fil. Fl. Br. Ind.* i. 84. A tree; young branches tomentose, becoming glabrous and darkly cinereous. *Leaves* coriaceous, ovate-lanceolate to elliptic, sub-acute, the base rounded; the edges slightly revolute when dry; upper surface shining, reticulate, glabrous except the pubescent midrib; under-surface deep brown, with rather pale pubescence; main nerves about 10 pairs, spreading, inter-arching some way from the edge, faint; length 3 to 4·5 in., breadth 1·25 to 2 in.; petiole ·25 in., pubescent. *Flowers* 2 to 2·5 in. long, solitary or in pairs, axillary; pedicels stout, tomentose, with a single large, ovate, acute, often bifid bract. *Sepals* thick, ovate, acute, connate into a 3-toothed cup, adpressed-pubescent outside, glabrous inside. *Petals* sub-equal, the inner narrower and shorter, narrowly linear, slightly expanded and concave at the base, tapering towards the apex, pubescent except in the basal concavity. *Stamens* numerous, elongate, with an oblong obtuse apical process. *Anthers* lateral, linear, septate. *Pistils* about 15, narrowly oblique, hirsute on the outer side, 4-ovuled. *Style* filiform, long. *Ripe carpels* obovoid-oblong, compressed, blunt, minutely tomentose, 1·4 in. long and ·65 in. in diam.; stalks thick, only ·15 in. long. *Seeds* about 4, in two rows, arillate; the testa bony. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 120.

Malacca,—*Maingay* (*Kew Distrib.*) No. 83. Singapore,—*Ridley*. Perak,—*Scortechini*.

Plate 197B. Xylopia magna, *Maing.* 1, Flowering branch; 2, ripe carpels; 3, section of carpel—*of natural size;* 4, flower dissected—*slightly enlarged;* 5 & 6, anthers; 7 & 8, pistils—*much enlarged*.

18. Xylopia ferruginea, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 85. A tree 30 to 60 feet high; young branches brownish-pubescent. *Leaves* coriaceous, narrowly oblong, acute; the base slightly narrowed and oblique, rounded or minutely sub-cordate: upper surface glabrous, shining; the lower glaucous and softly purplish-brown, pubescent, most densely so on the midrib; main nerves 10 to 12 pairs, oblique, inter-arching near the edge, prominent beneath; length 3·5 to 5·5 in., breadth 1·1 to 2 in.; petiole ·2 in., channelled. *Flowers* solitary or in pairs, axillary or extra-axillary, erect or pendulous, yellow; pedicels ·5 to ·75 in., rusty-pubescent; bracteoles 1 to 3, small, lanceolate. *Sepals* broadly ovate-acuminate, connate at the base, spreading, small, pubescent outside, glabrous within. *Petals* linear, fleshy, tapering at the very apex, very long; the outer rufous-pubescent outside, cinerous-puberulous inside, concave at the very base, 1·25 to 2 in. long; inner petals much narrower and thinner and a little shorter than the outer, cinereous-puberulous. *Stamens* about 24, narrow. *Anthers* linear, lateral; the connective ending in a broadly oblong apical process. *Ovaries* numerous, narrowly oblong, pointed, densely rusty-hirsute, multi-ovular; style short, filiform, glabrous; stigma minute. *Ripe carpels* numerous, much elongate, cylindric, glabrescent, with transverse partitions between the seeds, many-seeded, sub-moniliform when dry, 2 to 5 in. long. *Seeds* oblong, rugose, minutely pellucid-dotted, ·3 in long. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 120.—Habzelia ferruginea, *H. f & T. Fl. Ind.* 123 *Miq. Fl. Ind. Bat.* i. *pt.* 2, 37.—Artabotrys malayana, *Griff. Notul.* iv. 713.

Malacca,—*Griffith* No. 385; *Maingay* (*Kew Distrib.*) No. 85. Perak,—*Scortechini, King's Collector, Wray;* common. Selangor,—*Curtis*. Distrib. Borneo,—*Beccari*.

Plate 198. Xylopia ferruginea, *H. f. & T.* 1, Flowering branch; 2, ripe carpels; 3, flower dissected—*of natural size;* 4 & 5, anthers; 6 & 7, pistils—*enlarged*.

19. Xylopia Ridleyi, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 121. A tree? Young branches stout, densely rusty-tomentose. *Leaves* coriaceous, obovate-elliptic, abruptly and very shortly acuminate, narrowed from below the middle to the slightly cuneate base; upper surface glabrous except the rufous-puberulous midrib; lower softly rusty-tomentose with longer, superficial, paler hairs intermixed; main nerves 12 to 14 pairs, oblique, inter-aching boldly within the margin, prominent on the lower, depressed on the upper, surface; length 6·5 to 8·5 in., breadth 2·75 to 3·5 in.; petiole ·5 to ·6 in., stout, tomentose. *Flowers* in extra-axillary (often leaf-opposed) fascicles of 3 to 5; pedicels stout, rufous-tomentose, with a single bracteole, ·25 to ·3 in. long. *Sepals* broadly ovate, long-acuminate, rufous-pubescent outside, glabrous within, ·35 in. long. *Petals* filiform, triquetrous, with expanded concave vaulted bases concealing the andro-gynœcium, glabrous inside, otherwise pubescent, 2·5 to 3·5 in. long. *Stamens* numerous, with truncate 4- or 5-angled heads concealing the elongate lateral anthers. *Ovaries* obliquely ovoid, densely sericeous, 4- to 6-ovuled; stigmas fleshy, agglutinated. *Ripe carpels* unknown.

Singapore,—*Ridley*.

Plate 199. Xylopia Ridleyi, *King*. 1, Flowering branch—*of natural size;* 2, flower dissected—*enlarged;* 3 & 4, anthers; 5 & 6, pistils—*much enlarged*.

22. Phæanthus, *H. f. & T.*

Trees or climbers. *Flowers* solitary, terminal or in extra-axillary fascicles. *Sepals* 3, small, valvate. *Petals* 6, valvate, in two rows; outer small like the sepals; inner large, flat, coriaceous. *Stamens* numerous, oblong or quadrate, truncate; anther-cells dorsal, distant. *Carpels* numerous; style cylindric or clavate, sometimes grooved ventrally. *Ovules* 1—2, sub-basal, ascending. *Ripe carpels* stalked, 1-seeded. Distrib.—Species about 6; one in Southern Peninsular India, the rest Malayan.

Leaves softly pubescent . . . . . 1. *P. nutans.*

Leaves glabrous.

Outer petals nearly of the same size as the sepals.

Ovules and seeds 1 . . . . . 2. *P. lucidus.*

Ovules and seeds 2; petals united at base . . . . . 3. *P. andamanicus.*

Outer petals twice as large as the sepals . . . . . 4. *P. malabaricus.*

1. Phæanthus nutans, *H. f. & Th. Fl. Ind.* 147. A small tree; young branches rusty-tomentose. *Leaves* membranous, oblong-lanceolate or oblanceolate to obovate-elliptic, caudate-acuminate, the base always narrowed and sometimes acute; upper surface glabrous, the midrib and main nerves tomentose; lower softly pubescent, the midrib tomentose; main nerves 10 to 14 pairs, spreading, prominent beneath, inter-arching near the edge; length 5 to 9 in., breadth 1·3 to 4·5 in.; petiole ·3 in., tomentose. *Flowers* fœtid, solitary or 2 or 3 together, drooping, extra-axillary; pedicels ·5 to 1·5 in. long, with 1 or 2 linear bracteoles, pubescent. *Sepals* linear-lanceolate, spreading, tomentose, ·2 in. long. *Petals* very unequal; the outer small like the sepals; inner ovate-oblong, acute, yellow, pubescent, 5- to 7-ribbed, ·75 to 1 in. long. *Ripe carpels* ovoid, pubescent, beaked, ·6 in. long and ·35 in. in diam.; stalk nearly as long. *Hook. fil. Fl. Br. Ind.* i. 72; *Miq. Fl.*

Ind. Bat. i. *pt.* 2, 51; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 122.—Uvaria nutans, *Wall. Cat.* 6481.—U. tripetala, *Roxb. Fl. Ind.* ii. 667.—U. ophthalmica, *Roxb. ex Don Gen. Syst.* i. 93.

Singapore,—*Wallich and others.* Penang,—*Curtis.* Malacca,—*Maingay* (*Kew Distrib.*) No. 67. Perak, at low elevations. Sugei Ujong,—*Ridley.* Distrib.—Moluccas, Sumatra.

PLATE 200A. Phæanthus nutans, *H. f. & Th.* 1, Flowering branch; 2, nearly ripe carpels—*of natural size;* 3, section of a ripe carpel; 4, sepals and andro-gynœcium—*slightly enlarged;* 5 & 6, anthers; 7 & 8, pistils—*much enlarged.*

2. PHÆANTHUS LUCIDUS, *Oliver in Hook. Ic. Pl., t.* 1561. A tree 40 to 50 feet high; young branches minutely rusty-pubescent or almost glabrous, dark-coloured and furrowed. *Leaves* thickly membranous, oblong-elliptic to lanceolate, acuminate, the base cuneate; both surfaces shining, glabrous except occasionally the puberulous midrib; main nerves about 8 pairs, oblique, rather prominent beneath; length 4·5 to 6·5 in., breadth 1·25 to 2·25 in.; petiole ·2 in. *Flowers* solitary, rarely in fascicles of 2 or 3, extra-axillary, erect, ·6 in. to 1 in. in diam.; buds triquetrous; peduncles 1 to 1·25 in. long, slender, puberulous, with 2 minute bracteoles. *Sepals* ovate, acute, less than 1 in. long. *Outer petals* like the sepals but a little longer; inner petals thick, greenish-yellow, oblong-ovate, acute, about ·5 in. long, glabrescent with puberulous edges. *Anthers* with square truncate heads. *Ovaries* numerous, 1-ovulate. *Ripe carpels* oblong, ·6 in. long and ·3 in. in diam., minutely granular, sub-glabrous as are the ·5 to ·6 in. long stalks. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 122.

Penang,—*Curtis* Nos. 839 & 1407. Perak; at low elevations,—*King's Collector* Nos. 7275 and 10044.

PLATE 200B. Phæanthus lucidus, *Oliver.* 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower; 4 & 5, anthers; 6 & 7, ovaries—*enlarged.* (*Nos.* 4 *to* 7 *are copied from Oliver's figure in Hook. Ic. Pl., t.* 1561.)

3. PHÆANTHUS ANDAMANICUS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 122. A small glabrous shrub; young branches pale brown, slender. *Leaves* membranous, elliptic or elliptic-lanceolate, acute, slightly narrowed to the rounded base, both surfaces rather pale when dry; main nerves 15 to 20 pairs, faint, slender, horizontal, forming double loops near the margin, the reticulations faint; length 4 to 7·5 in., breadth 1·75 to 2·5 in.; petiole ·35 in. *Flowers* ·5 to ·75 in. in diam., campanulate, solitary, rarely in pairs, extra-axillary; pedicels ·2 in. long, bracteolate at the base. *Sepals* very small, semi-orbicular. *Outer petals* slightly larger than the sepals and about ·1 in. long; inner petals united at the base, oblong-ovate, sub-acute, ·5 to ·7 in. long, 4- or 5-nerved. *Anthers* numerous, flattened from front to back, about as broad as long with truncate, not apiculate, heads. *Ovaries* numerous, elongate, narrow, 2-ovuled; stigmas elongate. *Ripe carpels* sub-globular, ·5 in. in diam.; stalks ·5 to ·7 in. *Seeds* 2, plano-convex, pale.

South Andaman,—*King's Collector.*

This is a very distinct species, recognisable at once by the unusual character (which connects the genus with *Miliusa*) of having its petals united at the base, and also by its 2-seeded carpels.

PLATE 201A. Phæanthus andamanicus, *King*. 1, Flowering branch; 2, ripe carpels; 3, seeds; 4, sepals and andro-gynœcium—*of natural size;* 5, inner petals; 6 & 7, anthers; 8 & 9, pistils—*enlarged.*

4. PHÆANTHUS MALABARICUS, *Beddome Ic. Pl. Ind. Or., t.* 36. A shrub or small tree; young parts rusty-tomentose. *Leaves* oblong-lanceolate, shortly and rather abruptly acuminate, the base rounded or cordate; both surfaces glabrous except the midrib on the lower; main nerves 7 to 9 pairs, faint, spreading, the reticulations minute; length 4 to 7 in., breadth 1 to 2 in.; petiole ·15 in., pubescent. *Flowers* solitary, extra-axillary or axillary, ·5 to ·75 in. in diam.; pedicels ·35 to ·5 in., with 2 minute basal bracteoles. *Sepals* orbicular-ovate, acute, rusty-tomentose, spreading. *Outer* petals like the sepals, but about twice as large; inner red, thick and fleshy, ovate, acute, with slightly inflexed tips, connivent, more than twice as large as the outer. *Ovaries* numerous; ovules 1 or 2. Fruit unknown.

Collected only by Colonel Beddome. By its rather large outer petals this forms a connecting link with *Miliusa.*

South India: in Southern Wynaad,—*Beddome.*

PLATE 201B. Phæanthus malabaricus, *Bedd.* 1, Flowering branch; 2, flower unexpanded; 3, flower expanded; 4, sepals and andro-gynœcium; 7, inner petal—*of natural size;* 5, sepal; 6, outer petal; 8 & 9, anthers; 10, pistil; 11 & 12, sections of pistil—*enlarged.* (*Copied from Beddome's Ic. Pl. Ind. Or., t.* 36.)

23. Miliusa, *Leschenault.*

Trees or shrubs. *Flowers* usually bi-sexual (dicœcious or polygamous in sp. 1), green or red, axillary or extra-axillary, solitary, fascicled or cymose. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 series; outer smaller, like the sepals; the inner thin, cohering when young by the margins, at length free. *Torus* elongated, cylindric. *Stamens* definite or indefinite. *Anthers* subdidymous; cells contiguous, ovoid, extrorse; connective more or less apiculate. *Ovaries* indefinite, linear-oblong; style oblong or very short; ovules 1—2, rarely 3—4. *Ripe carpels* globose or oblong, 1- or 2- or many-seeded.—Distrib. Species 8; all Indian.

Flowers dicœcious or polygamous . . . . . 1. *M. Roxburghiana.*

Flowers hermaphrodite.

Leaves more or less glabrous.

Flower pedicels 1·25 to 1·75 in. long; carpels oblong, ·6 in. long, blunt, their stalks shorter than the carpels; nerves of leaves 8 or 9 pairs . . . . . 2. *M. macrocarpe.*

Flower pedicels 1 to 1·25 in. long; carpels globular or ovoid, ·4 to ·5 in. long, mucronate, their stalks ·3 to ·5 in.; nerves of leaves 9 pairs . . . . . 3. *M. Wightiana.*

Flower pedicels ·5 to 1·5 in. long; carpels globose, ·4 in. in diam., mucronate; stalks ·35 in.; nerves of leaves 7 pairs . 4. *M. nilagirica.*

Flower pedicels ·5 to ·75 in. long; carpels ovoid-globose, ·25 to ·3 in. in diam.; their stalks ·75 to 1 in.; nerves of leaves 12 pairs	5. *M. longipes.*
Flower pedicels ·4 to ·5 in., decurved; carpels ovoid, nearly ·5 in. long, sub-sessile; nerves of leaves 7 pairs	6. *M. Zeylanica.*
Flower pedicels ·25 to ·35 in. long; carpels globose-ovoid, sub-sessile; nerves of leaves 5 or 6 pairs	7. *M. indica.*
Leaves and whole plant densely tomentose	8. *M. velutina.*

1. Miliusa Roxburghiana, *Hook. fil. & Thoms. Fl. Ind.* 150. A small tree; young branches softly pubescent, ultimately glabrous striate and pale. *Leaves* thinly coriaceous, oblong or oblong-lanceolate, shortly acuminate, the base rounded; upper surface glabrous, the lower sparsely adpressed-pubescent to tomentose; main nerves about 10 pairs, spreading, inter-arching ·15 in. from the edge; length 2·5 to 4 in., breadth ·85 to 1·4 in.; petiole ·05 in., pubescent. *Pedicels* 1 to 3 together, axillary, slender, ·5 to 1·5 in. long, sometimes on a short peduncle; bracteoles several, linear. *Flowers* diœcious or polygamous, about ·5 in. long. *Sepals* and outer petals sub-equal, lanceolate or linear, rusty-tomentose. *Inner petals* ·5 to ·6 in. long, ovate or oblong-lanceolate, sub-acute, nerved, red. *Stamens* in male flower numerous, with obliquely truncate broad apices. *Ovaries* (in female flower) oblong, glabrous; style oblong; ovules 1 or 2. *Ripe carpels* ovoid or oblong, blunt, glabrous, granular, ·25 to ·35 in. in diam.; stalk ·4 in. long, slender. *Seeds* 1, rarely 2. *Hook. fil. Fl. Br. Ind.* i, 87; *Kurz For. Fl. Burm.* i. 47; *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 123.—M. Wallichiana, *H. f. & T. l.c.* 149.—M. tristis, *Kurz For. Fl. Burm.* i. 47.—Uvaria dioica, *Roxb. Fl. Ind.* ii. 659.—Phœanthus dioicus, *Kurz in Flora* liii. (1870) 274.—Guatteria globosa, *A. DC. Mem. Soc. Genev.* v. 43; *Wall. Cat.* 6448.—Hyalostemma Roxburghiana, *Wall. Cat.* 6434; *Griff. Ic. Pl. Ind. Or.* iv. *t.* 653.

Sikkim-Himalaya; Assam Hill ranges up to 4,000 feet; Chittagong Hills; Burma; Singapore.

Kurz's species *M. tristis* (For. Flora Burma i. 47) appears to be a form of this with larger leaves and flowers than usual. The only specimens of it extant are very poor; and better material may show it to be, as Kurz thought, a distinct species. According to M. Pierre, his Cambodian species *M. mollis* (Fl. Forest. Coch.-Chine, t. 40) is closely allied to *M. Roxburghiana.* The same author's species *M. campanulata* (l.c. t. 41) is also allied to *M. Roxburghiana* and to *M. macrocarpa.*

Plate 189B. Miliusa Roxburghiana, *H. f. & T.* 1, Flowering branch; 2, ripe carpels—*of natural size;* 3, flower dissected; 4, anthers; 5, seeds—*enlarged.*

2. Miliusa macrocarpa, *Hook. fil. & Thoms. Fl. Ind.* 150. A small tree; young branches glabrous, dark-coloured, puberulous, striate, the older lenticellate. *Leaves* membranous, oblong or oblong-lanceolate, sometimes slightly oblanceolate, acuminate, the base acute; upper surface dull, glabrous except the minutely puberulous midrib; the lower paler, glabrous, the midrib sometimes muriculate; main nerves 8 to 11 pairs, rather prominent beneath, in old leaves forming wide inter-marginal arches; length 4·5 to 7 in., breadth 1·5 to 2·2 in.; petiole ·15 in. *Flowers* on long pedicels, extra-axillary, often leaf-opposed, solitary, or in few-flowered, often sub-terminal, cymes; pedicels glabrescent,

slender, ebracteolate, 1·25 to 1·75 in. long. *Sepals* thick, somewhat concave with everted pubescent edges, ovate, acute, pubescent, inside glabrous and granulate outside, ·35 in. long. *Outer petals* similar and about the same in size, both reflexed; inner petals erect, much larger (·65 in. long), lengthening after expansion, glabrous outside, glabrescent inside. *Stamens* intermixed with hairs, very numerous, short, compressed, with obliquely truncate apices not concealing the linear anthers. *Ovaries* small, numerous, pubescent, on a long narrow torus, oblong, 1- to 2-ovuled; style oblong. *Ripe carpels* oblong, terete, blunt, glabrous, grooved, ·6 in. long and ·35 in. in diam.; pericarp slightly pulpy. *Seed* one, rarely two. *Hook. fil. Fl. Br. Ind.* i. 86.

Sikkim-Himalaya, Khasia Hills; at elevations of 2,500 to 6,000 feet.

PLATE 202A. Miliusa macrocarpa, *H. f. & T.* 1, Flowering branch; 2, ripe carpels —*of natural size;* 2,* flower dissected—*enlarged;* 3 & 4, anthers; 5, pistil—*much enlarged.*

3. MILIUSA WIGHTIANA, *Hook. fil. & Thoms. Fl. Ind.* 149. A small tree; young branches striate and lenticellate, glabrous. *Leaves* thinly coriaceous, oblong-lanceolate or narrowly oblong, obtusely acuminate; the base sub-cuneate or slightly rounded; both surfaces glabrous, shining, reticulate; main nerves about 9 pairs, spreading, forming several series of intra-marginal arches, faint; length 2 to 4 in., breadth ·65 to 1 in.; petiole ·05 in. *Peduncles* slender, 1 to 1·5 in. long (longer in fruit), puberulous or glabrous; bracteoles minute, several basal and one sub-mesial. *Sepals* and *outer petals* very small, equal, ovate, ciliate. *Inner petals* many times larger (·5 in. long), oblong, sub-acute, glabrous or glabrescent. *Stamens* numerous, slightly apiculate. *Ovaries* numerous, oblong, glabrous, 1- or 2-ovuled; style short; stigma oblong. *Ripe carpels* 1-seeded and globular, or 2-seeded and ovoid, ·4 to ·5 in. long, always mucronate, glabrous, sub-granulate; stalks ·3 to ·5 in. *Bedd. Ic. Pl. Ind. Or., t.* 86; *Hook. fil. Fl. Br. Ind.* i. 87.

W. Peninsula, on the Travancore and Tinnivelly Hill ranges.

PLATE 202B. Miliusa Wightiana, *H. f. & T.* 1, Branch with flowers and young fruit; 2, flower; 3, ripe carpels—*of natural size;* 4 & 5, anthers; 6 & 7, pistils—*enlarged.* (*All copied from Beddome's Ic. Pl. Ind. Or., t.* 86.)

4. MILIUSA NILAGIRICA, *Beddome Ic. Pl. Ind. Or., t.* 88. A large glabrous shrub; young branches rugose, lenticellate. *Leaves* thinly coriaceous, lanceolate or elliptic-lanceolate, shortly acuminate, the base sub-cuneate; lower surface reticulate; main nerves about 7 pairs, spreading; length 2 to 4 in., breadth ·7 to 1·5 in.; petiole ·25 to ·35 in. *Peduncles* slender, solitary, axillary, ·5 to 1·5 in. long (longer in fruit), with 2 or 3 small basal bracteoles. *Flowers* ·4 in. long. *Sepals* and *outer petals* minute, equal, ovate, ciliate. *Inner petals* much larger than the outer, thick, ovate, oblong, acute, ·4 in. long, glabrous except the thickened margin towards the apex. *Stamens* few. *Ovaries* more numerous than the stamens; stigma oblong or globose, 1- or 2-ovuled. *Ripe carpels* globose, apiculate, glabrous, ·4 in. in diam.; stalks 35 in.

Nilgiri Hills, elevat. 5,000 feet,—*Beddome.*

PLATE 203A. Miliusa nilagirica, *Bedd.* 1, Flowering and fruiting branch; 2, ripe carpel—*of natural size;* 3, section of ripe carpel; 4, flower; 5, flower dissected—*enlarged;*

6 & 7, anthers; 8 & 9, pistils—*much enlarged.* (*Copied from Beddome's Ic. Pl. Ind. Or., t.* 87.)

5. MILIUSA LONGIPES, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 124. A small tree 15 to 30 feet high; young branches dark-coloured; all parts glabrous except the edges of the sepals and outer petals. *Leaves* membranous, shining, oblong-oblanceolate, acuminate, the base sub-cuneate or rounded; main nerves about 12 pairs, spreading, faint; length 5·5 to 7 in., breadth 1·75 to 2·75 in.; petiole ·1 to ·15 in. *Flowers* ·5 to ·65 in. long, axillary, solitary; pedicels slender, ·5 to ·75 in. long (longer in fruit), with 3 or 4 lanceolate bracteoles at the base. *Sepals* and *outer petals* sub-equal, minute, ovate, sub-acute, the edges ciliate. *Inner petals* very much larger than the outer, ovate-oblong, veined, sub-acute, greenish-yellow, ·5 or ·6 in. long. *Stamens* about 18, compressed, short, often bent; the apiculus broad, shallow. *Ovaries* numerous, elongate, glabrous; stigma large, capitate, sessile. *Ripe carpels* numerous, globular-ovoid, blunt, glabrous, sub-granular, ·25 to ·3 in. long; stalks ·75 to 1 in., slender. *Seeds* ovoid.

Perak: at low elevations,—*Scortechini, King's Collector.*

This species approaches *M. macropoda*, Miq., but its leaves are more narrowed to the base and more acuminate.

PLATE 204. Miliusa longipes, *King.* 1, Branch with flowers and ripe fruit—*of natural size;* 2, flower dissected—*enlarged;* 3, anther—(*much bent*); 4 & 5, pistils—*much enlarged.*

6. MILIUSA ZEYLANICA, *Gard. ex Hook. fil. & Thoms. Fl. Ind.* 149. A small tree; young branches rugose or smooth, minutely tomentose at first like the other young parts. *Leaves* thinly coriaceous, oblong-lanceolate, acute, shortly acuminate, or obtuse; the base sub-cuneate, slightly oblique; both surfaces glabrous except the midrib which is pubescent on both; main nerves about 7 pairs, spreading, very faint; length 2 to 4 in., breadth ·65 to 1·5 in.; petiole ·15 in., tomentose. *Flowers* axillary, solitary; pedicels puberulous, minutely bracteolate, ·4 to ·5 in. long. *Sepals* and *outer petals* small, sub-equal, ovate, pubescent, sub-acute. *Inner petals* many times larger than the outer, narrowly oblong from a broad base, green in the upper, purple in the lower, half, ·6 to ·75 in. long, adpressed-puberulous. *Stamens* intermixed with hairs, numerous; the apex conical and not concealing the anthers. *Ovaries* numerous, pubescent, oblong, oblique, 1- to 2-ovuled; stigma oblong. *Ripe carpels* numerous, sub-sessile, crowded, ovoid, blunt, glabrous, nearly ·5 in. long. *Thwaites' Enum. Pl. Ceyl.* 10; *Beddome Ic. Pl. Ind. Or., t.* 89; *Hook. fil. Fl. Br. Ind.* i. 87.

Ceylon: in the southern parts.

PLATE 203B. Miliusa Zeylanica, *Gard.* 1, Flowering and fruiting branch—*of natural size;* 2, flower dissected; 3, 4 & 5, anthers; 6 & 7, pistils—*enlarged.* (*Nos.* 3 *to* 7 *are copied from Beddome's Ic. Pl. Ind. Or., t.* 89.)

7. MILIUSA INDICA, *Lesch. in A. DC. Mem. Soc. Genev.* v. 36. A much-branched variable shrub; young branches tomentose strigose or glabrous. *Leaves* sub-sessile, thinly coriaceous, ovate or ovate-cordate and obtuse, or lanceolate and acute or acuminate;

the base rounded, slightly oblique; both surfaces glabrous or sparsely adpressed-pubescent; main nerves 7 or 8 pairs, spreading, inter-arching widely far from the margin, very faint; length 1 to 2·5 in., breadth ·75 to 1·25 in.; petioles ·05 in. long, pubescent. *Flowers* axillary, solitary, greenish, dashed with purple near the base; pedicels slender, ·25 to ·65 in., with several bracteoles near the base. *Sepals* ovate, pubescent outside. *Inner petals* broadly ovate, twice as large as the sepals, and pubescent like them; *inner petals* ovate, acuminate, pubescent, nerved, three or four times as long as the outer, deep purple. *Stamens* numerous, intermixed with stiff hairs, with rounded apiculus not concealing the anthers. *Ovaries* numerous, densely pilose, oblong, 1- to 2-ovuled; stigma oblong. *Ripe carpels* numerous, globose, ovoid, sub-sessile, glabrous, purple, ·5 in. long. *Seeds* 2, plano-convex, grooved. *W. & A. Prodr.* 10; *Wall. Cat.* 6433; *H. f. & T. Fl. Ind.* 148; *Hook. fil. Fl. Br. Ind.* i. 86; *Beddome Ic. Pl. Ind. Or., t.* 85.—M. montana, *Gardner ex Fl. Ind. l.c.; Thwaites' Enum. Pl. Ceyl.* 10; *Beddome l.c. t.*, 84.

Western Peninsula: in Malabar and Mysore. Ceylon.

A very variable plant, of which three varieties have been recognized by Hook. fil. & Thoms. These are characterised as below:—

"Var. 1, *tomentosa;* branchlets and leaves beneath tomentose, carpels pubescent.

Var. 2, *strigosa;* branchlets and leaves beneath strigose, carpels glabrous.

Var. 3, *montana;* branchlets and much smaller leaves glabrous. *M. montana, Gardner.*"

Plate 205A. Miliusa indica, *Lesch.* 1, Flowering branch; 2, ripe carpels; 3, seeds—*of natural size;* 4, flower with sepals and outer petals turned back, the inner petals having been removed; 5 & 6, anthers; 7, pistil—*enlarged.* (*Copied from a drawing lent by Dr. H. Trimen,* F.R.S., *Director of the Royal Botanical Garden, Ceylon.*)

8. Miliusa velutina, *Hook. fil. & Thoms. Fl. Ind.* 151. A tree 30 to 50 feet high; young branches and all the other parts more or less densely tomentose. *Leaves* thickly membranous, ovate-oblong to elliptic or sub-rotund, very variable in size, minutely apiculate, acute or obtuse; the base rounded or slightly cordate; both surfaces pale tomentose, the upper less so; the lower velvety when young, sometimes both pubescent especially when adult; main nerves 8 to 12 pairs, oblique or spreading, rather prominent on both surfaces; length 4 to 10 or even 14 in., breadth 2·5 to 4 or even 7 in.; petiole ·2 in. *Flowers* ·35 to ·5 in. long, on slender, 2 to 3 in. long (elongating in fruit), very tomentose, ebracteolate pedicels arising singly or 2 or 3 from a shorter, tomentose, leaf-opposed peduncle. *Sepals* and *outer petals* small, ovate. *Inner petals* much larger (·25 to ·3 in. long), broadly ovate to rotund, blunt, all (as also the sepals) densely tomentose outside, blackish-purple and glabrous inside. *Stamens* short, with very slight sub-acute apiculus. *Ovaries* ovoid, pubescent, 2-ovuled; stigma sub-sessile, sub-capitate. *Ripe carpels* ovoid to oblong, blunt, often oblique, puberulous, bluish purple, ·5 to ·75 in. in diam.; stalk ·25 to ·35 in. *Seed* 2, transversely ridged. *Hook. fil. Fl. Br. Ind.* i. 87; *Kurz For. Fl. Burm.* i. 47; *Miq. Fl. Ind. Bat.* i. *pt.* 2, 52; *Brandis For. Flora* 6, *t.* 2; *Beddome Fl. Sylvat., t.* 37, *and Ic. Pl. Ind. Or., t.* 87; *Pierre Fl. Forest. Coch.-Chine, t.* 39.—Uvaria velutina—*Dunal Anon.* 91.—U. villosa, *Roxb. Fl. Ind.* ii. 664.—Guatteria velutina, *A. DC. Mem. Soc. Genev.* v. 42; *Wall. Cat.* 6441.

The drier parts of Northern India and in Burmah, at low elevations: common.

PLATE 206. Miliusa velutina, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3 & 4, sections of carpels—*of natural size;* 5 & 6, anthers; 7, ovary—*enlarged.*

Doubtful Species.

MILIUSA FLAVIDA, *Kurz* MSS. The only specimens thus named are in the Calcutta Herbarium, and they are too imperfect for description.

24. Saccopetalum, *Bennett.*

Trees. *Leaves* deciduous. *Flowers* axillary, solitary or fascicled. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 series; outer small, like the sepals; inner much larger, erect or conniving, base saccate. *Stamens* indefinite; anther-cells dorsal, contiguous; connective produced into a conspicuous appendage. *Ovaries* indefinite; ovules 6 or more. *Ripe carpels* sub-globose. Distrib.—Species five, Eastern Asiatic, with one Australian.—Reduced to *Miliusa* by Baillon (*Hist. des Plantes* 244), from which it differs chiefly by its saccate petals.

Synopsis of the species.

Flowers hermaphrodite.

Flower pedicels 1·75 to 2·5 in. long	1. *S. tomentosum.*
Flower pedicels ·25 in. long	2. *S. longiflorum.*

Flowers dioceous.

Flower pedicels ·25 to ·35 in. long	3. *S. sclerocarpum.*

1. SACCOPETALUM TOMENTOSUM, *H. f. & Th. Fl. Ind.* 152. A large tree; young branches tomentose, afterwards glabrous and pale. *Leaves* thickly membranous, ovate or ovate-oblong, acute, the base sub-acute or rounded; upper surface glabrous or glabrescent, the midrib always pubescent; under-surface pubescent or tomentose, nearly glabrous when old; main nerves 6 to 11 pairs, spreading, prominent beneath; length 4 to 6 in., breadth 2·5 to 3 in.; petiole ·2 in. *Flowers* 1 in. in diam., leaf-opposed or sub-terminal, solitary or in pairs; their pedicels very slender, puberulous, 1·75 to 2·5 in. long, bracteolate at the base; peduncle (when present) less than ·5 in. long, tomentose. *Sepals* and *outer petals* minute, sub-equal, lanceolate, reflexed, pubescent, ·15 in. long. *Inner petals* much larger than the outer, ·45 in. long, ovate-oblong, obtuse, pouched at the base, minutely pubescent on both surfaces. *Stamens* in several rows, numerous, compressed, minutely apiculate. *Ovaries* ovate, pointed, hirsute at the base, otherwise sparsely pubescent; ovules about 6, in two rows; stigma sessile, capitate. *Ripe carpels* globose, succulent, tapering slightly to the base, pubescent, dark purple when ripe, 1 in. in diam.; stalks ·5 in. *Dalz. Bomb. Flora* 4; *Beddome Ic. Pl. Ind. Or., t.* 49.—Uvaria tomentosa, *Roxb. Corom. Pl.* i. *t.* 35; *Fl. Ind.* ii. 667; *W. & A. Prodr.* 8; *Wall. Cat.* 6472.

Nepal Terai; Goojerat; Rajputana, Central India; Orissa; Bihar; Concan; Travancore.

In leaves this often resembles some of the forms of *Miliusa velutina*, but the latter have shorter petioles. The flower pedicels, and even the flowers themselves, are also superficially somewhat alike; but the inner petals of this are pouched at the base and

are pubescent on both surfaces, whereas those of *Miliusa velutina* are glabrous inside and quite flat. The ovaries of this have, moreover, six ovules.

PLATE 207. Saccopetalum tomentosum, *H. f. & Th.* 1, Flowering branch; 2, branch with ripe fruit—*of natural size;* 3, section of a carpel; 4 & 5, flowers—*enlarged;* 6, andro-gynœcium; 7 & 8, anthers; 9 & 10, pistils—*much enlarged.* (*Nos.* 5 *to* 10 *are copied from Beddome's Ic. Pl. Ind. Or., t.* 49.)

2. SACCOPETALUM LONGIFLORUM, *Hook. fil. Fl. Ind.* 151. A tree; young branches puberulous, ultimately pale, glabrous, striate. *Leaves* thinly coriaceous, ovate-oblong or oblong-lanceolate, shortly acuminate, the base abruptly sub-cuneate; both surfaces reticulate, glabrous when adult; the lower adpressed-pubescent when young; main nerves about 12 pairs, spreading, inter-arching far from the margin, rather prominent beneath; length 7 to 9 in., breadth 3·5 in.; petiole ·25 in. long. *Flowers* in the axils of fallen leaves, solitary; pedicels ·25 in. long, puberulous. *Sepals* and *outer petals* oblong, ·2 in. long. *Inner petals* much larger (1·3 in. long), oblong-lanceolate, tapering to the obtuse apex; the base sub-saccate, puberulous. *Ovaries* pale, hirsute; ovules about 10; style long. *Ripe carpels* 1 to 1·25 in. in diam., sub-globose, glabrous, almost black; the pericarp succulent; stalks ·75 in. Uvaria badajamba, *Roxb. Hort. Beng.* 43.—Guatteria badajamba, *Wall. Cat.* 6443; *Voigt's Hort. Calcutt.* 16.

Bengal: near Purnea—*Buchanan Hamilton;* Chittagong (*fide Voigt l.c.*)

This plant does not appear to have been collected in a wild state since Hamilton's time. In his *Hortus Calcuttensis* (*l.c.*) Voigt states that it was collected in Chittagong and was introduced into the Botanical Garden, Calcutta, in the year 1810. In the Botanical Garden it is still cultivated; but collectors from this garden sent to Chittagong district for the express purpose of re-collecting some of the lost species of Roxburgh quite failed to find any traces of this one. Neither has any specimen of it been received from the Purnea district.

PLATE 208. Saccopetalum longiflorum, *H. f. & Th.* 1, Leafy branch; 2, flowering branch; 3, flower dissected; 9 & 10, ripe carpels—*of natural size;* 4, flower with inner petals removed—*enlarged;* 5 & 6, anthers; 7, pistil; 8, section of same—*much enlarged.*

3. SACCOPETALUM SCLEROCARPUM, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 88. A tree; young branches glabrous. *Leaves* thinly coriaceous, ovate or oblong, obtuse or obtusely acuminate; the base acute; both surfaces glabrous; length 4 to 5 in., breadth 2 to 2·5 in. *Flowers* dicœcious, ·5 to ·7 in. long, yellowish, on long slender glabrescent ebracteolate pedicels ·25 to ·35 in. long, fascicled or solitary, from short axillary peduncles. *Sepals* and petals sub-equal, linear-lanceolate, blunt, puberulous outside, pale-tomentose inside. *Stamens* numerous. *Carpels* (unripe) obliquely ovoid, sub-mamillate, ·5 to ·65 in. long, glabrous, rather shorter than their stalks. Miliusa sclerocarpa, *Kurz For. Fl. Burm.* i. 48; *in Journ. As. Soc. Bengal vol.* 41, *pt.* 2, 291.—Uvaria sclerocarpa, *A. DC. in Mem. Genev.* v. 27; *Wall. Cat.* 6461; *Hook. fil. & Thoms. Fl. Ind.* 103.

Burmah: Martaban,—*Wallich.*

A very imperfectly known plant, which does not appear to have been collected since Wallich's time. The only specimens I have seen of it are imperfect, and the

above description has been drawn up from *Hook. fil. & Thoms.* (*l.c.*); and from *Kurz* (*l.c.*), who refers it to *Miliusa*.

PLATE 208 BIS. Saccopetalum sclerocarpum, *H. f. & Th.* 1, Leaf-twig; 2, branch with unripe carpels—*of natural size.* (*Drawn from Wallich's specimen, Cat. No.* 6461.)

25. Alphonsea, *H. f. & T.*

Lofty trees, or shrubs. *Leaves* more or less coriaceous, glabrous, shining. *Flowers* small or middle-sized, in leaf-opposed, rarely extra-axillary, peduncled fascicles; buds conical. *Sepals* 3, small, valvate. *Petals* 6, valvate in two series, often saccate at the base, larger than the sepals, equal or the inner rather smaller. *Torus* cylindric or hemispheric. *Stamens* indefinite, loosely packed; anther-cells dorsal, contiguous; connective apiculate. *Ovaries* 1 or more; style oblong or depressed; ovules 4—8, in two series on the ventral suture. *Carpels* sub-sessile or stalked. Distrib.—Species 13, all Indian or Malayan.—Baillon (*Hist. Pl.*) unites this genus with *Bocagea*.

Leaves rusty-pubescent beneath at all stages . . . . . 1. *A. Maingayi.*
Leaves glabrous above, sparsely adpressed-strigose beneath, oblong to elliptic; main nerves 10 pairs . . . . . 2. *A. lutea.*

Leaves glabrous above, glabrous, or nearly so, beneath.

Leaves more than 3 in. long.

Buds conical; fruit ovoid or globose.

Leaves quite glabrous, oblong to elliptic-oblong; main nerves 14 to 18 pairs . . . . . 3. *A. ventricosa.*
Leaves glabrous on the upper surface, puberulous on the lower when young, elliptic or ovate-elliptic; main nerves 6 to 8 pairs . . . . . 4. *A. elliptica.*
Leaves quite glabrous, broadly elliptic, shortly acuminate; main nerves 7 or 8 pairs . . . . . 5. *A. lucida.*

Buds globose; ripe carpels cylindric . . . . . 6. *A. sub-dehiscens.*

Leaves 3 in. long or less.

Ripe carpel cylindric . . . . . 7. *A. cylindrica.*

Ripe carpel globose or ovoid.

Leaves elliptic-lanceolate, ovate or oblong, obtuse; main nerves 6 or 7 pairs . . . . . 8. *A. madraspatana.*

Leaves narrowly lanceolate.

Ripe carpels 1 in. long, not at all, or only slightly, tuberculate . . . . . 9. *A. zeylanica.*
Ripe carpels 1·5 to 2 in. long, much tuberculate . . 10. *A. sclerocarpa.*

Of uncertain position (fruit unknown) . . . . . 11. *A. Curtisii.*

1. ALPHONSEA MAINGAYI, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 90. A tree; branches rusty-tomentose, ultimately dark-coloured and glabrous. *Leaves* coriaceous, elliptic-oblong or oblong-lanceolate, shortly, and often obtusely, acuminate, the base rounded; upper surface shining, glabrous except the midrib puberulous near the base; lower surface

rusty, conspicuously reticulate, pubescent, the midrib tomentose; main nerves 8 or 9 pairs, oblique, inter-arching far from the edge; length 5 to 7 in., breadth 1·5 to 2·7 in.; petiole ·25 in. *Flowers* ·75 in. in diam., supra-axillary, solitary or in small racemes; pedicels ·1 in. long, rusty-tomentose; bracteole small. *Sepals* sub-orbicular, very small. *Petals* ovate, pubescent outside, glabrous within; the outer recurved, the inner smaller. *Stamens* with broad short filaments; the anther-cells small, diverging below. *Ovules* about 20. *Ripe carpels* ovoid, short-stalked, 2 in. long by 1 in. in diam. *Seeds* many, smooth. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 125.

Malacca,—*Maingay* (*Kew Distrib.*) No. 98.

Plate 205B. Alphonsea Maingayi, *H. f. & Th.* 1, Flowering branch—*of natural size;* 2, flower dissected—*slightly enlarged;* 3 & 4, anthers; 5, pistil; 6, section of same—*much enlarged.*

3. Alphonsea lutea, *Hook. fil. & Thoms. Fl. Ind.* 153 (*not of Teysm. & Binn.*) A tree; young branches minutely rufous-tomentose. *Leaves* coriaceous, ovate-oblong to elliptic, obtusely acuminate, the base sub-cuneate or rounded; upper surface glabrous, shining; the lower sparsely adpressed-strigose; main nerves 8 to 10 pairs, spreading, inter-arching within the edge, faint; length 2·5 to 5·5 in., breadth 1·25 to 2·75 in.; petiole ·2 in., pubescent. *Racemes* leaf-opposed, in clusters of 2 or 3, woody, tomentose, with many small bracts and 2 or 3 flowers. *Flowers* ·6 to ·75 in. in diam.; pedicels yellowish-tomentose, with 1 bracteole. *Sepals* connate into an open 3-angled cup, tomentose outside, glabrous inside. *Outer petals* ovate, tomentose outside, puberulous inside except at the glabrous base; inner petals rather broader than the outer, pubescent outside, glabrous inside. *Stamens* in three rows, short, broad, flat; the connective scarcely produced above the lateral anther-cells. *Ovaries* oblong, compressed, strigose; ovules 10, in two rows; style very short, glabrous; stigma small. *Ripe carpels* 4 to 6, broadly ovoid, pointed, puberulous, 1·2 to 1·5 in. long; stalk thick, ·25 to ·4 in. long. *Seeds* 3 to 6, oval-oblong, pointed. *Thwaites' Enum. Pl. Ceyl.* 399; *Hook. fil. Fl. Br. Ind.* i. 89; *Kurz For. Fl. Burm.* i. 49; *Beddome Ic. Pl. Ind. Or., t.* 91.—Uvaria lutea, *Roxb. Cor. Pl.* i. *t.* 36; *Fl. Ind.* ii. 666 (*not of Wall., nor of W. & A.*); Uvaria Russellii, *Wall. Cat.* 6464.

From Sylhet to Pegu. Orissa. Ceylon: in hilly country.

Plate 209. Alphonsea lutea, *H. f. & Th.* 1, Flowering branch; 2, branch with ripe carpels; 3, ripe carpel from another specimen; 4, section of ripe carpel; 5, seed—*of natural size;* 6, flower-bud; 7, flower dissected—*enlarged;* 8 & 9, anthers; 10 & 11, pistils—*much enlarged.* (*The foregoing are all from Ceylon specimens and are copied from a drawing kindly lent by Dr. H. Trimen,* F.R.S.); 12 & 13, flowers (from Indian specimens)—*slightly enlarged.*

3. Alphonsea ventricosa, *Hook. fil. & Thoms. Fl. Ind.* 152. A tall tree; young branches softly tomentose but speedily glabrous dark-coloured and striate. *Leaves* coriaceous, drooping, oblong to oblong-elliptic, shortly acuminate, the base slightly cuneate or rounded; both surfaces glabrous, reticulate, the midrib pubescent on the lower when young; main nerves 14 to 18 pairs, slender, spreading, inter-arching freely within the edge; length 4·5 to 10·5 in., breadth 1·75 to 2·75 in.; petiole ·1 to ·2 in., thick,

pubescent. *Flowers* greenish-white, about ·4 in. long, in very short fascicle-like leaf-opposed or extra-axillary racemes, opening 1 or 2 at a time; pedicels ·4 or ·5 in. long, rusty-tomentose, with one bracteole in the middle and another at the base. *Sepals* small, broadly ovate, acute, tomentose outside, glabrous inside. *Petals* thick, sub-equal, ovate-oblong, tapering to the sub-acute apex, sub-cordate at the base; the inner rather shorter, pubescent on both surfaces, but rather less so on the inner, ·4 to ·5 in. long. *Stamens* broad, flattened, slightly apiculate. *Ovaries* numerous, oblong, tapering to the apex, densely pubescent, multi-ovulate; stigma sub-sessile, capitate. *Ripe carpels* ovoid, yellow when ripe, minutely pubescent, 1·5 to 2·5 in. long and 1·2 to 1·75 in. in diam. *Seeds* 6 or 7, immersed in pulp, in two rows, compressed; testa brown, hard. *Hook. fil. Fl. Br. Ind.* i. 89; *Kurz For. Fl. Burm.* i. 48.—Uvaria ventricosa, *Roxb. Fl. Ind.* ii. 658; *Wall. Cat.* 6453.

Assam; Chittagong; Andamans; Penang.

Plate 210. Alphonsea ventricosa, *H. f. & Th.* 1, Flowering branch; 2, ripe carpels; 3 & 4, sections of carpel—*of natural size;* 5, section of flower; 6, stamen; 7 & 8, sections of ovaries—*enlarged.*

4. Alphonsea elliptica, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 90. A tree? Young branches rather stout, grey, glabrous. *Leaves* coriaceous, elliptic or ovate-elliptic, shortly and bluntly acuminate or acute, the base abruptly cuneate; upper surface glabrous, shining; the lower reticulate, puberulous when young, glabrous when adult, slightly paler than the upper; main nerves 6 to 8 pairs, spreading, slightly prominent beneath; length 3·5 to 5 in., breadth 1·25 to 1·75 in.; petiole ·2 in. *Flowers* ·8 in. in diam., axillary, solitary, or 2 to 3 in short racemes; peduncles very short, multi-bracteate; pedicels ·25 to ·35 in. long, with 1 or 2 minute bracteoles. *Sepals* sub-orbicular, obtuse, recurved, connate at the base. *Petals* adpressed-pubescent; the outer ovate-lanceolate, reflexed; the inner rather smaller. *Stamens* in several rows, apiculate. *Ovaries* linear-oblong, pubescent; stigma sub-sessile, sub-capitate; ovules numerous, in two series. *Ripe carpels* ovoid, oblong, blunt at each end, densely covered with minute tawny tomentum, 2 in. long and 1 in. in diam. *Seeds* 6 or 7, flattened. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 125.

Malacca,—*Maingay* (*Kew Distrib.*) No. 99.

Maingay's specimens (Kew Distrib. No. 107) in fruit only and with some detached leaves, and which have hitherto remained undetermined, appear to me to belong to this species; and it is from these that the fruit of this species is now for the first time described.

Plate 211A. Alphonsea elliptica, *H. f. & Th.* 1, Flowering branch—*of natural size;* 2, flower dissected—*enlarged;* 3 & 4, anthers; 5, pistil—*much enlarged.*

5. Alphonsea lucida, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 126. A shrub 6 to 8 feet high; all parts glabrous except the flower; young branches slender, rather dark-coloured. *Leaves* thinly coriaceous, broadly elliptic, shortly abruptly and rather obtusely acuminate, the base cuneate; under-surface very minutely scaly; main nerves 7 or 8 pairs, oblique, curving, depressed on the upper, bold and prominent on the lower, surface; length 4·5 to 5·5 in., breadth 1·75 to 2·5 in.; petiole ·3 in. stout. *Flowers* extra-axillary, solitary or 2 or 3 in racemes; peduncle of raceme short;

pedicels shorter than the peduncle, puberulous, ebracteolate, ·3 to ·4 in. long. *Sepals* triangular-ovate, connate at the base, reflexed, puberulous outside, glabrous inside. *Petals* yellowish-white, sub-equal, oblong, oblique, tapering gradually to the sub-acute apex; the base broad, suddenly narrowed and slightly pouched, puberulous, ·5 in. long; the inner slightly smaller. *Stamens* in 3 rows; filament very short; connective with a short apiculus. *Ovaries* 4 or 5, oblong, adpressed-pubescent; ovules many, in two rows; stigma sessile, sub-capitate. *Ripe carpels* unknown.

Perak: elevat. 500 feet,—*King's Collector* Nos. 5387, 7119 and 7516.

PLATE 212. Alphonsea lucida, *King*. 1, Flowering branch; 2, flower-bud—*of natural size;* 3, flower dissected—*slightly enlarged;* 4 & 5, anthers; 6 & 7, pistils—*much enlarged.*

6. ALPHONSEA SUB-DEHISCENS, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 126. A shrub or small tree; young branches rather slender, puberulous at first but speedily becoming glabrous. *Leaves* thinly coriaceous, oblong-lanceolate to elliptic, shortly and rather bluntly acuminate, the base rounded or sub-cuneate; upper surface glabrous except the puberulous midrib; the lower reticulate, sparsely puberulous or glabrous; main nerves about 10 pairs, spreading, very faint; length 4 to 6 in., breadth 1·75 to 2·3 in.; petiole ·25 in. *Flowers* globular, scarcely opening, ·25 in. in diam., solitary or in pairs, slightly supra-axillary, on short pedicels, with several large sub-orbicular pubescent bracteoles. *Sepals* thick, fleshy, connate into a flat cup, ·3 in. in diam., with three broad obtuse spreading lobes. *Petals* larger than the sepals, thick, hard and fleshy, valvate, orbicular, acute, concave; outside tawny-pubescent, inside glabrous except near the apex; the outer ·2 in. in diam., the inner row rather smaller than the outer. *Stamens* numerous; the apical processes large, fleshy, conical, concealing the apices of the narrow linear anther-cells. *Torus* conical. *Pistil* solitary, clavate, minutely puberulous, many-ovuled; stigma minute. *Ripe carpels* elongate-clavate, puberulous, 1 to 1·25 in. long, tapering into a stalk ·25 to ·3 in. long. *Seeds* about 10.

Perak,—*King's Collector* No. 10818.

The dried fruits of this species sometimes open longitudinally by a sort of quasi-suture; hence the specific name.

PLATE 213. Alphonsea sub-dehiscens, *King*. 1, Flowering branch; 2, bud seen from above; 3, bud opened up; 4, flower dissected; 5, unripe carpels; 6, ripe carpels—*of natural size*; 7 & 8 anthers; 9 & 10, pistils—*enlarged.*

7. ALPHONSEA CYLINDRICA, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 127. A small tree 20 to 30 feet high; young branches with long, soft, pale-brown pubescence, ultimately glabrous, cinereous, striate. *Leaves* thinly coriaceous, ovate-lanceolate, sometimes oblanceolate, shortly and bluntly acuminate; the base rounded or sub-cuneate, slightly oblique; upper surface glabrous, shining, the midrib pubescent; the lower dull, sparsely pubescent on the midrib and nerves; main nerves 7 to 9 pairs, spreading, faint; length 2·5 to 3·5 in., breadth 1·1 to 1·5 in.; petiole ·15 in. *Flowers* ·35 in. long, single, or 2 or 3 from leaf-opposed or extra-axillary peduncles; peduncles ·15 to ·4 in. long, with deciduous distichous sub-orbicular bracts; pedicels ·2 to ·35 in. long, pubescent, each with 1 bracteole near the base. *Sepals* semi-orbicular, blunt, connate at the base, tomentose outside, glabrous within, reflexed. *Petals* sub-equal, oblong-ovoid, tapering from the sub-

saccate base to the sub-acute apex, tomentose outside, minutely pubescent inside except a glabrous patch at the base, ·35 in. long. *Stamens* in 3 rows with short broad filaments. *Anthers* ovate, the connective very slightly apiculate. *Ovaries* 3, oblong, densely pale-yellowish sericeous, with many ovules in two rows; style short; stigma bifid, sub-capitate. *Ripe carpels* 1 or 2, elongate, terete, tapering to the apex, pubescent or puberulous, nearly 1 in. long and only ·2 in. in diam.

Perak; on Ulu Bubong, elevat. 400 to 600 feet,—*King's Collector* No. 10633.

A species resembling *A. sub-dehiscens* in its narrow cylindric fruit.

PLATE 211B. Alphonsea cylindrica, *King*. 1, Flowering branch; 2, twig with fruit—*of natural size;* 3, flower dissected—*slightly enlarged;* 4 & 5, anthers; 6, pistil; 7, section of the same—*much enlarged.*

8. ALPHONSEA MADRASPATANA, *Beddome Ic. Pl. Ind. Or., t.* 92; *Flora Sylvat., t.* 76. A tree; all parts glabrous except the flowers and fruit; young branches pale, lenticellate and striate. *Leaves* coriaceous, elliptic-lanceolate, sometimes ovate or oblong, obtuse, the base sub-cuneate; both surfaces glabrous and inconspicuously reticulate, the lower paler; main nerves 5 to 7 pairs, spreading, very faint; length 1·8 to 3 in., breadth ·85 to 1·2 in.; petiole ·25 in., rugulose, sub-puberulous or glabrous. *Flowers* yellow, in leaf-opposed or extra-axillary fascicles of 2 to 6; pedicels ·25 to ·5 in. long, puberulous, with a bract below the middle. *Sepals* small, ovate, pubescent. *Petals* sub-equal, ovate, bluntly acuminate, pubescent externally, glabrous within. *Stamens* in two rows, compressed, very slightly apiculate. *Ovaries* oblong, truncate at the apex, tapering at the base, pubescent; ovules 8, in two rows; style sub-globose, sub-sessile. *Ripe carpels* ovoid-globose, slightly apiculate, tawny-tomentose.

Mysore and the Carnatic,—*Beddome.*

A species very near *A. sclerocarpa* in flowers and leaves, but with smaller non-tubercular fruit. It has been collected only by Colonel Beddome.

PLATE 214A. Alphonsea madraspatana, *Bedd.* 1, Flowering branch; 2, ripe carpel; 3, flower—*of natural size;* 4, anther; 5, pistil; 6, section of same—*enlarged.* (*Nos.* 2 *to* 6 *are copied from Beddome's Flora Sylvatica, t.* 76.)

9. ALPHONSEA ZEYLANICA, *Hook. fil. & Thoms. Fl. Ind.* 153. A tree; young branches puberulous but speedily glabrous striate and dark-coloured. *Leaves* small, coriaceous, narrowly lanceolate, acuminate, the base acute; upper surface glabrous, shining; the lower dull, the midrib puberulous when young; main nerves 10 or 12 pairs, spreading, inter-arching widely within the margin, very faint; length 2·25 to 3 in., breadth ·5 to 1 in.; petiole ·2 in. *Flowers* few, in leaf-opposed or extra-axillary fascicles, yellowish-green, ·5 to ·65 in. long; pedicels pubescent, ·25 to ·5 in., with a small basal bracteole. *Sepals* connate for half their length, broadly ovate, sub-acute, tomentose outside, glabrous inside, reflexed when ripe. *Petals* sub-equal, ·5 to ·65 in. long, ovate-acute, puberulous outside, glabrous inside; their apices reflexed. *Stamens* in several rows, compressed, with a slight conical apiculus. *Ovaries* few, oblong, 4- to 6-ovuled; style short, thick; stigma truncate. *Ripe carpels* ovoid, obtuse, tomentose, slightly tuberculate, or not tuberculate, 1 in. long and ·65 in. in diam.; their stalks stout, tomentose, 1 to 1·5 in. long. *Seeds* 4 to 5. *Hook. fil. Fl. Br. Ind.* i. 89; *Thwaites'*

Enum. Pl. Ceyl. 11; *Beddome Ic. Pl. Ind. Or., t.* 90.—Uvaria lutea, VAR. *a*, *W. & A. Prodr.* 8 (*excl. syn.*)—Guatteria acutifolia, *Wall. Cat.* 6438D.

W. Peninsula: at Courtallam. Ceylon; central province, alt. 2,000 to 3,000 feet.

PLATE 214B. Alphonsea zeylanica, *H. f. & T.* 1, Flowering branch; 2, ripe carpel—*of natural size;* 3, petals; 4, andro-gynœcium; 5 & 6, anthers; 7, sepals, torus and ovaries; 8, section of ovary—*enlarged.* (*All copied from a drawing made in the Peradeniya Herbarium and kindly lent by Dr. H. Trimen,* F.R.S.)

10. ALPHONSEA SCLEROCARPA, *Thwaites' Enum. Pl. Ceyl.* 11. A tree; young branches slender, glabrous, pale, striate (the very youngest puberulous). *Leaves* coriaceous, narrowly lanceolate or ovate-lanceolate, obtuse, the base sub-cuneate or rounded; both surfaces glabrous, the upper shining, the lower pale; main nerves 8 or 9 pairs, oblique, inter-arching inside the margin, faint; length 1·75 to 3 in., breadth ·7 to 1·1 in.; petiole ·2 in. *Flowers* numerous, yellowish, in short extra-axillary bracteate racemes; pedicels ·2 in. long, pubescent, with a minute bracteole at the base. *Sepals* connate at the base, orbicular, reflexed, puberulous. *Petals* sub-equal, ovate-oblong, tapering to the obtuse apex and slightly contracted at the base, minutely pubescent outside, ·25 in. long. *Stamens* in two rows, slightly apiculate, compressed. *Ovaries* 3 to 5, oblong, glabrous; ovules 8, in two rows; style very short; stigma capitate. *Ripe carpels* large, woody, sub-obovoid or sub-globose, tomentose, 1·5 to 2 in. long and 1·4 in. in diam., sub-sessile, or with thick stalks ·25 in. long, tuberculate. *Hook. fil. Fl. Br. Ind.* i. 89.

Ceylon,—*Thwaites.*

PLATE 215A. Alphonsea sclerocarpa, *Thwaites.* 1, Flowering branch; 2, ripe carpels —*of natural size;* 3, flower; 4, inner petal; 5, outer petal; 6, sepals and andro-gynœcium; 7, anther; 8 & 9, sections of ovaries—*enlarged.* (*All copied from a drawing made in the Peradeniya Herbarium and lent by Dr. H. Trimen,* F.R.S.)

11. ALPHONSEA CURTISII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 127. A shrub; young branches yellowish-pubescent, speedily becoming glabrous and dark-coloured. *Leaves* coriaceous, oblong-lanceolate, acute at base and apex; upper surface glabrous, shining; the lower minutely, sparsely adpressed-puberulous, or glabrous, darker than the upper when dry, minutely reticulate; main nerves about 12 to 15 pairs, sub-horizontal, very faint, inter-arching far from the edge; length 4 to 5·5 in., breadth 1·2 to 1·75 in.; petiole ·2 in. *Peduncles* extra-axillary, 1- or 2-flowered; flowers about ·5 in. long, conical in bud; pedicels about ·3 in. long, tawny-tomentose; bracteoles 1 or 2, sub-orbicular. *Sepals* connate into a spreading cup, ·25 in. broad, tomentose outside and glabrous inside, with 3 broad sub-acute teeth. *Petals* much larger than the sepals, fleshy, oblong, ovate, sub-acute; the outer tomentose on both surfaces, ·4 in. long; the inner narrower, glabrous inside. *Stamens* numerous, with short thick filaments; apical process of connective small, not concealing the short perfectly dorsal anther-cells. *Pistils* about 3, oblong, tomentose, many-ovuled; stigma large, broad, sessile. *Ripe carpels* unknown.

Penang,—*Curtis* No. 1410.

PLATE 215B. Alphonsea Curtisii, *King.* 1, Flowering branch; 2, flower dissected—*of natural size;* 3 & 4, anthers; 5 & 6, pistils—*much enlarged.*

26. Kingstonia, *H. f. & T.*

Trees. *Flowers* fascicled on cauline tubercles, bisexual. *Sepals* 3, persistent, ovate, acute, the bases connate. *Petals* 6; outer valvate; inner smaller, oblong, imbricate. *Stamens* about 12; the filament half the length of the extrorse anther-cells; connective obliquely truncate. *Ovary* 1; stigma sessile, peltate, crenate; ovules few. *Ripe carpels* globose. *Seeds* several, 2-seriate.

1. Kingstonia nervosa, *Hook. fil. & Thoms. Fl. Br. Ind.* i. 93. Young branches rusty-pubescent. *Leaves* thinly coriaceous, oblong, rarely elliptic, shortly acuminate, the base rounded; both surfaces glabrous, the nerves and midrib puberulous beneath when young; main nerves 12 to 14 pairs, oblique, rather straight, depressed on the upper, strong and prominent on the lower, surface; length 4 to 8 in., breadth 1·5 to 3·25 in.; petiole ·4 in., puberulous. *Flowers* ·25 in. long, in extra-axillary fascicles of 8 or 10; pedicels ·35 to ·5 in., slender, rusty-pubescent; bracteoles orbicular, one close to the flower, the others basal and imbricate. *Sepals* ovate, connate at the base, spreading, pubescent outside, glabrous within. *Outer petals* oblong-elliptic, concave, obtuse, cinereous-tomentose outside, pubescent inside; *inner petals* smaller, thick, concave and very tomentose in the upper half. *Stamens* about 15; the connective with a broad truncate apex. *Ovary* one, oblong, angled, pubescent; ovules 4 to 6. *Ripe carpels* broadly ovoid, blunt, minutely velvety pale-rusty tomentose, 1·5 in. long and 1·1 in. in diam.; pericarp woody. *Seeds* about 4, oblong, compressed, separated by dissepiments. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 128.

The species above described has only a single pistil. But there are, in the Calcutta Herbarium, specimens from Sumatra (Forbes No. 2713, in fruit but without flower) of what appears to be a second *Kingstonia*, and in these there are two carpels. If that plant proves to be a *Kingstonia*, the diagnosis of the genus will have to be amended.

Malacca,—*Maingay* (*Kew Distrib.*) No. 22. Perak,—*Wray* No. 3376.

Plate 216A. Kingstonia nervosa, *H. f. & Th.* 1, Leaf-twig; 2, flowering branch; 3, ripe carpel; 4, section of the same—*of natural size;* 5, flower dissected—*enlarged;* 6 & 7, anthers; 8, pistils—*much enlarged.*

27. Mezzettia, *Beccari.*

Trees. *Flowers* small, greenish, axillary or from the axils of fallen leaves, fasciculate or umbellate. *Sepals* 3, ovate, valvate. *Petals* 6, valvate, opening late and accrescent, flat, linear; the inner petals smaller than the outer. *Stamens* 9 to 12, in two rows; anther cells lateral, introrse; connectives produced beyond their apices, truncate. *Torus* small, slightly concave, pubescent. *Ovary* solitary, ovate, glabrous, contracted into a very short style; stigma sub-capitate; ovules 2, superposed. *Carpel* coriaceous, elliptic or globose. *Seeds* 2, large, compressed. Five species, all Malayan.

Leaves coriaceous; flowers more than ·25 in. long; sepals broadly ovate; outer petals obtuse.

Flower-pedicels minutely bracteolate; outer petals linear; ovary narrowly ovoid, tapering slightly upwards . . . . . 1. *M. leptopoda.*

Flower-pedicels ebracteolate; outer petals ovate-lanceolate; ovary oblong, tapering gradually to apex	2. *M. Herveyana.*
Leaves thinly coriaceous; flowers ·25 in. long; sepals semi-orbicular, tomentose; outer petals acute	3. *M. Curtisii.*

1. MEZZETTIA LEPTOPODA, *Oliver in Hook. Ic. Pl., t.* 1560. A tree; young branches dark-coloured, glabrous, striate, rather stout. *Leaves* coriaceous, oblong or narrowly elliptic, obtusely acuminate or acute, the base rounded or acute; upper surface glabrous, shining; the lower dull, obscurely reticulate; main nerves 8 or 9 pairs, forming wide arches far from the margin, very faint; length 2·5 to ·4 in., breadth 1 to 1·75 in.; petiole ·35 in. *Flowers* ·5 in. long, on long slender pedicels in axillary fascicles of 2 to 6; pedicels ·5 to ·75 in., pubescent; bracteoles minute. *Sepals* broadly ovate, connate at the base, tomentose, reflexed. *Petals* tomentose on both surfaces; the outer linear, obtuse, ·2 in. long; the inner shorter and broader. *Ovary* narrowly ovoid, tapering slightly upwards. *Ripe carpels* unknown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 129.—Lonchomera leptopoda, *H. f. & Th. Fl. Br. Ind.* i. 94.

Malacca,—*Maingay* (*Kew Distrib.*) No. 102.

This plant is very imperfectly known. The carpels associated with Maingay's specimens do not agree with his description of them (*Fl. Br. Ind.* i. 94), and they are evidently those of some species of *Polyalthia.*

PLATE 216B. Mezettia leptopoda, *Oliver.* 1, Flowering branch—*of natural size;* 2, flower dissected—*enlarged;* 3 & 4, anthers; 5 & 6, pistils—*much enlarged.*

2. MEZZETTIA HERVEYANA, *Oliver in Hook. Ic. Pl., t.* 1560. A tree; young branches rather stout, nodose, glabrous. *Leaves* coriaceous, elliptic-oblong, shortly acuminate, the base cuneate; both surfaces glabrous, the upper shining; main nerves about 10 pairs, spreading, inter-arching within the margin, faint; length 2·5 to 3 in., breadth 1 to 1·25 in.; petiole ·25 to ·35 in. *Flowers* ·4 in. long, rather crowded, in sessile axillary or extra-axillary fascicles of 3 to 8; pedicels ·3 in. long, puberulous, ebracteolate. *Sepals* broadly ovate, obtuse, connate at the base, pubescent like the petals. *Outer petals* ovate, obtuse, flat; the inner smaller, broadly elliptic, obtuse, the tips incurved. *Anthers* about 12, sessile, obovate-quadrate. *Ovary* oblong, tapering gradually into the style; ovules 2, superposed. *Ripe carpels* unknown. *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 129.

Malacca,—*Hervey.*

PLATE 217A. Mezzettia Herveyana, *Oliver.* 1, Flowering branch—*of natural size;* 2, flower; 3, flower from which the petals have been removed; 4, pistil in longitudinal section; 5 & 6, anthers—*enlarged.* (*Nos.* 2 *to* 6 *are copied from Hooker's Icones, t.* 1560.)

3. MEZZETTIA CURTISII, *King in Journ. As. Soc. Bengal* 61, *pt.* 2, 129. A tree 30 to 40 feet high; young branches cinereous, rugose. *Leaves* thinly coriaceous, oblong-lanceolate or oblong, more or less acuminate, the base acute; both surfaces glabrous; the upper shining, the lower dull; main nerves about 10 pairs, spreading, faint; length

2·5 to 5 in., breadth ·5 to 1·5 in., petiole ·25 in. *Flowers* ·25 in. long, in crowded, sessile, axillary or extra-axillary fascicles of 5 to 10; pedicels slender, ebracteolate, scurfily pubescent, ·35 to ·6 in. long. *Sepals* semi-orbicular, with reflexed sub-acute tips, connate and forming a spreading, shallow cup, densely and minutely tomentose. *Outer petals* ligulate, acute, tomentose like the sepals but with a glabrous patch at the base inside. *Inner petals* like the outer, but less acute and one-third shorter. *Anthers* about 12, sessile, short, about as broad as long; the connective very broad, truncate at the apex. *Ovary* solitary, broadly ovoid, tapering abruptly to the curved truncate stigma, 2-ovuled. *Ripe carpels* sub-globose, sometimes laterally compressed, truncate (often obliquely so), 1·5 to 2 in. in diam., smooth, glaucous. *Seeds* oblong, sub-compressed, 1 in. long.

Penang, on Government Hill at 1,200 feet,—*Curtis* No. 2266.

A species with rather longer thinner leaves than *M. Herveyana*, and a different calyx.

PLATE 217B. Mezzettia Curtisii, *King*. 1, Flowering branch; 7, ripe carpel 8, section of the same—*of natural size;* 2, flower dissected—*enlarged;* 3 & 4, anthers; 5, pistil; 6, section of same—*much enlarged.*

W. J.—Reg. No. 5254J—270—27-6-93.

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Drawn by K.P. Dass.

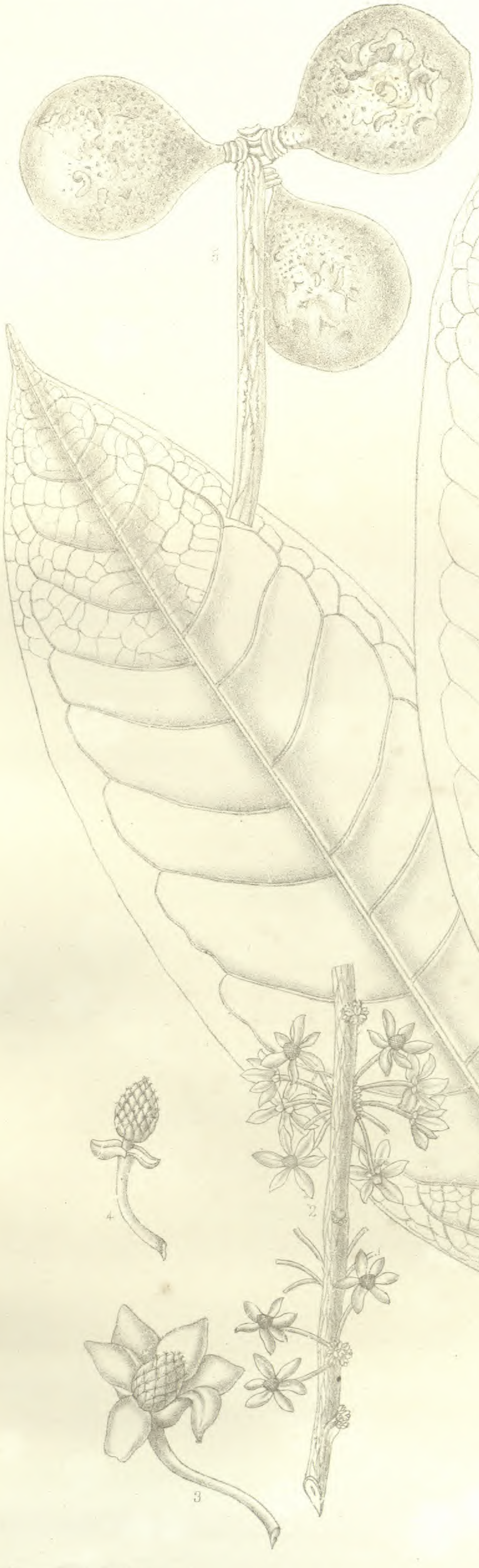
3TELECHOCARPUS PUNCTATUS, King.

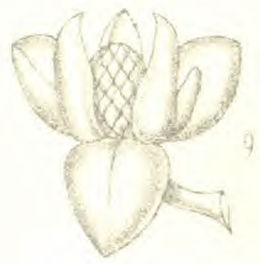
Lith. by B.K.Roy

Drawn by G. C. Dass.

STELECHOCARPUS NITIDUS, King.

Lith. by B. K. Roy.





Drawn by A. D. Molla.

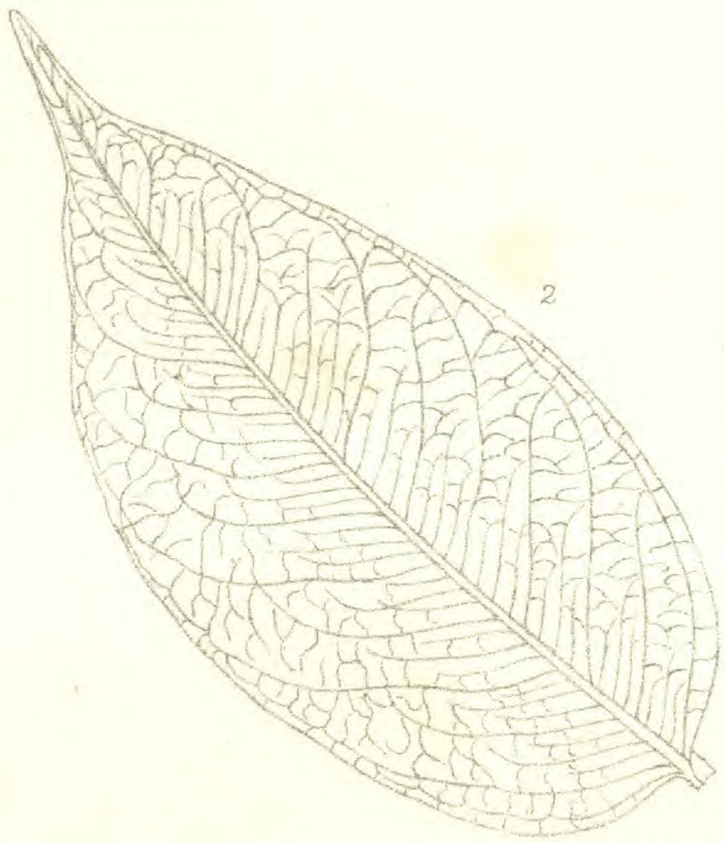
STELECHOCARPUS BURAHOL Blume.

Lith. by A. C. Singha.

Drawn by K.P. Dass.

UVARIA LAREP, Miq.

Lith. by P. N. Sinha



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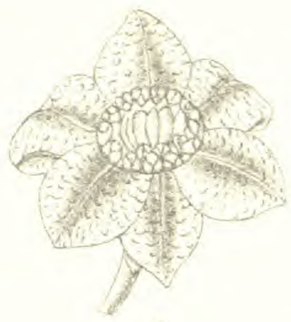

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Drawn & lith. by A. D. Molla.

UVARIA SPHENOCARPA, H. f. and T.

Drawn by K.P. Dass.

UVARIA HAMILTONI, H.f and T

Lith by A.D Mehta.

Drawn by D. N. Chowdory. Lith. by K. H. Das.

UVARIA BRACTEATA, Roxb.

Drawn by G.C.Dass.

UVARIA DULCIS, Dun.

Lith. by A.C.Sanyal.

Drawn by D. N. Chowdory.

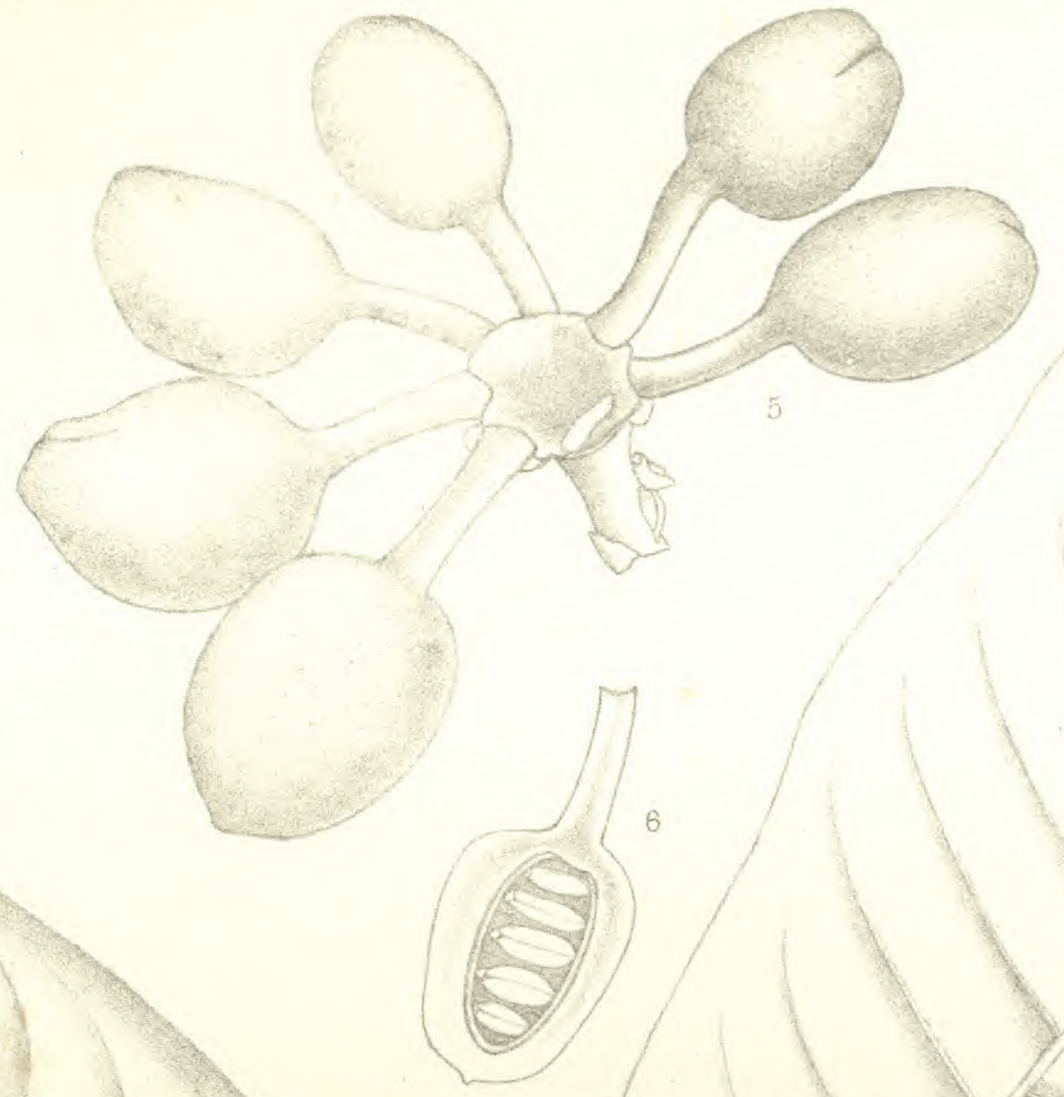
UVARIA LOBBIANA, H. f. and T.

Ann. Roy. Bot. Gard Calcutta, Vol. 4, PLATE 10.

Drawn by A. D. Molla.

UVARIA MACROPHYLLA, Roxb.

Lith by B. K. Roy



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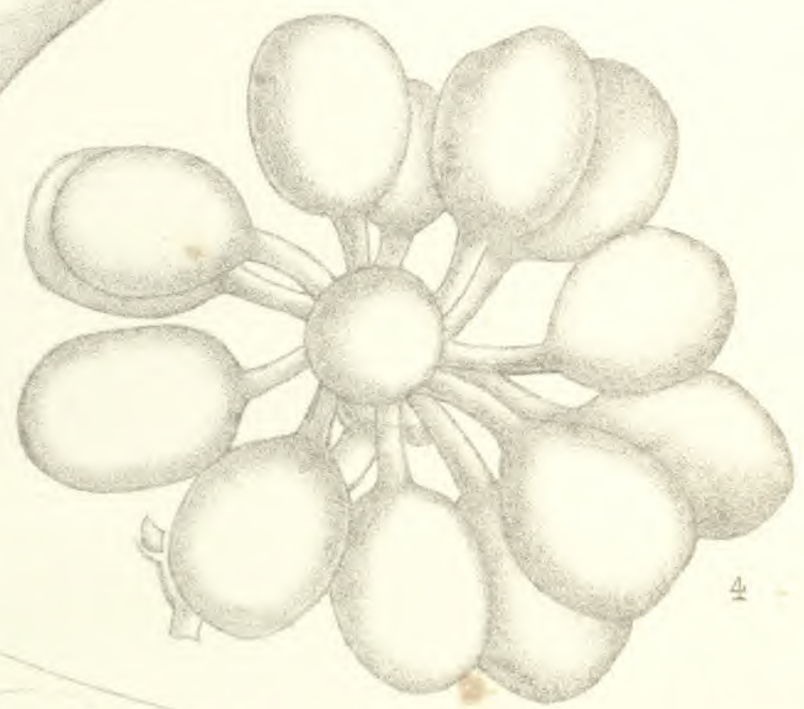

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Drawn by K.P. Dass.

UVARIA SEMECARPIFOLIA, H. f. and T.

Lith. by K. H. Das.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 12.

Drawn by A. L. Singh.

UVARIA PURPUREA, Blume.

Lith by P. N. Sinha.

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Drawn by A.L. Singh.

UVARIA OVALIFOLIA, Blume.

Lith. by T. N. Sinha.

Ann. Roy. Bot. Gard. Calcutta. Vol. 4, PLATE 14.

Drawn by K.P. Dass.

UVARIA HIRSUTA, Jack.

Lith. by B. K. Roy.

Drawn by A.L. Singh.

UVARIA FERRUGINEA, Ham.

Ann. Roy. Bot. Garden, Calcutta, Vol. 4. PLATE 16.

Drawn by A. D. Molla.

UVARIA PAUCI-OVULATA, H. f. and T.

Lith. by A. C. Singha.

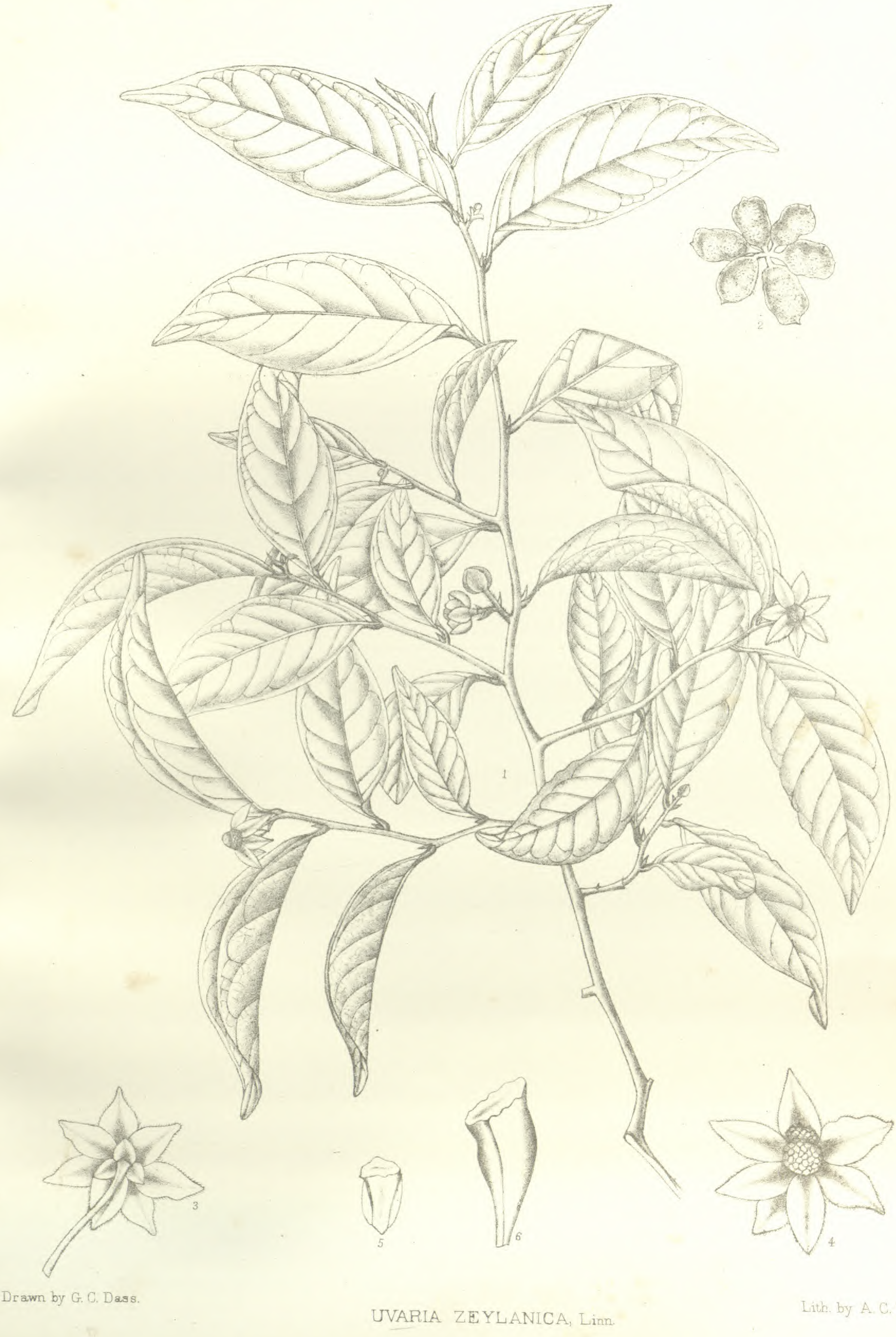
Drawn by G. C. Dass.

Litho by K. P. Das.

UVARIA SCORTECHINII, King.

Drawn by A. D. Molla.

UVARIA MICRANTHA, H. f. and Th.



Drawn by G. C. Dass.

UVARIA ZEYLANICA, Linn.

Lith. by A. C. Mukerjei.

Drawn by K. P. Dass.

UVARIA MACROPODA, H. F. and T.

Lith. by B. K. Roy.

Drawn by K.P. Dass.

UVARIA MACROPODA, H. f. and T.

Drawn by A. L. Singh.

UVARIA NARUM, Wall.

Lith. by A. D. Molla.

Drawn by G.C. Das.

Lith. by K.M. Das.

UVARIA HOOKERI, King.

Drawn by A. L. Singh.

UVARIA LURIDA, H. f. and T. VAR SIKKIMENSIS.

Lith by A. C. Mukerjee

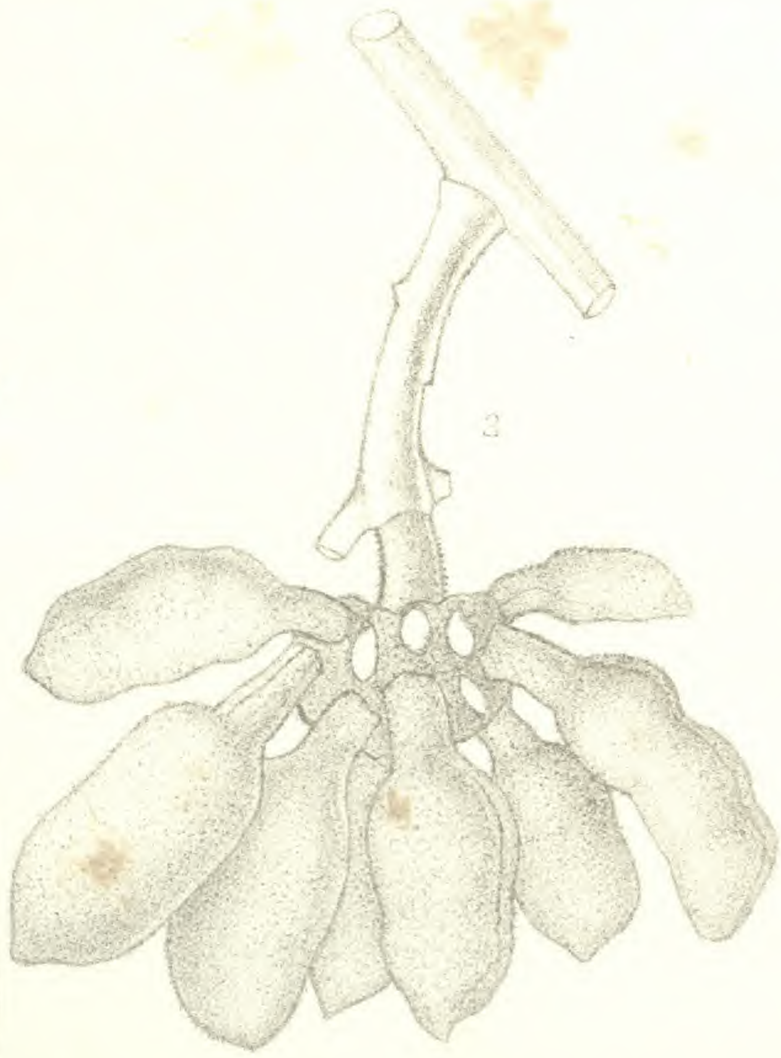
Drawn by A.D. Molla.

UVARIA RIDLEYI, King.

Lith: by A. C. Mukerjei.

UVARIA CURTISII, King.

3



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Drawn by D. N. Chowdory.

UVARIA ANDAMANICA, King.

Litho by K. H. Dass.

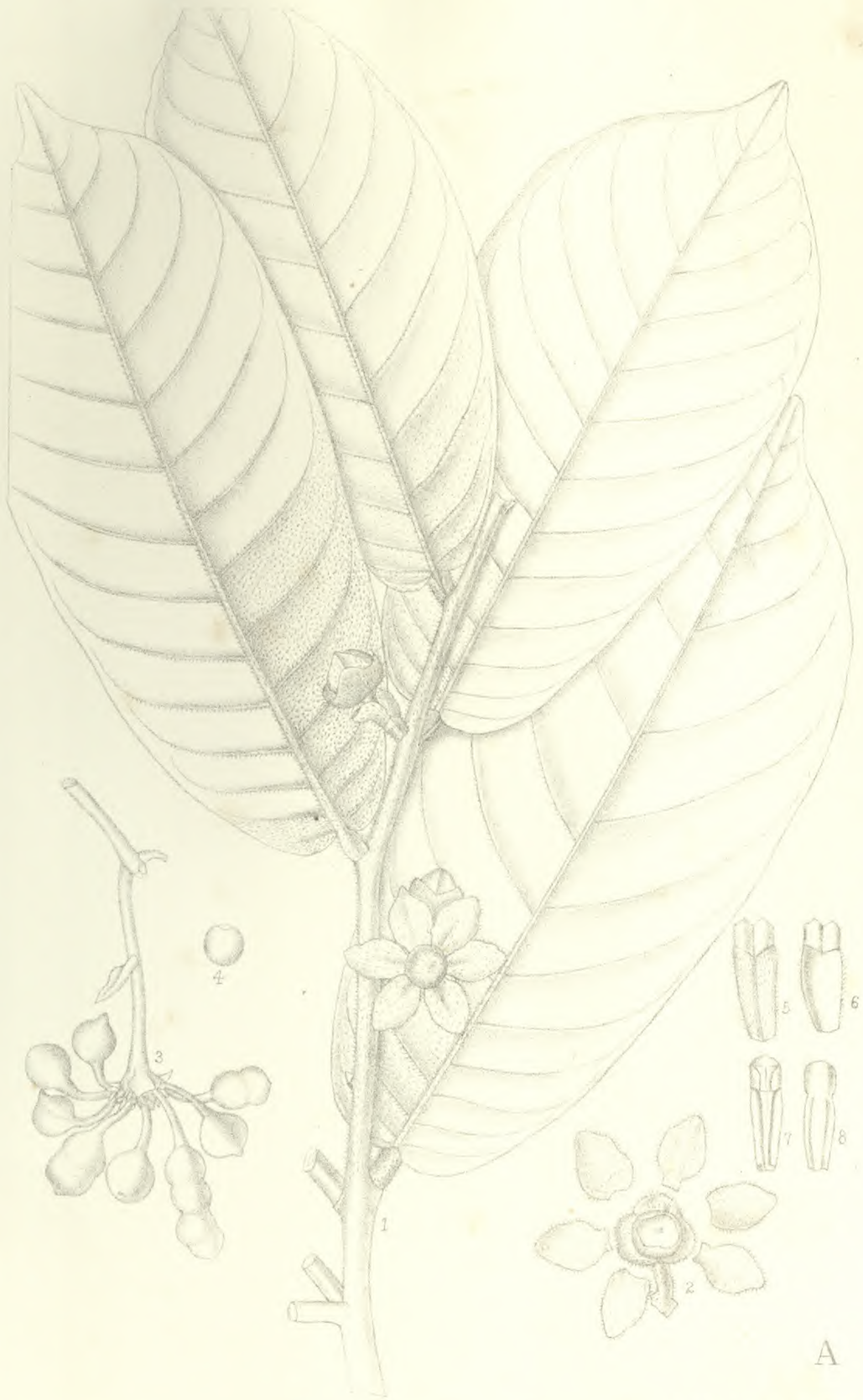
Drawn by A. L. Singh.

UVARIA EXCELSA, Wall.

Lith by E. H. Das.

Drawn by A. L. Singh.

ELLIPEIA GLABRA, H.f. & T.



Lith. by A. C. Mukerjei.

UVARIA ASTROSTICTA, Miq.

UVARIA PTYCHOCALYX, Miq.

Lith. by A. C. Mukerjee

Drawn by D.N. Choudhary.

ELLIPEIA CUNEIFOLIA, H f. and T.

Lith. by Chitra Silpi C[illegible]

Drawn by A.L. Singh.

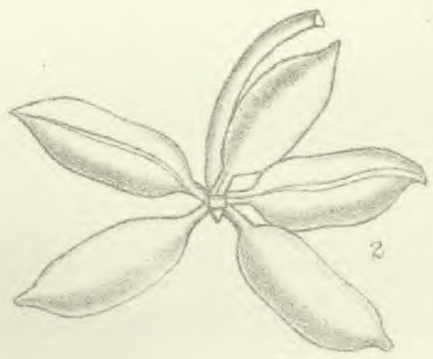
ELLIPEIA LEPTOPODA, King.

Lith by B.K.Roy.

Drawn by M. Smith.

ELLIPEIA COSTATA, King.

Lith. by A. C. Mukerjei



Drawn by K.P. Dass.

ELLIPEIA PUMILA, King.

Lith. by A.T. Mallik.

Drawn by G. C. Dass.

ELLIPEIA NERVOSA, H. f. & Th.

Lith. by A. C. Singha

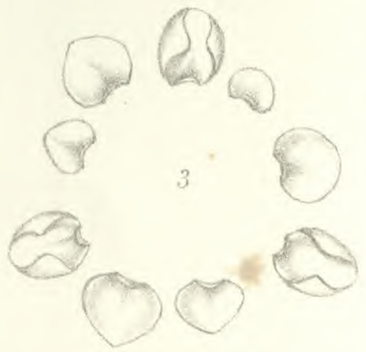
Drawn by A.D. Molla.

SAGERAEA ELLIPTICA, H. f. & Th.

Lith: by A.C. Singha.

b

SAGERÆA LAURINA, Dalz.



A

SAGERÆA LISTERI, King.

Lith: by Chitra Silpi Cº.

King, Anonaceæ.

Drawn by A.D. Molla.

SAGERÆA THWAITESII, H. f. & Th.

Lith: by P. N. Sinha.

Drawn by K. P. Dass.

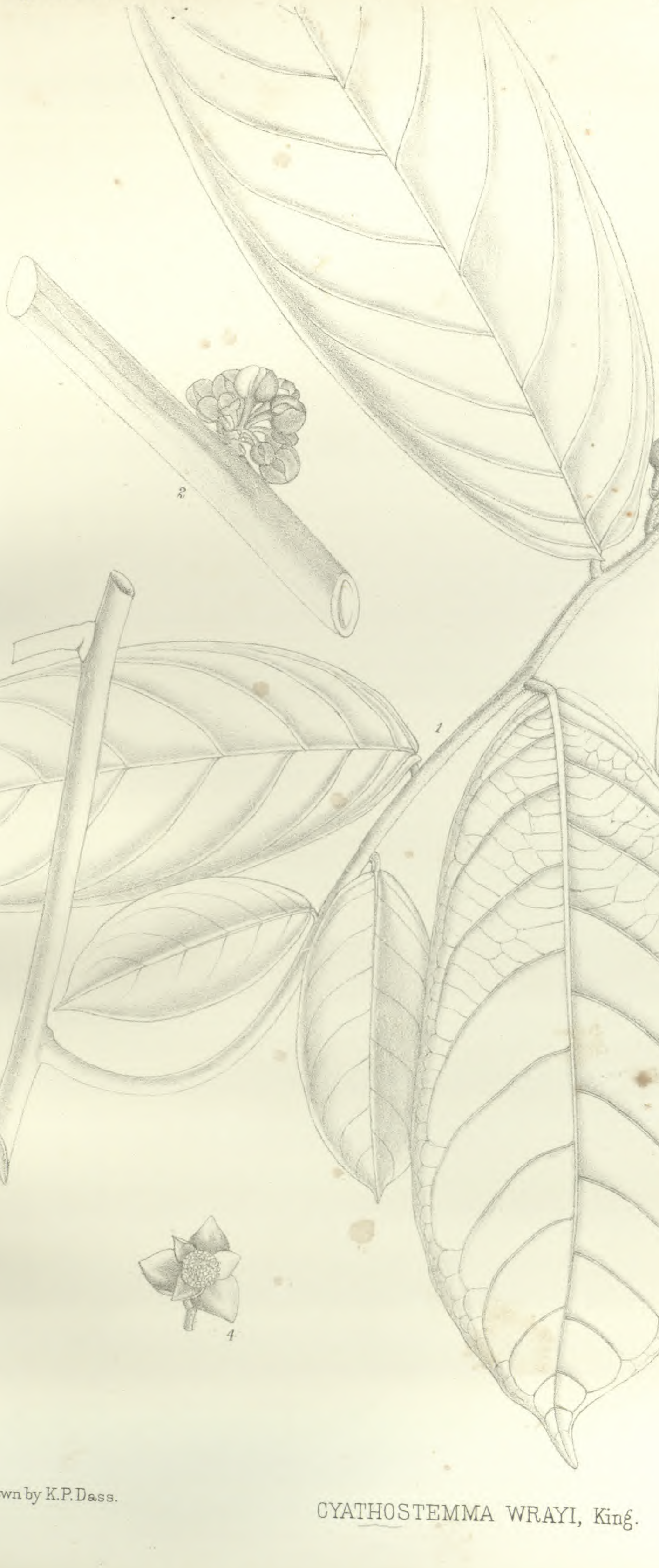
CYATHOSTEMMA VIRIDIFLORUM, Griff..

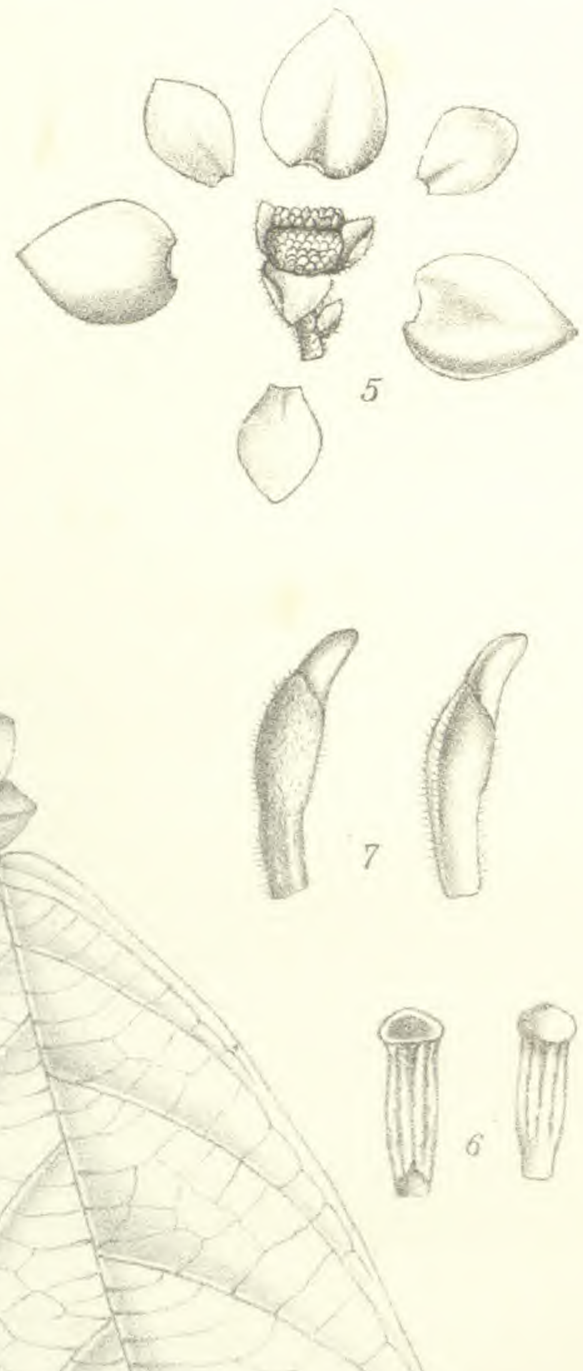
Lith. by K. P. Dass.

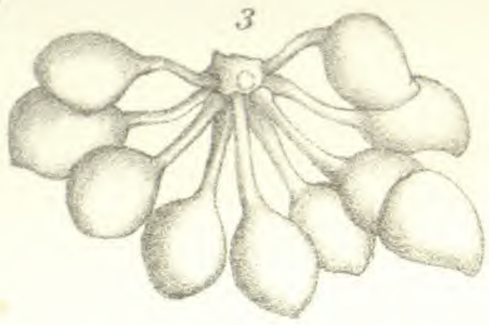
Drawn by G.C. Dass.

CYATHOSTEMMA SCORTECHINII, King.

Lith. by K. H. Das.







Drawn by K.P. Dass.

CYATHOSTEMMA WRAYI, King.

Lith: by A. C. Singha.

Drawn by A.D.Molla

CYATHOSTEMMA HOOKERI, King.

Lith by Chitra Silpi Cal

Drawn by G. C. Dass.

GYATHOSTEMMA ACUMINATUM, King.

Lith. by Chitra Sikpi Co.

Drawn by G. C. Dass.

Lith by A. C. Singha

CYATHOCALYX ZEYLANICUS, H. F. and T.

Drawn by G. C. Dass.

Lith. by A. C. Roychowdhury.

CYATHOCALYX MARTABANICUS, H. F. and T.

Drawn by A.D. Molla.

Lith. by A. C. Mukerjee

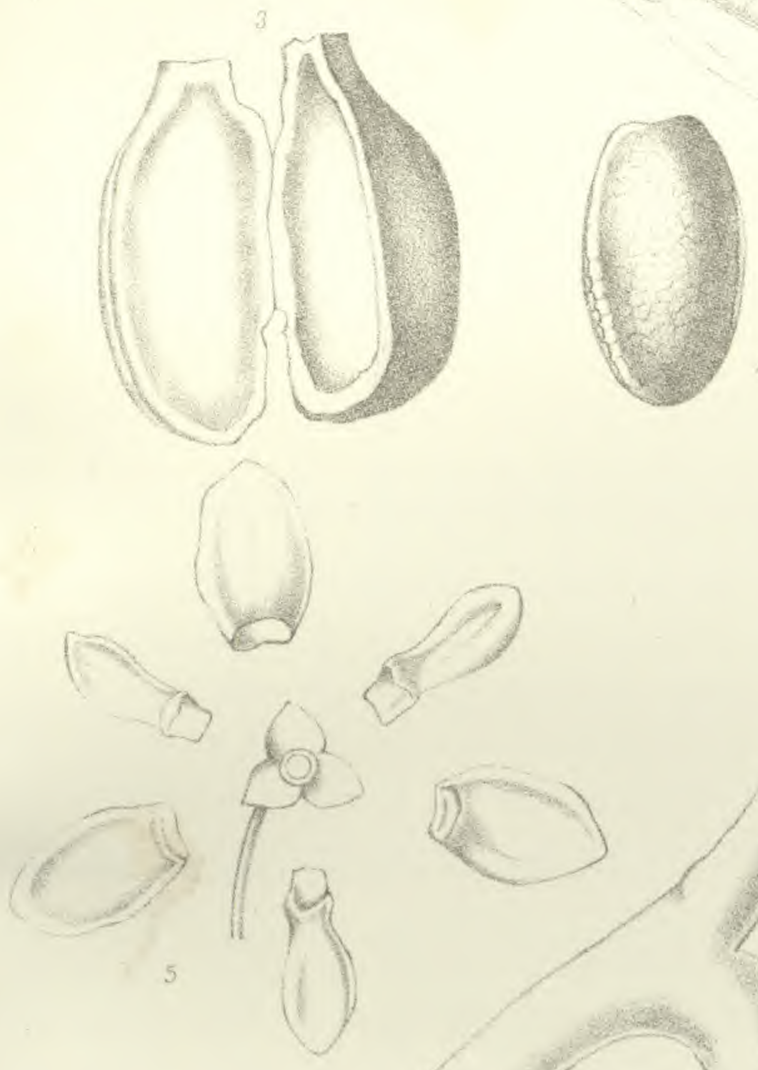
~~CANANGA VIRGATA, Hook. fil. and Thoms.~~

CYATHOCALYX VIRGATUS, King.

Drawn by R.K.Dass.

CYATHOCALYX MAINGAYI, Hf. and Th.

Lith. by Cintra, Calcutta.



Drawn by A.L. Singh.

ARTABOTRYS ~~MACROPHYLLUS,~~ King.

GRANDIFOLIUS.

Lith. by K.D. Chundra

Drawn by D. N. Choudhary

ARTABOTRYS KURZII, H. F. and T.

Lith. by K. D. Chundra

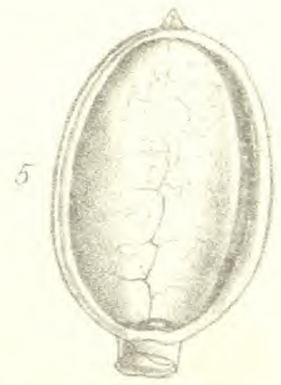
Drawn by A. D. Molla.

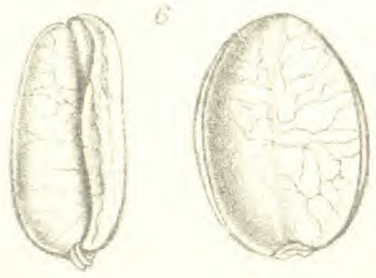
ARTABOTRYS SCORTECHINII, King.

Lith. by J. C. Chuckerbutty.

M. Smith delt.

ARTABOTRYS PLEUROCARPUS, H. f. & Th.





Drawn by K.P. Dass.

Lith by J. C. Chuckerbutty.

ARTABOTRYS VENUSTUS, King.

Drawn by K.P. Dass.

ARTABOTRYS CRASSIFOLIUS, H.f. & Th.

Lith. by A.C. Sengha.

Drawn by G.C.Dass.

ARTABOTRYS OBLONGUS, King.

Lith. by J. C. Chuckerbutty.

Drawn by W. D. Alwiss.

ARTABOTRYS ZEYLANICUS, H. f. and T.

Lith. by S. P. Roy.

King: Anonaceæ.

Drawn by G.C. Dass.

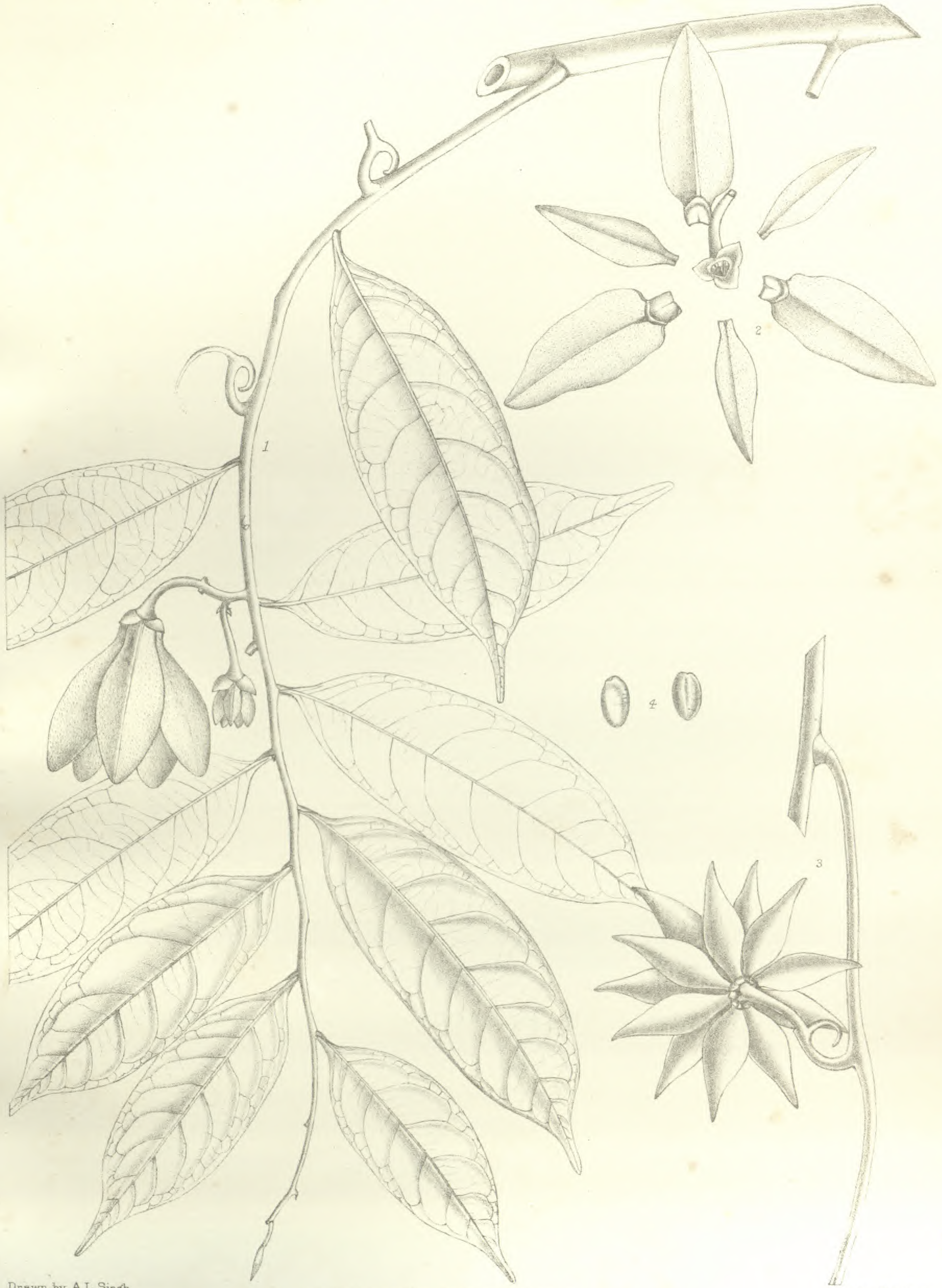
Lith by A.C. Gupta

ARTABOTRYS LOWIANUS, Scort.

Drawn by A.D. Molla.

ARTABOTRYS ODORATISSIMUS, R. Br.

Lith. by B.K.Roy.



Drawn by A.L.Singh.

ARTABOTRYS OXYCARPUS, King.

Luth by B K Roy

Drawn by K.P. Dass.

ARTABOTRYS SPECIOSUS, Kurz.

Lith. by B. K. Roy

Drawn by M. Smith.

Lith. by S. Kurz.

ARTABOTRYS MAINGAYI, Hook. fil. and Th.

Drawn by A.L. Singh.

ARTABOTRYS CAUDATUS, Wall.

Lith. by A.C. Singha.

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Drawn by A.L. Singh.

Lith. by [illegible]

ARTABOTRYS GRACILIS, King.

Drawn by A. D. Molla.

ARTABOTRYS SUAVEOLENS, Blume.

Drawn by C.C. Dass.

ARTABOTRYS BURMANICUS, A. DC.

Drawn by D. N. Chowdory.

Lith. by K. H. Das.

ARTABOTRYS COSTATUS, King.

Drawn by A. D. Molla.

ARTABOTRYS WRAYI, King.

Lith. by Chitra Salpi

Drawn by A. L. Singh.

DREPANANTHUS PRUNIFERUS, Maing.

Lith by P. N. Sinha.

Drawn by A. L. Singh.

DREPANANTHUS RAMULIFLORUS, Maing.

Lith. by P. M. Sinha

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Drawn by D. N. Chowdory. Litt. by K. H. Das.

~~CANANGA ODORATA, H. f. and Th.~~

CANANGIUM ODORATUM, Baill.

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Drawn by A.L. Singh.

CANANGIUM SCORTECHINII, King.

Lith. by Chitra. Silpi Co.

Drawn by A. D. Molla.

UNONA ELEGANS, Thwaites.

Drawn by G. C. Deas.

UNONA ŽEYLANICA, Hook. fil. and Thoms.

Lith. by A. C. Mukerjea

Drawn by G. C. Dass.

UNONA DUNALII, Wall

Lith. by A. C. Mukerjee

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Drawn by D. N. Chowdhari.

UNONA PANNOSA, Dalz.

Lith: by Chitra Silpi Co

Drawn by K. P. Dass.

UNONA DESMOS, Dunal.

Lith by Chuni Bhpi

Drawn by G. C. Dass.

UNONA DISCOLOR, Roxb.

Lith. by J. C. Chuckerbutty

Drawn by K. P. Dass.

UNONA VIRIDIFLORA, Bedd.

Lith. by J. C. Chuckerbutty.

Drawn by G. C. Dass.

UNONA DUMOSA, Roxb.

Lith. by B K Roy

Drawn by D.N. Chowdhary

Lith: by P.N. Sinha.

POLYALTHIA SUBEROSA, Bth & H. f.

Drawn by A.L. Singha.

UNONA LAWII, H. f. & Th.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 78.

Drawn by A. D. Molla.

UNONA LATIFOLIA, H. f. & T.

Lith: by P. N. Sinha.

M. Smith delt.

UNONA PRÆCOX, H.f. & Th.

King, Anonaceæ.

Drawn by G. C. Dass.

UNONA LONGIFLORA, Roxb.

Lith. by A. C. Singha.

Drawn by D.N. Choudhary.

UNONA DASYMASCHALA, Blume.

Lith. by K. D. Chandra.

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Drawn by D.N. Chowdhari.

UNONA WRAYI, Hemsl.

Lith. by Chitra Gilpi (P)

Drawn by A.L. Singh.

Litho by Chitra Silpi Pvt.

UNONA DESMANTHA, H.f.and Th.

Drawn by A.D.Molla.

Lith: by P. N. Sinha.

UNONA CRINITA, H.f. & Th.

Drawn by A.D.Molla

Litho by P. N. Sinha

UNONA STENOPETALA, H.f. & Th.

B

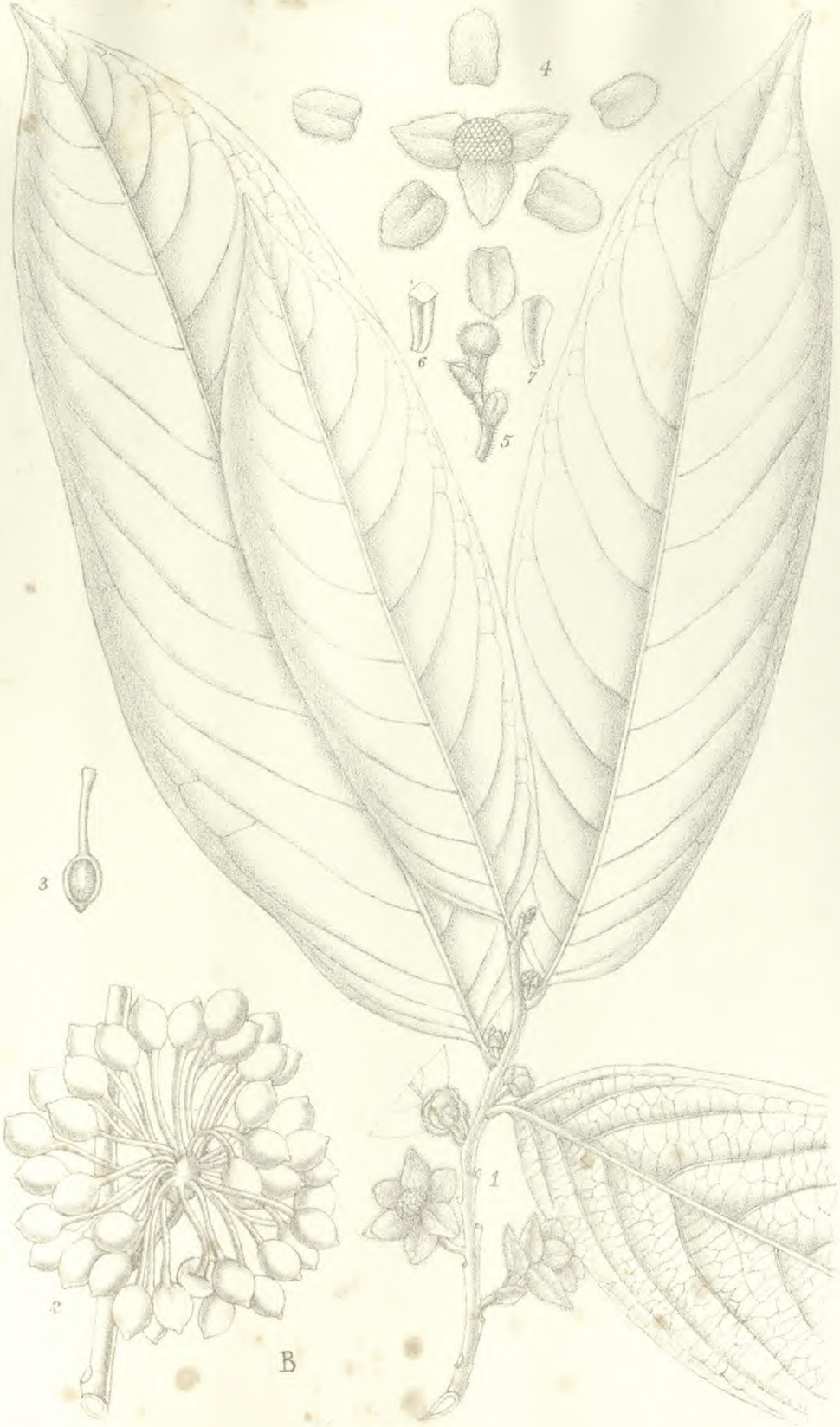
Drawn by A. D. Molla.

POLYALTHIA CERASOIDES, Benth. & H.f.

A

POLYALTHA DUMOSA, King.

Lith: by J. C. Chuckerbutty.



Drawn by D.N. Chowdhury.

POLYALTHIA KUNSTLERI, King.

Drawn by G. C. Dass.

Lith: by J. C. Chuckerbutty.

POLYALTHIA PERSICAEFOLIA, Bth.&H.f.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 87.

Drawn by A.L. Singh.

POLYALTHIA HYPOLEUCA, Hook. fil. & Th.

Lith. by B. K. Roy.

Drawn by A.D. Molla.

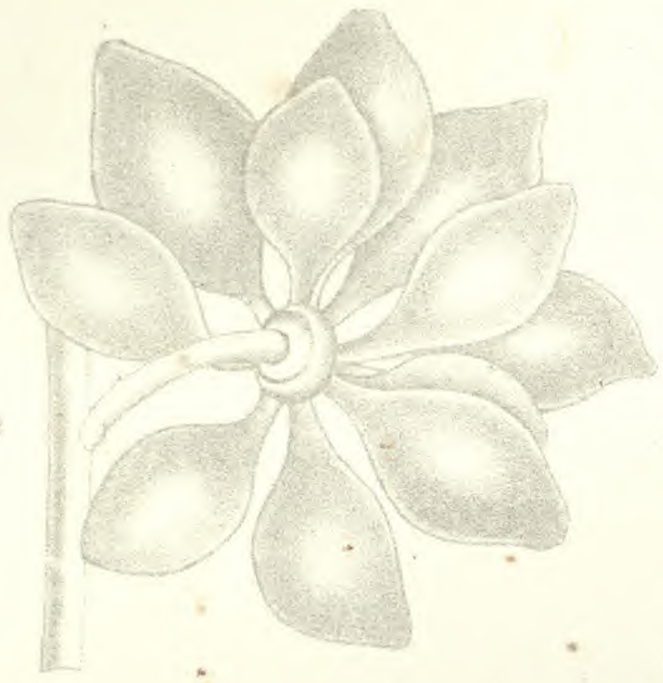
POLYALTHIA SUMATRANA, King.

Lith. by B. K. Roy

Drawn by K. P. Dass.

POLYALTHIA ANDAMANICA, Kurz.

Lith. by B. K. Roy.



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Drawn by T. Alwiss.

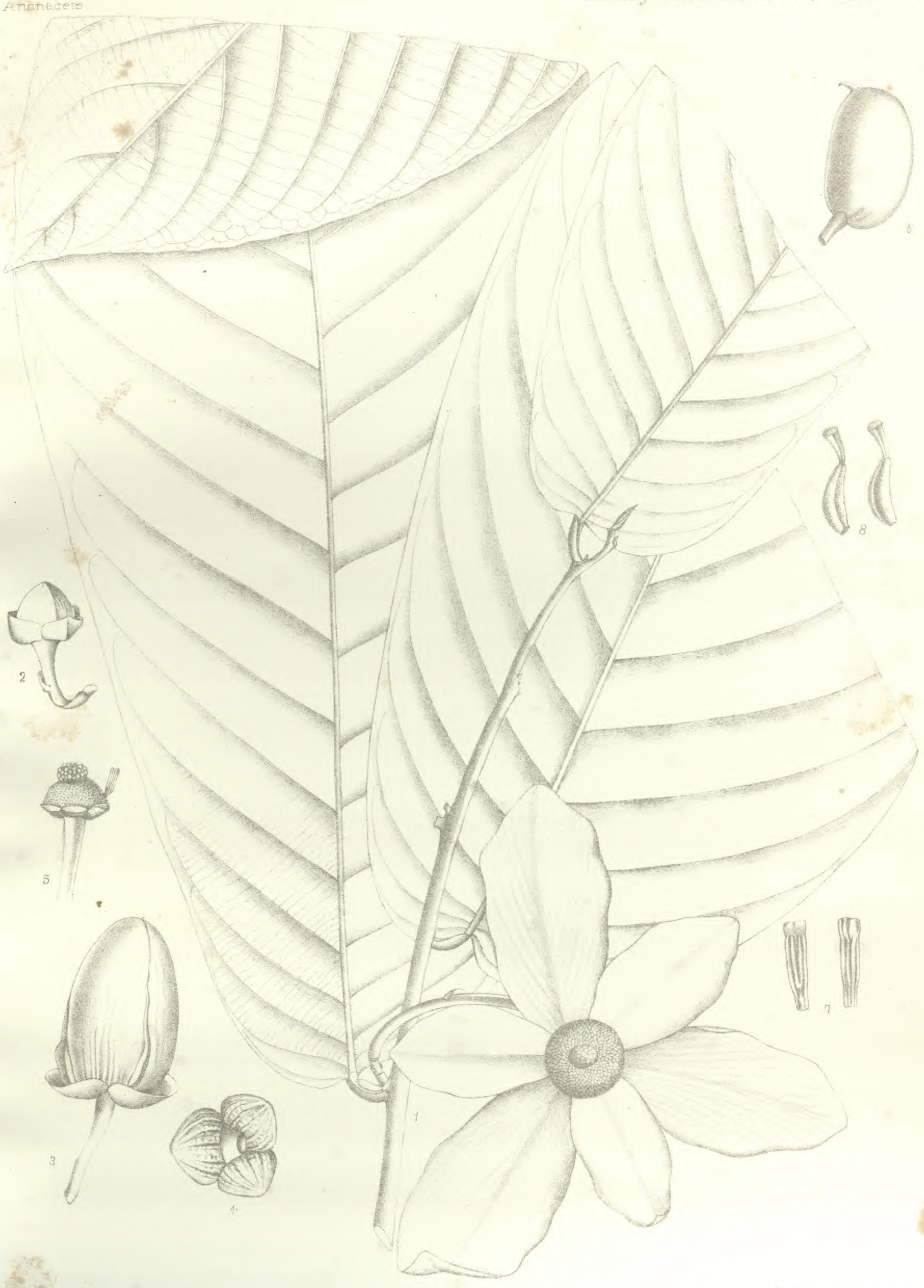
Lith. by K. D. Chunder.

POLYALTHIA COFFEOIDES, Hook. fil & Thoms.

M. Smith delt.

POLYALTHIA NITIDA, Hook. fil. & Th.

Lith. by Chuse, Vepery



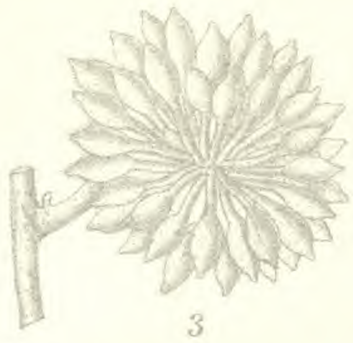
POLYALTHIA MACRANTHA, King.

Lith by K. D. Thomson

Drawn by G. C. Dass.

POLYALTHIA PULCHRA, King.

Lith: by A. D. Molla.



Drawn by A. L. Singh.

Lith. by A. D. Molla.

POLYALTHIA SCORTECHINII, King.

Drawn by A. L. Singh.

POLYALTHIA JENKINSII, Benth. & Hook. fil.

Lith. by A. D. Mella.

Drawn by K.P.Dass.

POLYALTHIA HOOKERIANA, King.

Lith by P. N. Sinha.

Drawn by G. de Alwis.

POLYALTHIA ACUMINATA, Thwaites.

Lith by P. N. Sinha.

King, Anonaceæ.

Ann. Roy. Bot. Garden, Calcutta. Vol. 4, PLATE 99.

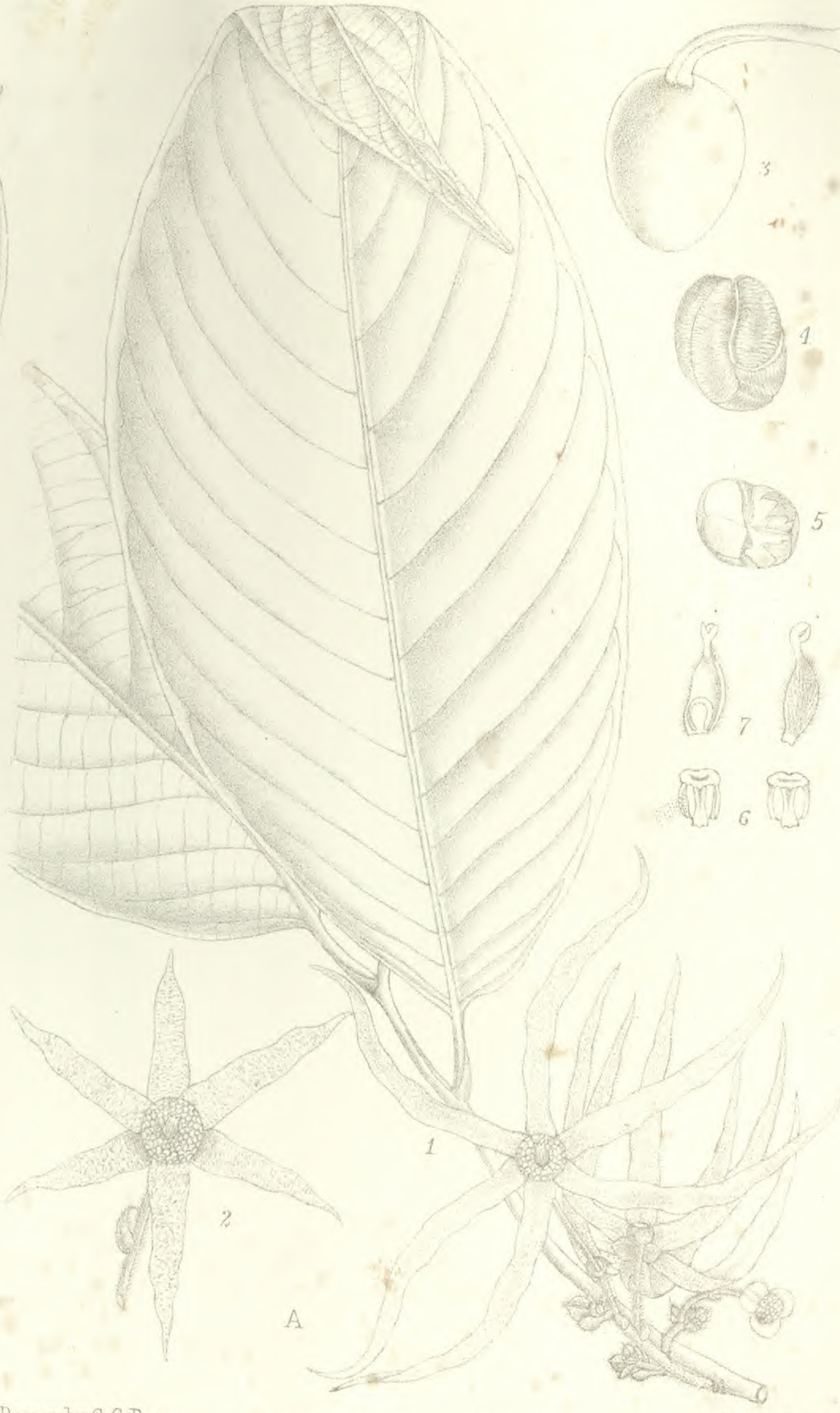
Drawn by K.P.Dass.

POLYALTHIA LONGIFOLIA, Benth. & Hook. fil.

Litho by Thos. Smith

Drawn by A. D. Molla.

POLYALTHIA OBLIQUA, H.f. & Th.



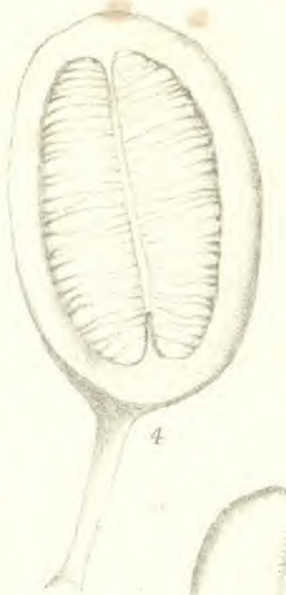
Drawn by G. C. Dass.

POLYALTHIA FRAGRANS, Bth.. & H. f.

Lith: by J. C. Chuckerbutty.

Ann. Roy. Bot. Gard. Calcutta. Vol. 4. PLATE 100.

Ann. Roy. Bot. Garden, Calcutta, Vol 4, PLATE 101.



Drawn by G. C. Dass.

POLYALTHIA SIMIARUM, Benth. & Hook. fil.

Lith by Chitra Silpa Co.

Drawn by A. D. Molla

POLYALTHIA LATERIFLORA, King.

M. Smith del.

POLYALTHIA SCLEROPHYLLA, H.f. & Th.

Lith. by Chunra Gupt[illegible]

Drawn by A.L. Singh.

POLYALTHIA MACROPODA, King.

Drawn by D. N. Chowdhary

POLYALTHIA CLAVIGERA, King.

Drawn by K.P. Dass.

POLYALTHIA GLOMERATA. King.

Litho by K. K. Das

Drawn by A.D. Molla.

POLYALTHIA CONGREGATA, King.

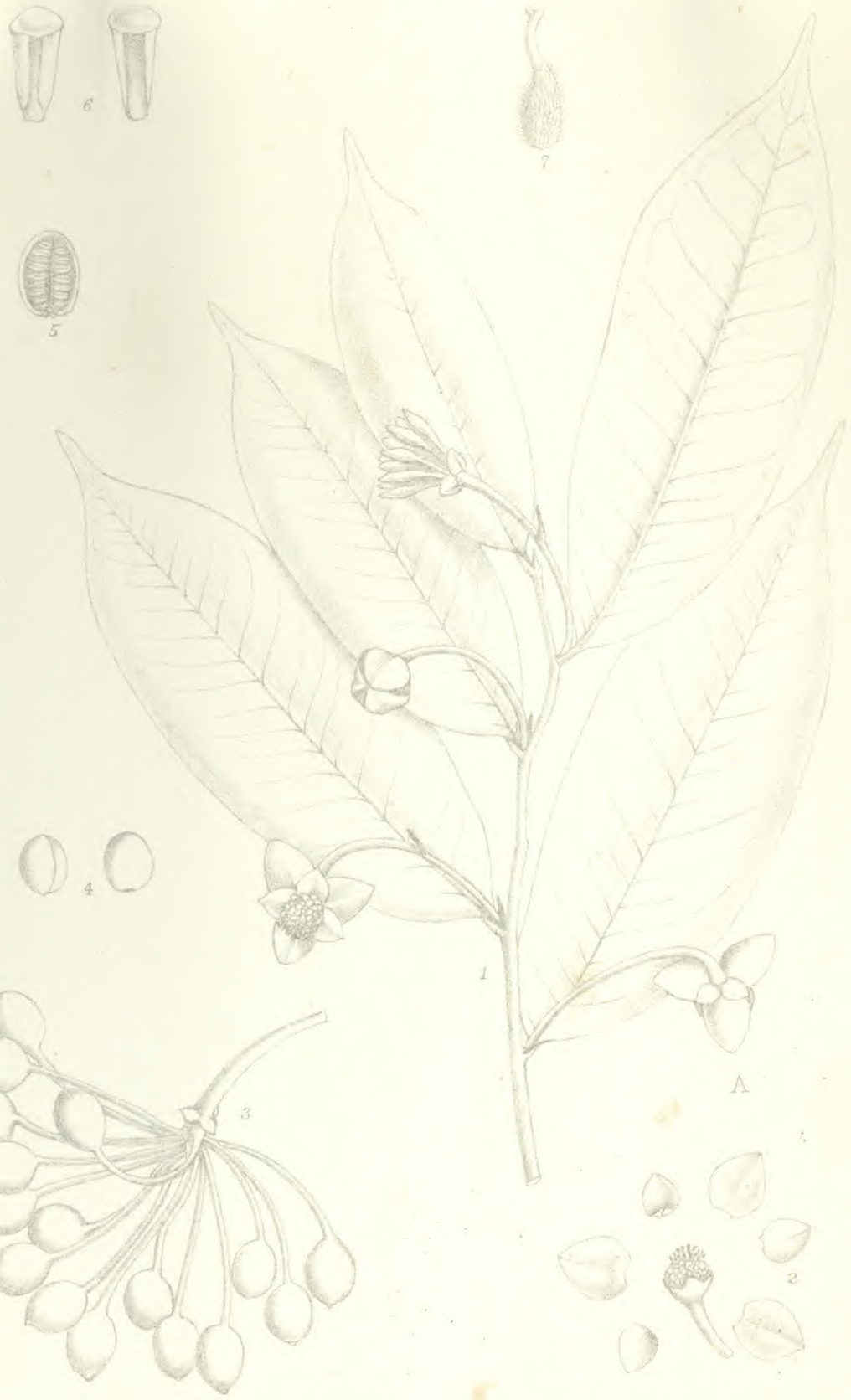
Lith. by Chitra Silpi Co.

Drawn by A. L. Singh.

POLYALTHIA HYPOGÆA, King.

Lith. by Bhuwa Singh Co.

POLYALTHIA MOONII, Thw.



POLYALTHIA ABERRANS, Maing.

Drawn by K.P. Dass

Lith by Chitra Silpi Cª

B

Drawn by K.P. Dass.

POLYALTHIA BECCARII, King.

A

Drawn by A.D. Molla.

Lith. by B.K.Roy.

POLYALTHIA KORINTI, Benth. & H. f.

Drawn by A.D. Molla.

POLYALTHIA BULLATA, King.

Lith. by A. D. Molla.

Drawn by G. C. Dass.

POLYALTHIA SUB-CORDATA, Blume.

Lith. by A. D. Mollo.

Drawn by K. P. Dass.

POLYALTHIA OBLONGA, King.

Lith. by B. L. Roy.

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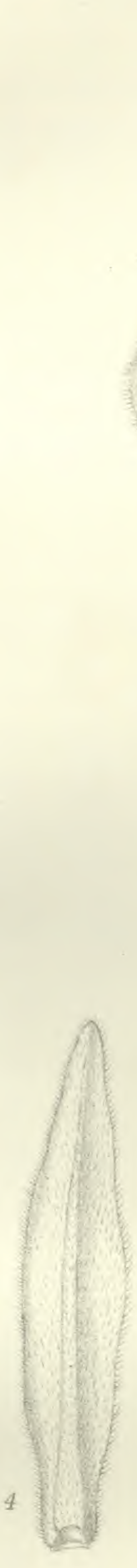

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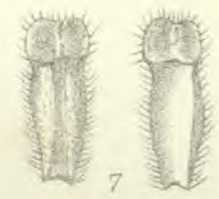

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Drawn by K.P. Dass.

POLYALTHIA CINNAMONEA, H.f. & Th.

Lith. by B. K. Roy.

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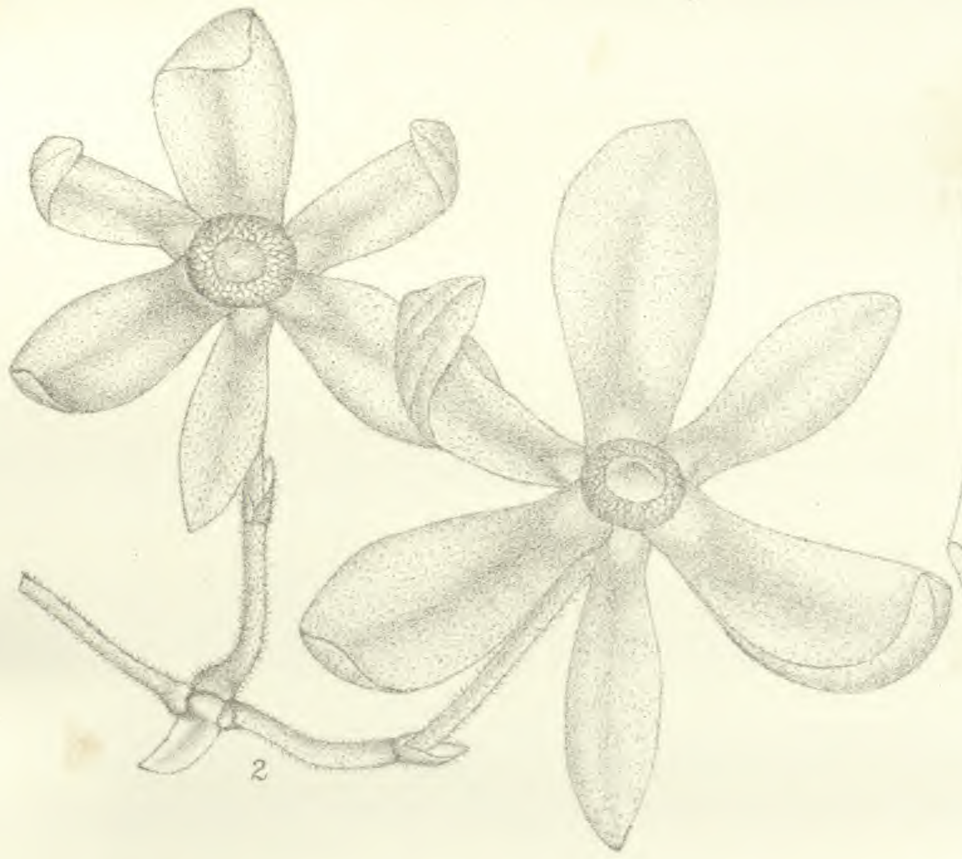

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Drawn by G. C. Dass.

POLYALTHIA PACHYPHYLLA, King.

Lith: by J. C. Chuckerbutty.

M. Smith delt.

POLYALTHIA CAULIFLORA, H.f. & Th.

Lith. by Chitra Silpi Co.

Drawn by M. Smith.

POLYALTHIA PYCNANTHA, King.

M. Smith delt.

POLYALTHIA RUFESCENS, H.f.& Th.

Litho by A. D. Mitra

M. Smith delt.

UVARIA SUBREPANDA, Wall.

Lith. by H. P. Ray

Drawn by A.L. Singh.

DISEPALUM LONGIPES, King.

Drawn by G.C.Dass

Lith: by J. C. Chuckerbutty.

ANAXAGOREA LUZONIENSIS, A.Gray.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 118.

Drawn by G. C. Dass.

ANAXAGOREA SCORTECHINII, King.

Lith. by A. C. Singha.

Drawn by K.P. Dass.

GONIOTHALAMUS GARDNERI, H.f. & Th.

Lith by A.C. Singha.

Drawn by D. N. Chowdhary.

GONIOTH. SUB-EVENIUS, King.

Drawn by A. D. Chowdhary.

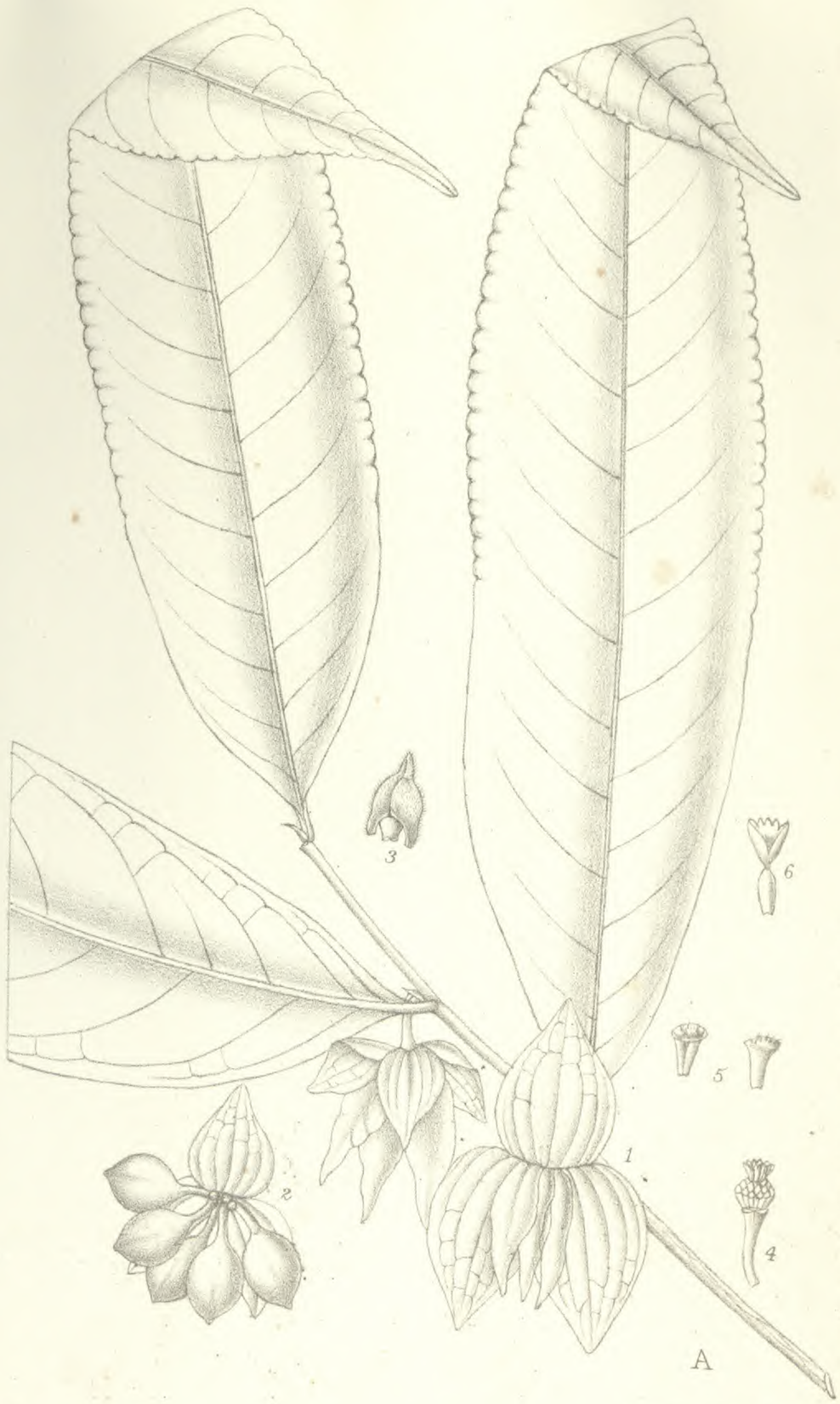
GONIOTH. THWAITESII, H.f. Th.

Lith: by J. C. Chuckerbutty.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 121.

Drawn by K.P. Dass.

GONIOTH. WIGHTII, H.f.& Th.



Drawn by A.D. Molla.

GONIOTHAL. TENUIFOLIUS, King.

Lith: by A. C. Singha.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4. PLATE 122.

Drawn by A.L. Singh.

GONIOTHALAMUS PRAINIANUS, King.
VAR. ANGUSTIPETALA.

Lith. by P. N. Sinha.

Drawn by G. C. Dass.

GONIOTHALAMUS KUNSTLERI, King.

Lith by P. M. Sinha.

M. Smith delt.

GONIOTHALAMUS WALKERI, H.f.&Th.

Drawn by K.P. Dass.

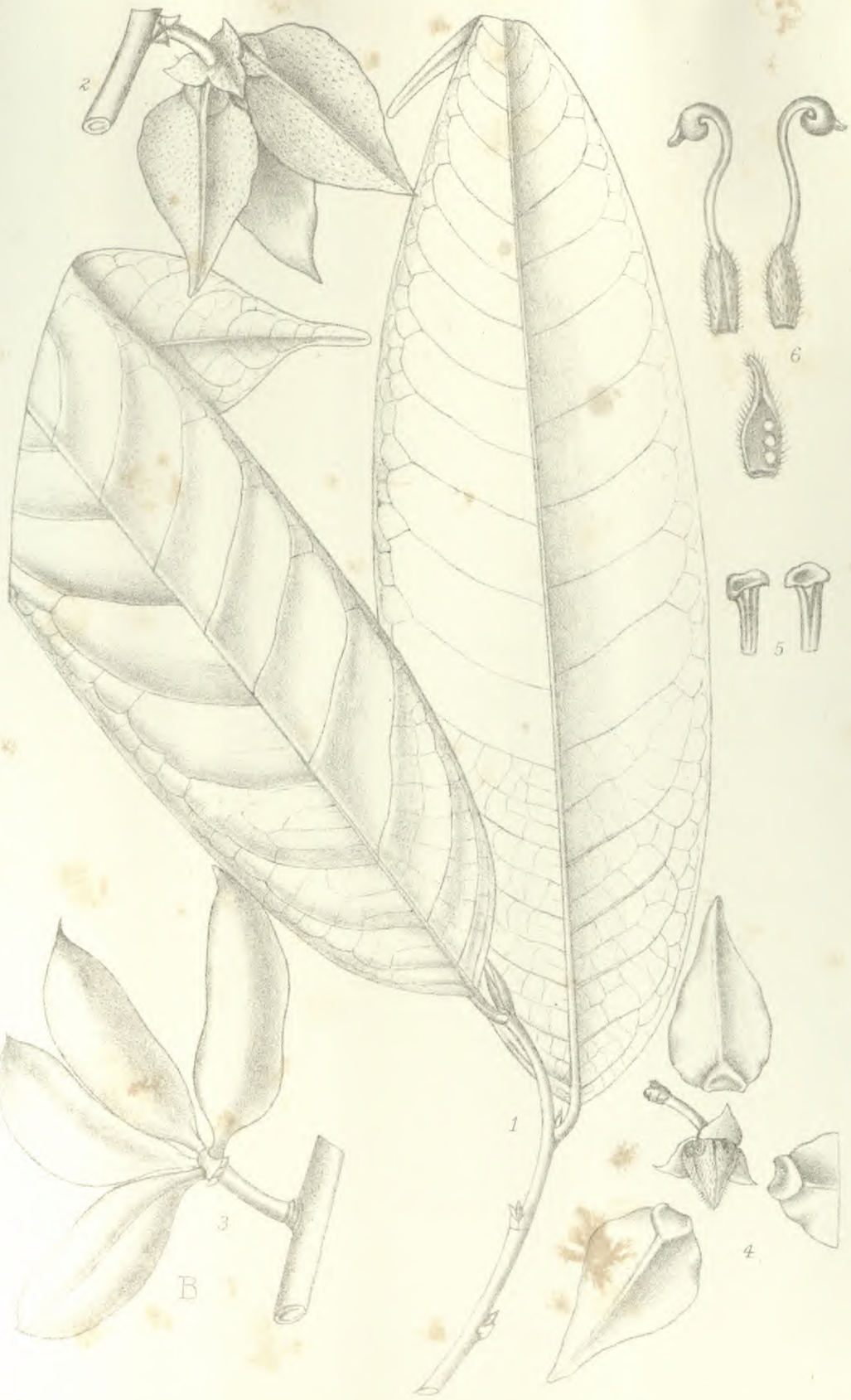
GONIOTHALAMUS RETICULATUS, Thw.

Lith by P. N. Sinha.

Drawn by J.D.Alwiss.

GONIOTHALAMUS THOMSONII, Thw.

Lith by A. C. Mukerjee.



Drawn by G.C.Dass.

GONIOTHALAMUS MALAYANUS, H.f.& Th.

Lith by A.C. Mukerjei.

GONIOTHALAMUS WYNAADENSIS, Bedd.

Drawn by G. C. Dass.

GONIOTHALAMUS CARDIOPETALUS, H.f. & Th.

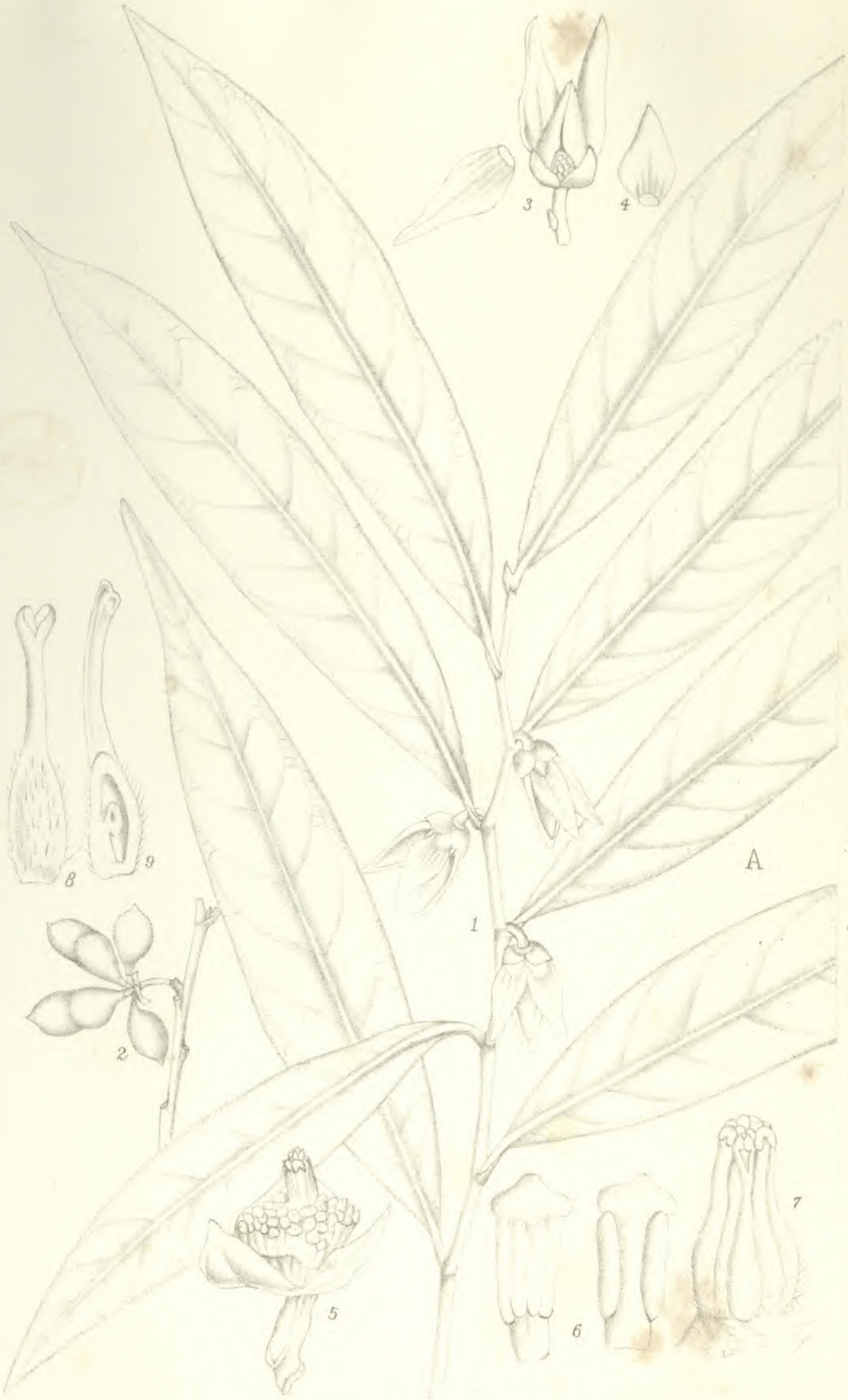
Lith by B. K. Roy

Drawn by A. L. Singh.

GONIOTHALAMUS GIGANTEUS, H.f. & Th.

Lith. by A. C. Mukerjee.

OROPHEA SETOSA, King.



GONIOTH. SALICINUS, H. f. & Th.

Drawn by A. D. Chowdhary.

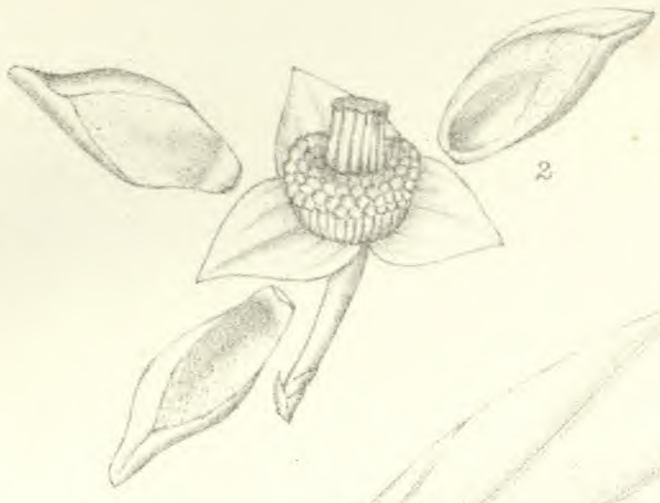
Lith: by P. N. Sinha.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 131.

Drawn by G. C. Dass.

GONIOTHALAMUS MACROPHYLLUS, H. f. & Th.

Lith. by P. K. Roy.



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Drawn by G.C.Dass.

GONIOTHALAMUS HOOKERI, Thwaites.

Drawn by K.P. Dass.

GONIOTHALAMUS FULVUS, H.f. & Th.

Lith. at P.W.D. Press

Drawn by G. C. Dass.

GONIOTHALAMUS CURTISII, King.

Litho by I. N. Sircar.

Drawn by G. C. Dass.

GONIOTHALAMUS GRIFFITHII, King.

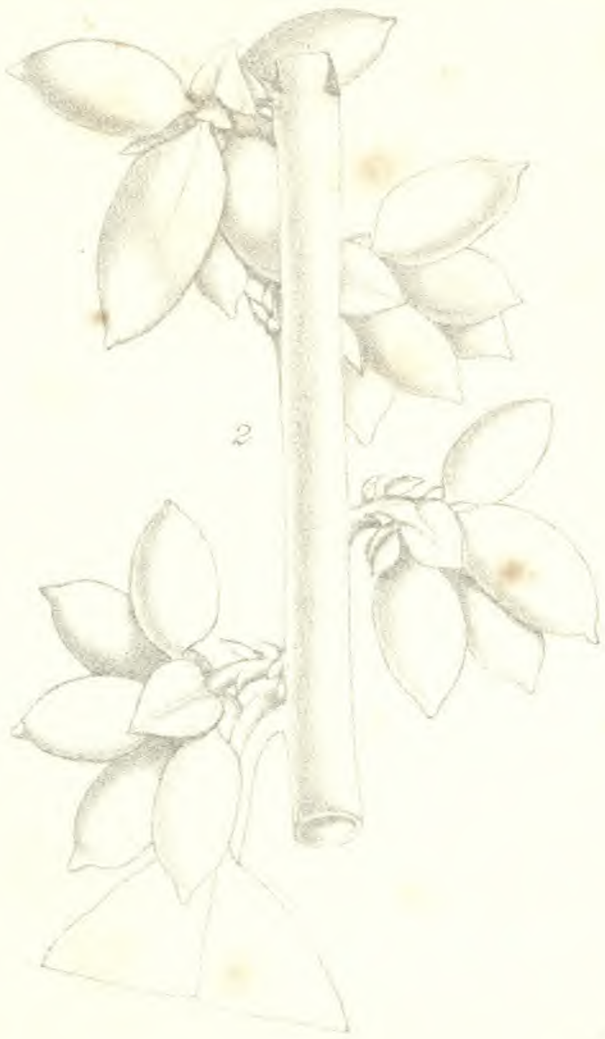
Drawn by G. C. Das.

GONIOTHALAMUS SIMONSII, H. f. and Th.

Lith. by K. H. Das.

Drawn by A.D. Molla.

GONIOTHALAMUS RIDLEYI, King.



Drawn by K. P. Dass.

GONIOTHALAMUS SESQUIPEDALIS, H.f.& Th.

Lith by Chitra Silpa

Drawn by A. L. Singh.

GONIOTHALAMUS TAPIS, Miq.

Lith by Chitra Silpi Cª

Drawn by G. C. Dass.

GONIOTHALAMUS SCORTECHINII, King.

Lith: by Chitra Silpi C2.

Drawn by A.L.Singh.

GONIOTHALAMUS WRAYI, King.

Lith. by A. D. Molla

Drawn by A. L. Singh.

GONIOTHALAMUS UVARIOIDES, King.

Lith. by A. D. Mollá

Drawn by K. P. Dass

OROPHEA THOMSONI, Bedd.

Drawn by A.L. Sing.

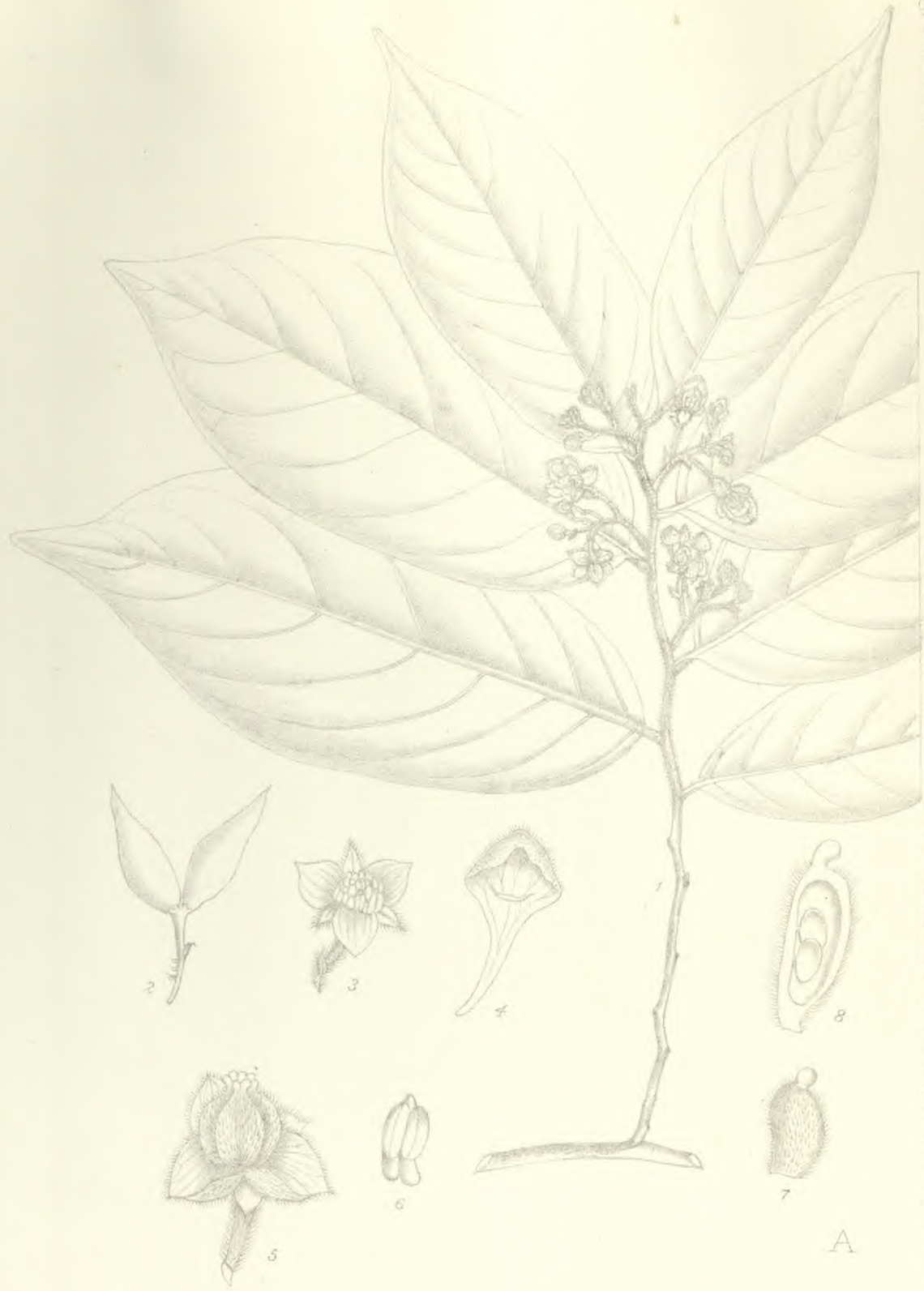
OROPHEA UNIFLORA, H. f. & Th.

Lith by K.D Chundra.

Drawn by D.N. Choudhary.

OROPHEA KATSCHALLICA, Kurz.

Drawn by G.C. Dass.



OROPHEA ERYTHROCARPA, Bedd.

Lith: by Chitra Silpi C^a.

Drawn by J.D. Alwiss

OROPHEA ZEYLANICA, H.f. & Th.

Drawn by D.N. Choudhary

OROPHEA HIRSUTA, King

Lith: by Chitra. Silpi Cr.

Ann. Roy. Bot. Gard. Calcutta, Vol 4, PLATE 146.

Drawn by A. L. Singh

OROPHEA HEXANDRA, Blume

Drawn by G. C. Dass.

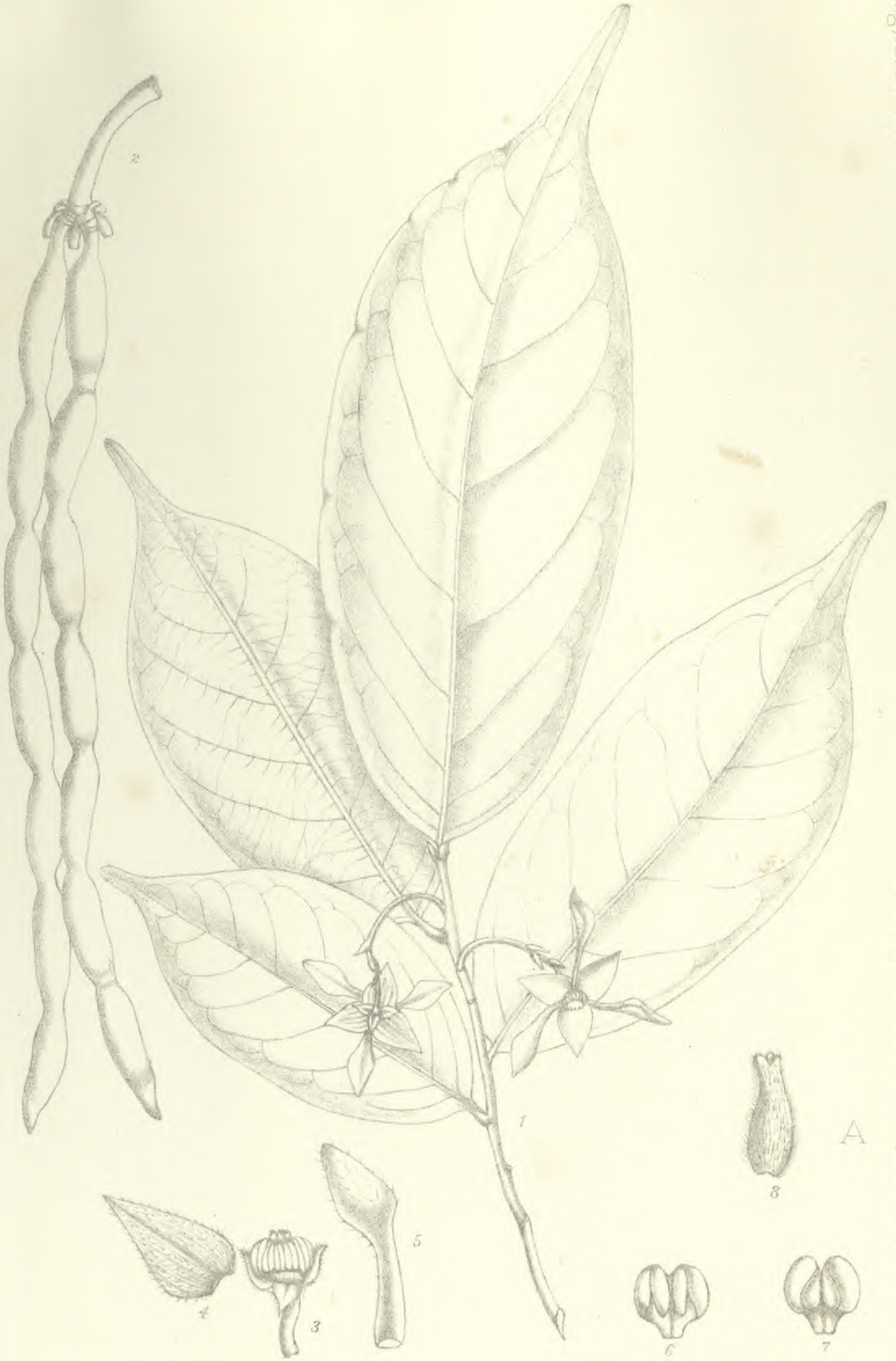
OROPHEA BRANDISII, H.f. & Th.

Lith: by Chitra Silpi C.o

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 148.

Drawn by A. D. Molla.

OROPHEA MACULATA, Scort.

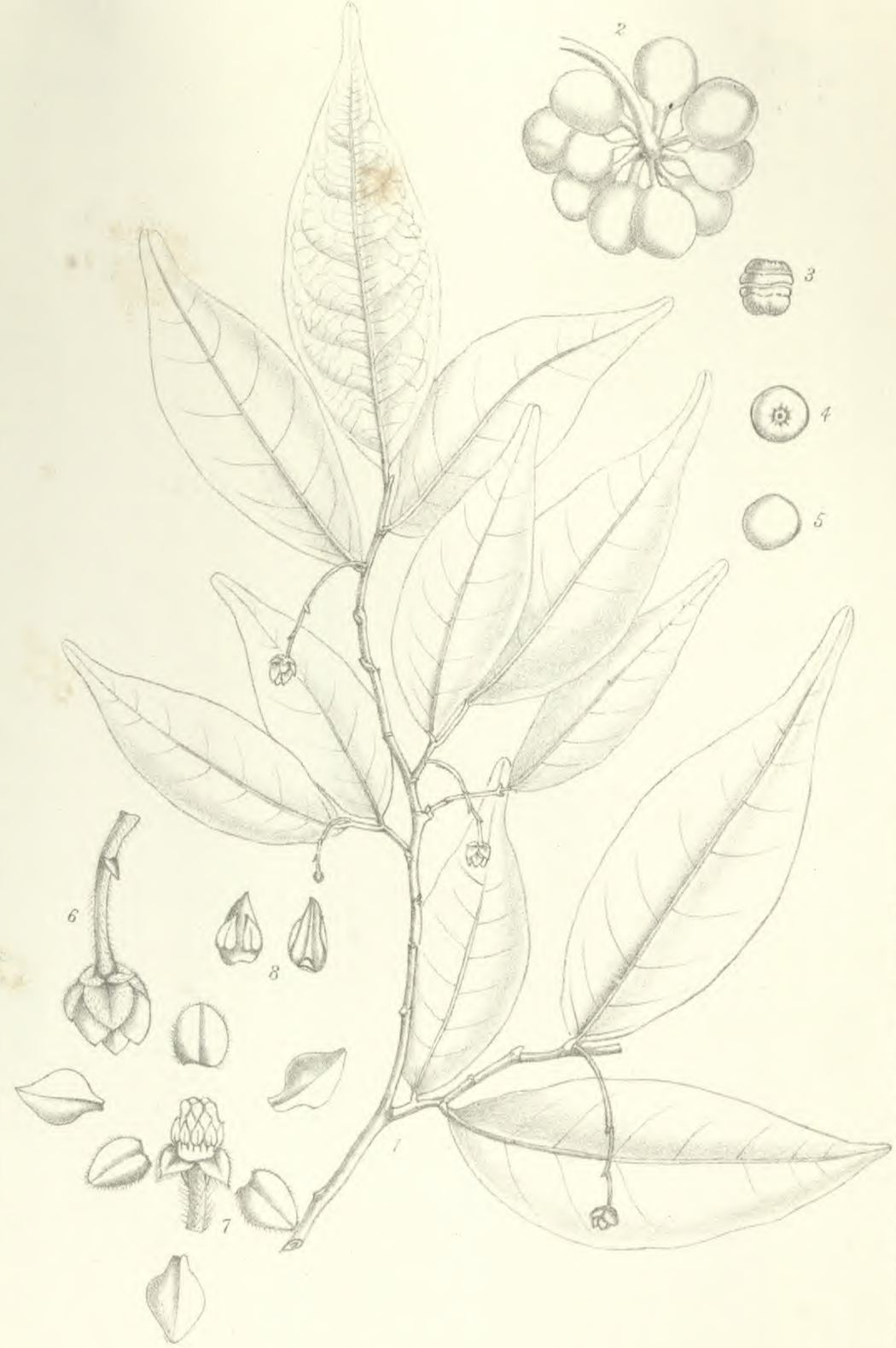


OROPHEA ENTEROCARPA, Maing.

Lith: by Chitra Silpi Co.

Drawn by K.P.Dass.

ORDPHEA HASTATA, King



Drawn by A.D.Molla.

ORDPHEA GRACILIS, King

Lith: by Chitra Silpi C^a.

Drawn by G. C. Dass.

OROPHEA CUNEIFORMIS, King.

OROPHEA DODECANDRA, Miq.

Lith. by Chitra Silpi Cº

Drawn by A.D. Alwiss.

OROPHEA CORIACEA, Thw.

Drawn by K.P. Dass.

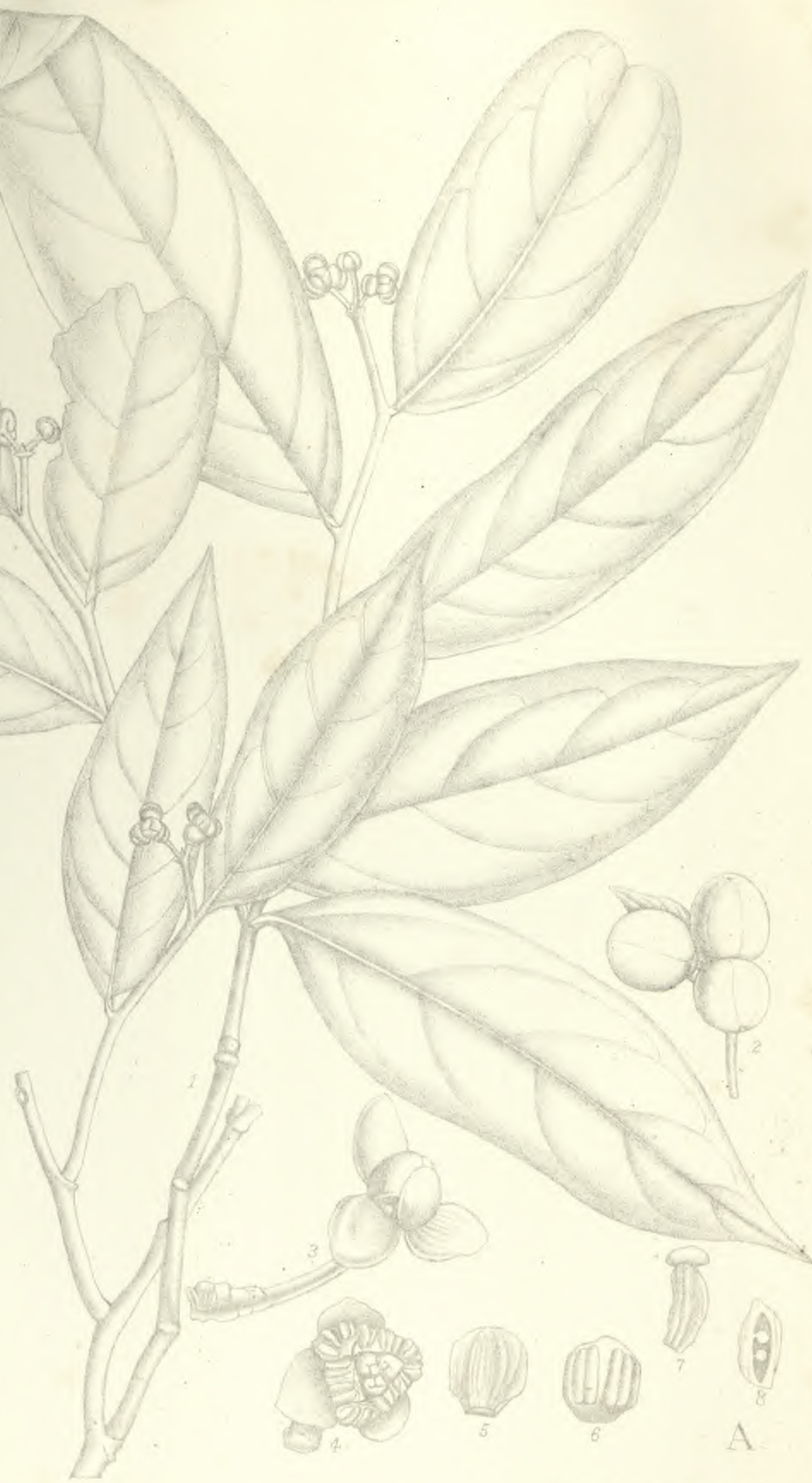
Lith. by A. C. Mukerjei

OROPHEA POLYCARPA, A.DC.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 15.

Drawn by D.N. Chaudhary.

MITREPHORA HEYNEANA, Thw.

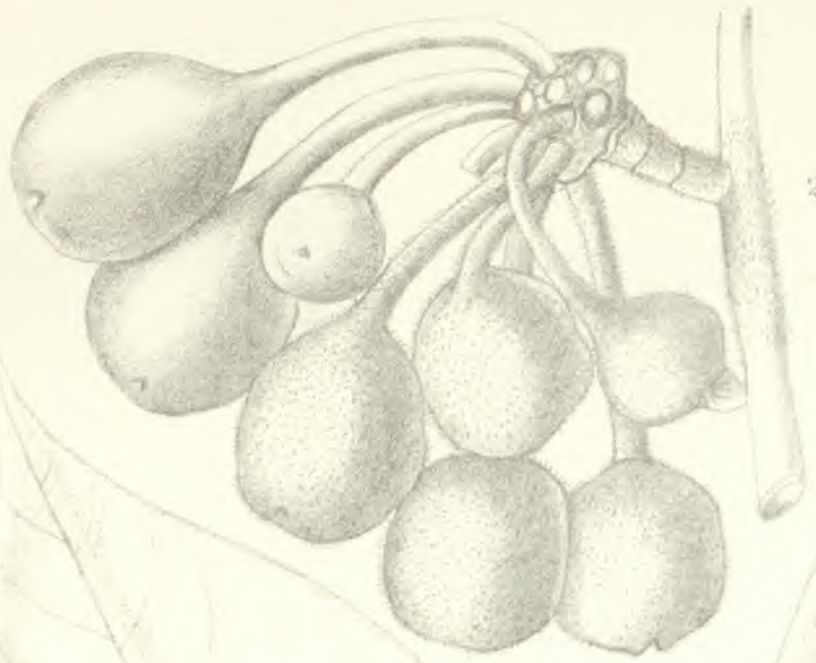


Lith by A. C. Mukerjei.

OROPHEA OBLIQUA, H.f. & Th.

King, Annulaceæ.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 152.



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Drawn by A. L. Singh.

MITREPHORA TOMENTOSA, H. f. & Th.

Drawn by G. C. Dass.

Lith by K. D. Chandra.

MITREPHORA MAINGAYI, H.f.& Th.

Ann. Roy. Bot. Garden, Calcutta, Vol. 4, PLATE 155.

Drawn by Govindoo.

MITREPHORA GRANDIFLORA, Bedd.

Lith. by Chitra. Stip. C.S.

Drawn by D N. Choudhary

OXYMITRA FORNICATA, H.f. & Th.

Drawn by K.P. Dass.

MITREPHORA RETICULATA, H.f. & Th.

Lith. by B. K. Ray

Drawn by G. C. Dass.

Lith by K. H. Das.

MITREPHORA MACROPHYLLA, Oliver.

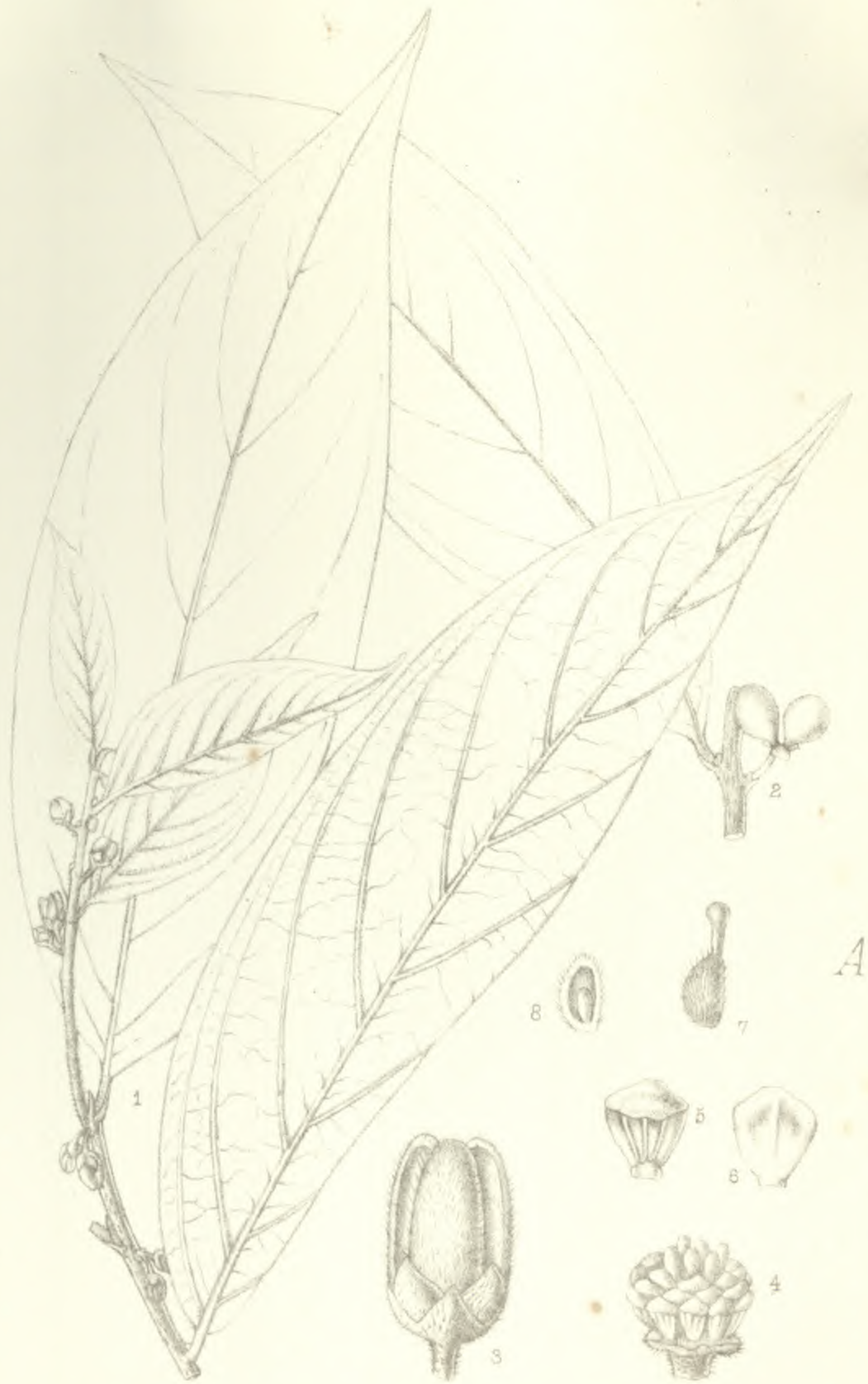
Drawn by A. D. Molla.

MITREPHORA PRAINII, King.

Lith by A. C. Sanghe.

Drawn by K.P.Dass.

POPOWIA RAMOSISSIMA, H.f.and Th.



Drawn by M.Smith.

POPOWIA PAUCIFLORA, Maing.

Ann. Roy. Bot. Garden, Calcutta, Vol. 4, PLATE 159.

Drawn by A. D. Molla.

POPOWIA BEDDOMEANA, H.f.& Th.

M. Smith. delt.

Lith by B. K. Roy.

POPOWIA HELFERI, H.f.& Th.

Drawn by A. L. Singh.

POPOWIA PERAKENSIS, King.

Drawn by A.D.Molla.

POPOWIA FŒTIDA, H.f.& Th.

Lith: by P. N. Sinha.

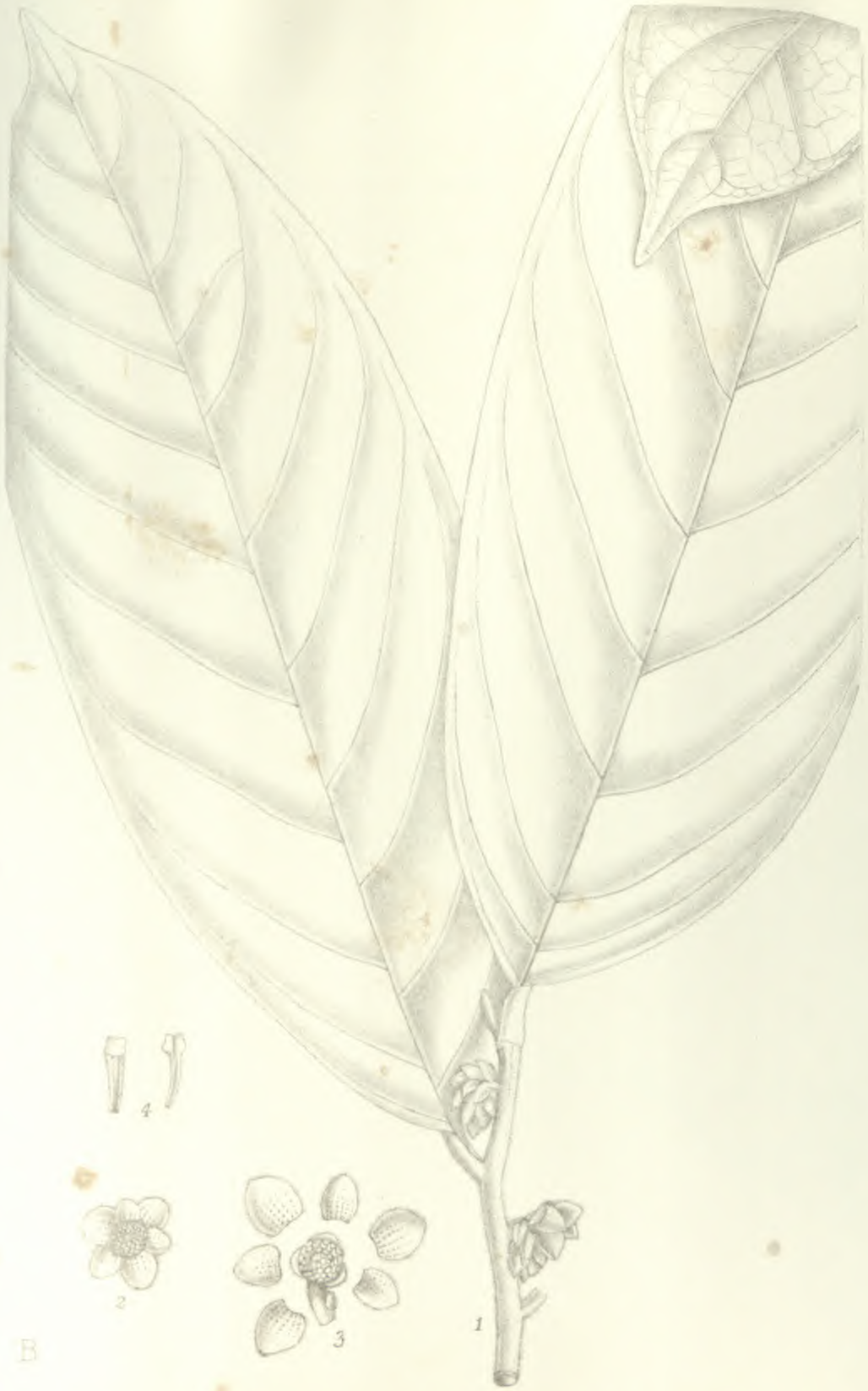
Drawn by P. N. Chaudhary.

POPOWIA VELUTINA, King.

Drawn by G. C. Dass.

POPOWIA FUSCA, King.

Lith by P. N. Sinha.



Drawn by K. P. Dass.

POPOWIA KURZII, King.

Drawn by A. D. Molla.

POPOWIA TOMENTOSA, Maing.

Lith. by B. K. Roy.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 163.

Drawn by D. N. Choudhury.

POPOWIA NERVIFOLIA, Maing.

Drawn by K. P. Dass.

POPOWIA NITIDA, King.

M. Smith delt.

Lith. by P. N. Sinha.

POPOWIA HOOKERI, King.

Drawn by J. C. Bass.

OXYMITRA LATIFOLIA, H.f. & Th.

OXYMITRA AFFINIS, H.f. & Th.

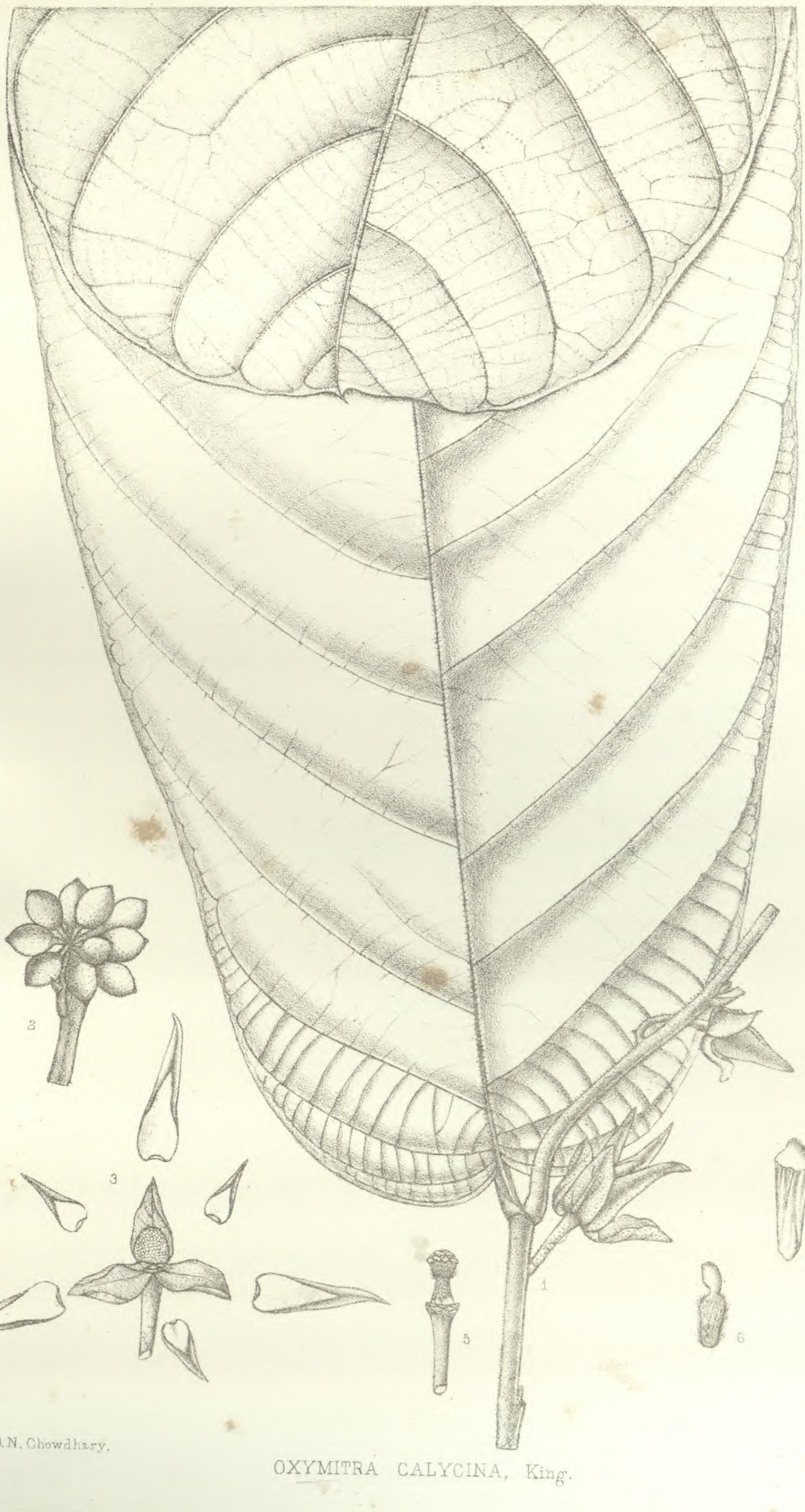
Lith. by B. K. Roy.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 166.

Drawn by A.D. Molla.

OXYMITRA FILIPES, H.f. and Th.

Lith by K.H.Das.



Drawn by D. N. Chowdhary.

OXYMITRA CALYCINA, King.

Lith. by K. H. Das.

Drawn by K. P. Dass.

Litho by P. N. Sinha.

OXYMITRA MACLELLANDII, H. f. & Th.

M. Smith delt.

OXYMITRA UNONÆFOLIA, H. f. & Th.

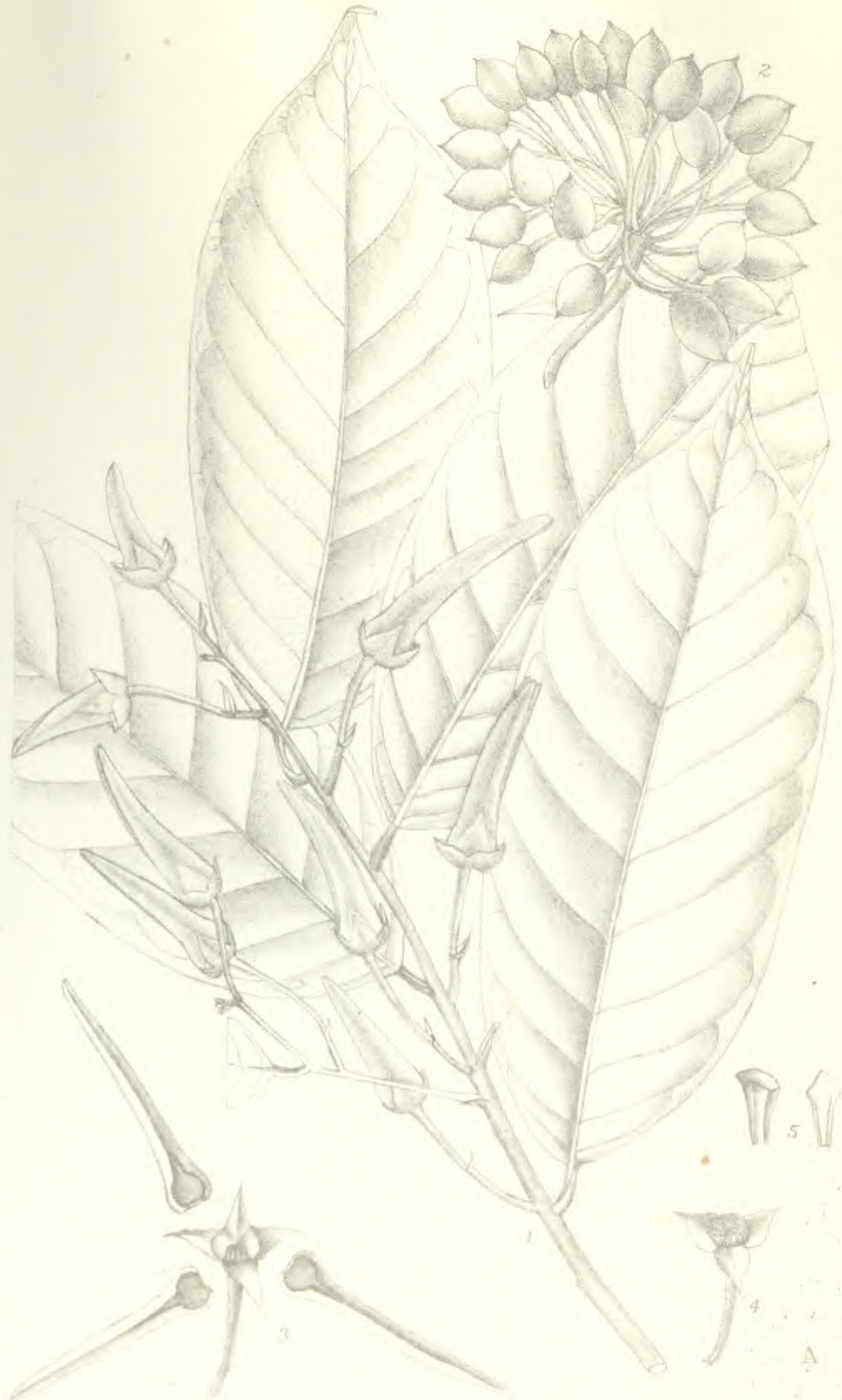
Drawn by G. C. Dass.

OXYMITRA BIGLANDULOSA, Scheff.

Lith. by K. H. Das

Drawn by G. C. Bass.

MELODORUM RUFINERVE. H.f.&Th.



OXYMITRA GLAUCA, H.f.&Th.

Lith. by P.N. Sinha.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 171.

Drawn by A. L. Singh.

MELODORUM GRIFFITHII, H.f. & Th.

Drawn by K.P.Dass.

MELODORUM POLYANTHUM, H.f. & Th.

Lith. by A. C. Mukerjei.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 172.

Drawn by A. L. Singh.

MELODORUM LITSEÆFOLIUM, King.

Lith. by P. N. Sinha.

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Drawn by G.C.Dass.

MELODORUM FULGENS, H.f.& Th.

Lith by B.K.Roy.

Drawn by A. D. Molla.

MELODORUM BICOLOR, H. f. & Th.

Lith. by A. C. Mukerjee.

MELODORUM WALLICHII, H. f. & Th.

Drawn by G. C. Dass.

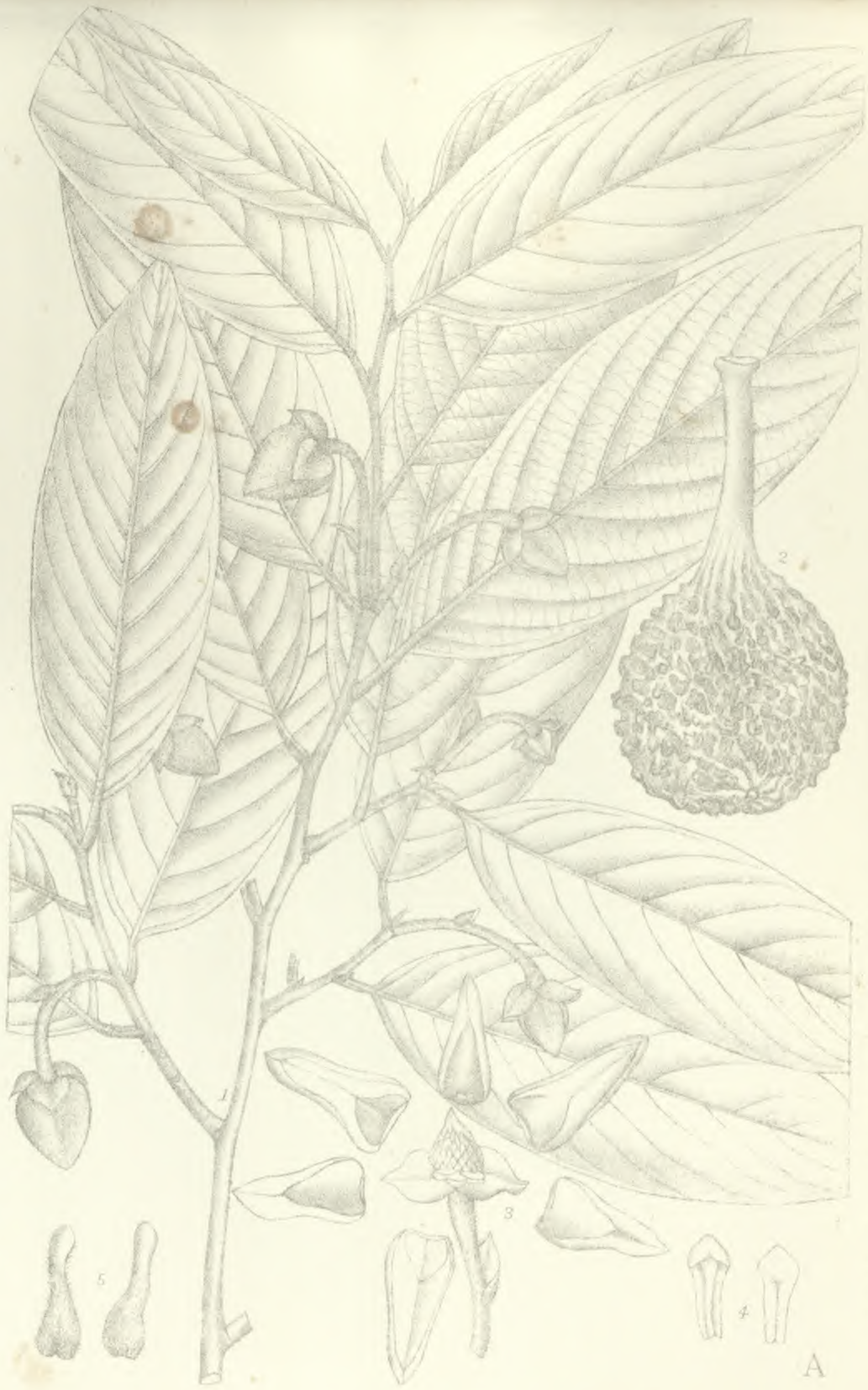
MELODORUM MANUBRIATUM, H.f. and Th

Lith. by A. C. Mukerjei

Ann. Roy. Bot. Garden, Calcutta, Vol. 4, PLATE 177.

Drawn by G. C. Dass.

MELODORUM CYLINDRICUM, Maing.



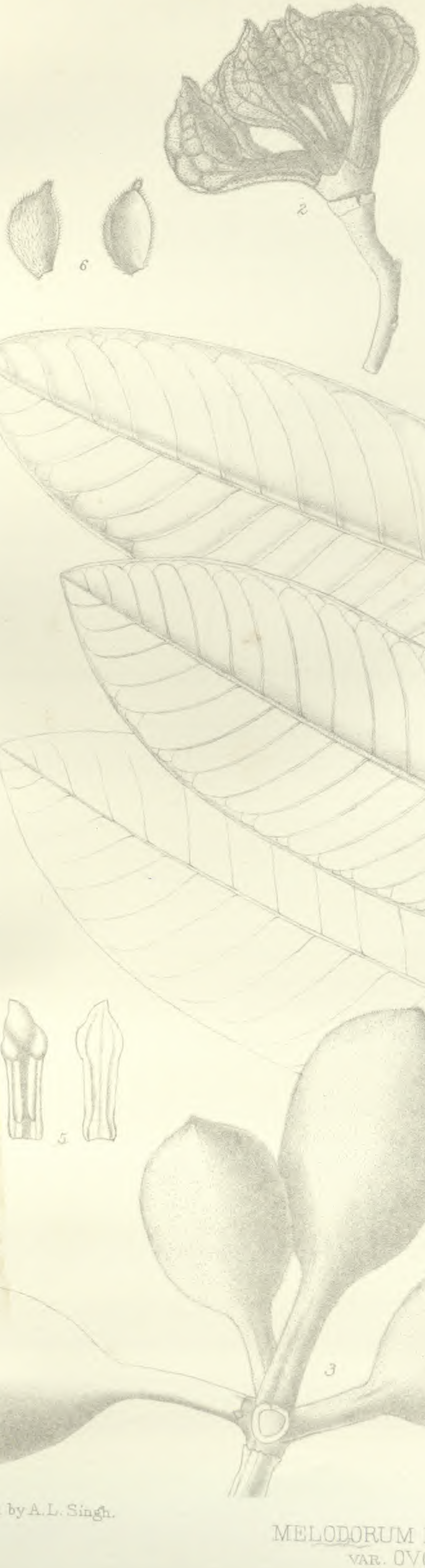
Lith. by A. C. Mukerjei.

MELODORUM VERRUCOSUM, H. f. & Th.

Drawn by G. C. Dass.

MELODORUM LATIFOLIUM, H. f. & Th.

Lith. by B. K. Roy.



Drawn by A. L. Singh.

MELODORUM LATIFOLIUM, H. f. & Th.
VAR. OVOIDEA, King.

Lith. by P. N. Sinha.

Drawn by A. D. Molla.

MELODORUM SPHAEROCARPUM, Miq.

Drawn by A. D. Chowdhury.

MELODORUM HYPOGLAUCUM, Miq.

Lith. by B. K. Roy.

Ann. Roy. Bot. Gard. Calcutta, Vol 4, PLATE 180.

Drawn by G. C. Dass.

MELODORUM PARVIFLORUM, Scheff.

Lith. by K. H. Das.

Drawn by G. C. Dass.

MELODORUM LANUGINOSUM, H. f. & Th.

Lith. by K. D. Chundra.

Drawn by A. L. Singh.

Lith. by K. D. Chander.

MELODORUM RUBIGINOSUM, H. f. & Th.
VAR. OBLONGA, King.

Drawn by D.N. Chaudhary.

MELODORUM ELEGANS, H.f.& Th.

Lith. by A. D. Molla.

MELODORUM MAINGAYI, H.f.& Th.

Drawn by G. C. Dass.

MELODORUM PRISMATICUM, H.f. & Th.

Lith by Chitra Silpi Cº.

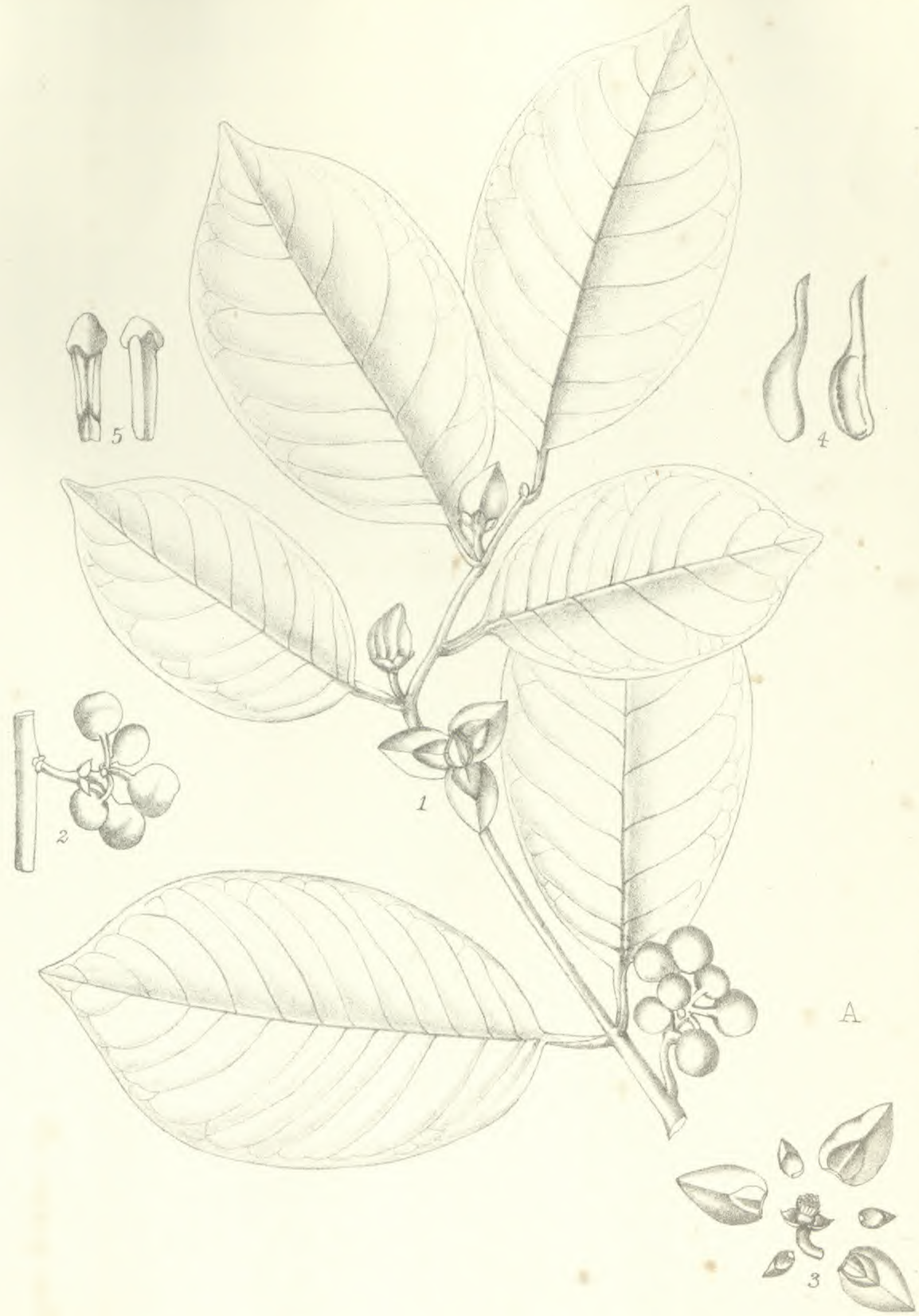
Drawn by A.D. Molla.

MELODORUM MACRANTHUM, Kurz.

Lith by Chitra Silpi Co.

Drawn by G. C. Dass.

XYLOPIA MALAYANA, H.f.& Th.



MELODORUM PISOCARPUM, H.f.& Th.

Lith: by Chitra Silpi Co.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 187.

Drawn by M. Smith.

Lith by K. H. Das.

XYLOPHIA OXYANTHA, H.f. and Th.

B

MILIUSA ROXBURGHIANA, H.f. & Th.

A

XYLOPIA DICARPA, H.f. & Th.

Lith. by Chitra Silpi Co.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 189.

Drawn by K.P.Dass.

XYLOPIA FUSCA, H.f.& Th.

Drawn by G.C.Dass.

XYLOPIA PARVIFOLIA, H.f.& Th

Lith by Chitra Silpi Cº.

Drawn by M. Smith.

XYLOPHIA PUSTULATA, H.f. & Th.

Lith. by A. C. Mukerjei.

XYLOPHIA MAINGAYI, H.f. & Th.

Ann. Roy. Bot. Garden, Calcutta, Vol. 4, PLATE 191

Drawn by A.D.Molla.

XYLOPIA NIGRICANS, H.f. & Th.

Drawn by D. N. Choudhary.

XYLOPIA CURTISII, King.

Lith by Chitra Silpi Co.

Drawn by D.N. Chaudhary

XYLOPIA CAUDATA, H.f.&Th.

XYLOPIA ELLIPTICA, Maing.

Lith. by A.D. Molla.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 193.

Drawn by K. P. Dass.

XYLOPIA CHAMPIONII, H.f.& Th.

Drawn by D. N. Chaudhary.

XYLOPIA STENOPETALA, Oliver.

Lith. by A. D. Molla.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 194.

Drawn by A. L. Singh.

XYLOPIA SCORTECHINII, King.

Lith. by A. C. Singha.

Drawn by A.L. Singh.

XYLOPIA OLIVACEA, King.

Lith. by K. H. Das.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 197.

XYLOPIA OBTUSIFOLIA, H.f.& Th.

Lith. by A. C. Singha.

Drawn by G. C. Dass.

XYLOPIA MAGNA, Maing.

Drawn by A. L. Singh.

XYLOPIA FERRUGINEA, H.f.& Th.

Lith. by K. D. Chundra.

Drawn by D.N. Chaudhary.

XYLOPIA RIDLEYI, King.

Lith. by A.C. Singha.

Drawn by A. D. Molla.

PHÆANTHUS LUCIDUS, Oliver.

Drawn by G. C. Dass.

PHÆANTHUS NUTANS, H. f. & Th.

Lith: by A. C. Singha.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 200.

Drawn by G. C. Dass.

PHÆANTHUS MALABARICUS, Bedd.

Drawn by A. L. Singh.

PHÆANTHUS ANDAMANICUS, King.

Lith: by A. C. Singha.

Drawn by G.C.Dass.

MILIUSA WIGHTIANA, H.f. & Th.

Drawn by A.D.Molla.

MILIUSA MACROCARPA, H.f. & Th.

Lith. by A.C. Singha.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 202.

Drawn by K.P. Dass.

MILIUSA ZEYLANICA, Gardn.

Drawn by D.N. Choudhory.

Lith. by A. C. Mukerjei.

MILIUSA NILAGIRICA, Bedd.

Drawn by A. D. Molla.

MILIUSA LONGIPES, King.

Lith. by K. H. Das.

Drawn by K. P. Dass

ALPHONSEA MAINGAYI, H. f. & Th.

Drawn by A. D. Molla.

MILIUSA INDICA, Lesch.

Lith: by P. N. Sinha.

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Drawn by K.P.Dass. Lith. by K.H.Das.

MILIUSA VELUTINA, H.f. and Th.

Drawn by G. C. Dass.

SACCOPETALUM TOMENTOSUM, H.f. & Th.

Drawn by A. L. Singh.

SACCOPETALUM LONGIFLORUM, H. f. & Th.

Lith. by Chitra Silpi C.º.

Drawn by M. Smith.

SACCOPETALUM SCLEROCARPUM, H.f. & Th.

Lith. at Indian Art Cottage, Calcutta.

Drawn by G. C. Dass.

ALPHONSEA LUTEA, H.f. & Th.

Lith. by K. D. Chandra.

Drawn by G G.Dass.

ALPHONSEA VENTRICOSA, H. f. & Th.

Lith by K D. Chandra.

Drawn by A.D.Molla.

ALPHONSEA CYLINDRICA, King.

ALPHONSEA ELLIPTICA, H.f.&Th.

Lith: by A.D. Molla.

Ann. Roy. Bot. Gard. Calcutta, Vol. 4, PLATE 211.

Drawn by A. D. Molla.

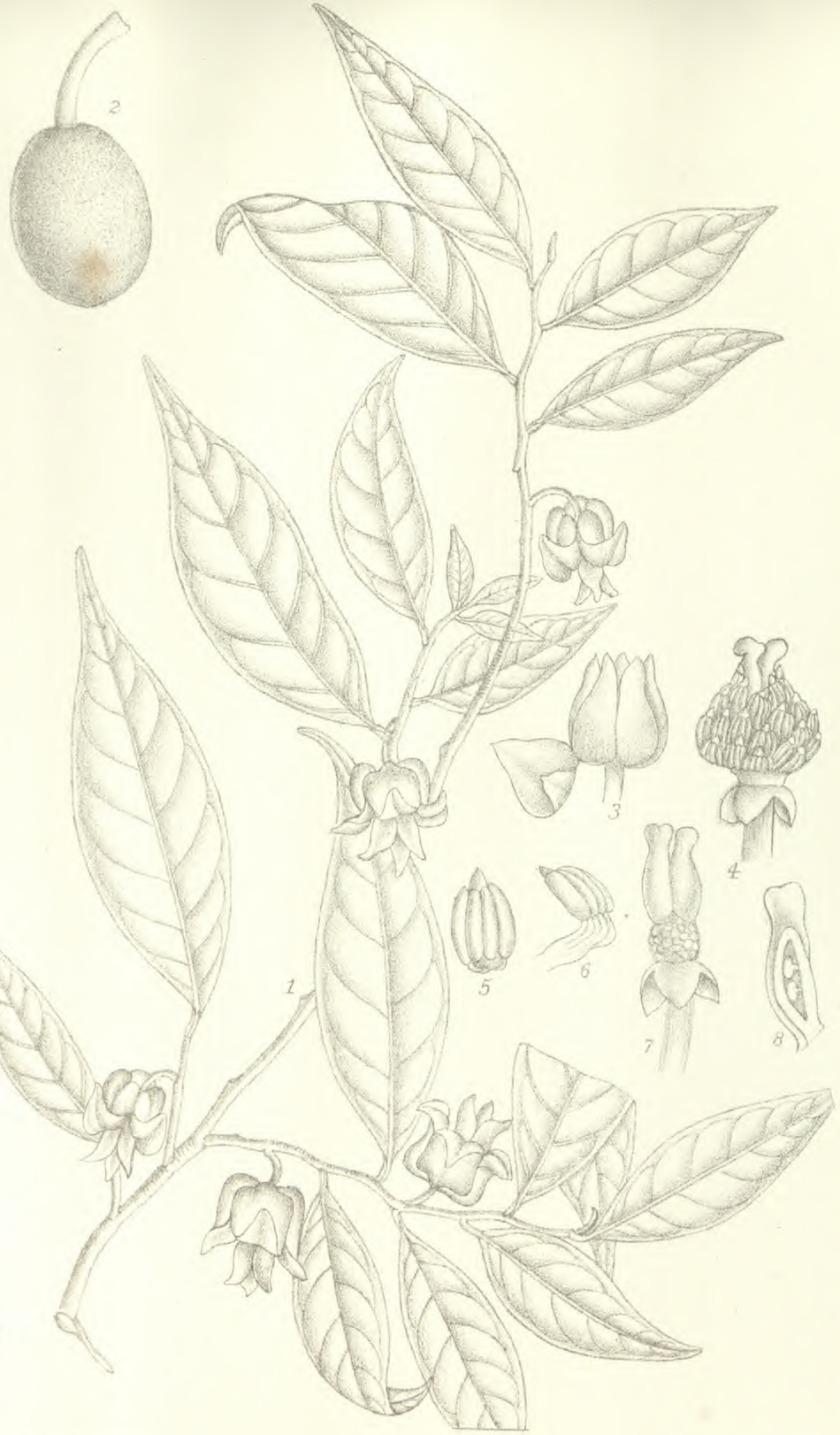
ALPHONSEA LUCIDA, King.

Lith. by K. H. Das.

Drawn by G. C. Dass.

ALPHONSEA SUB-DEHISCENS, King.

Lith. by A. D. Molla.



Drawn by G. C. Dass.

ALPHONSEA ZEYLANICA, H. f. & Th.

Lith. by A. C. Singha.

ALPHONSEA MADRASPATANA, Bedd.

Drawn by A.L. Singh.

ALPHONSEA CURTISII, King.

Drawn by K.P. Dass.

ALPHONSEA SCLEROCARPA, Thw.

Lith. by A. C. Singha.

Ann. Roy. Bot. Gard. Calcutta, Vol 4, PLATE 215.

Drawn by A.L. Singh.

MEZZETTIA LEPTOPODA, Oliver.

Drawn by K.P. Dass.

KINGSTONIA NERVOSA, H.f. & Th.

Lith. by A.C. Singha.

Drawn by K.P. Dass.

MEZZETTIA CURTISII, King.

Drawn by D.N. Choudhary.

MEZZETTIA HERVEYANA, Oliv.

Lith: by A.D. Molla.

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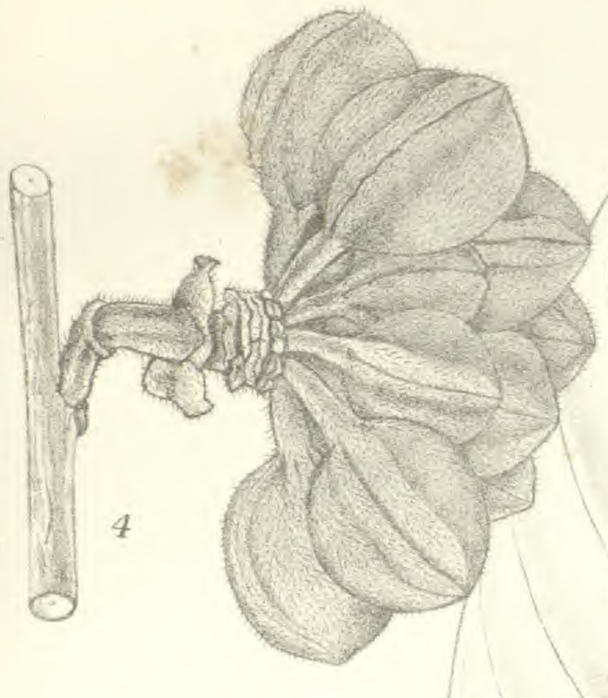
Drawn by M. Smith.

GRIFFITHIA MAGNOLIÆPETALA, Maingay.

Lith. by A. C. Mukerjei.



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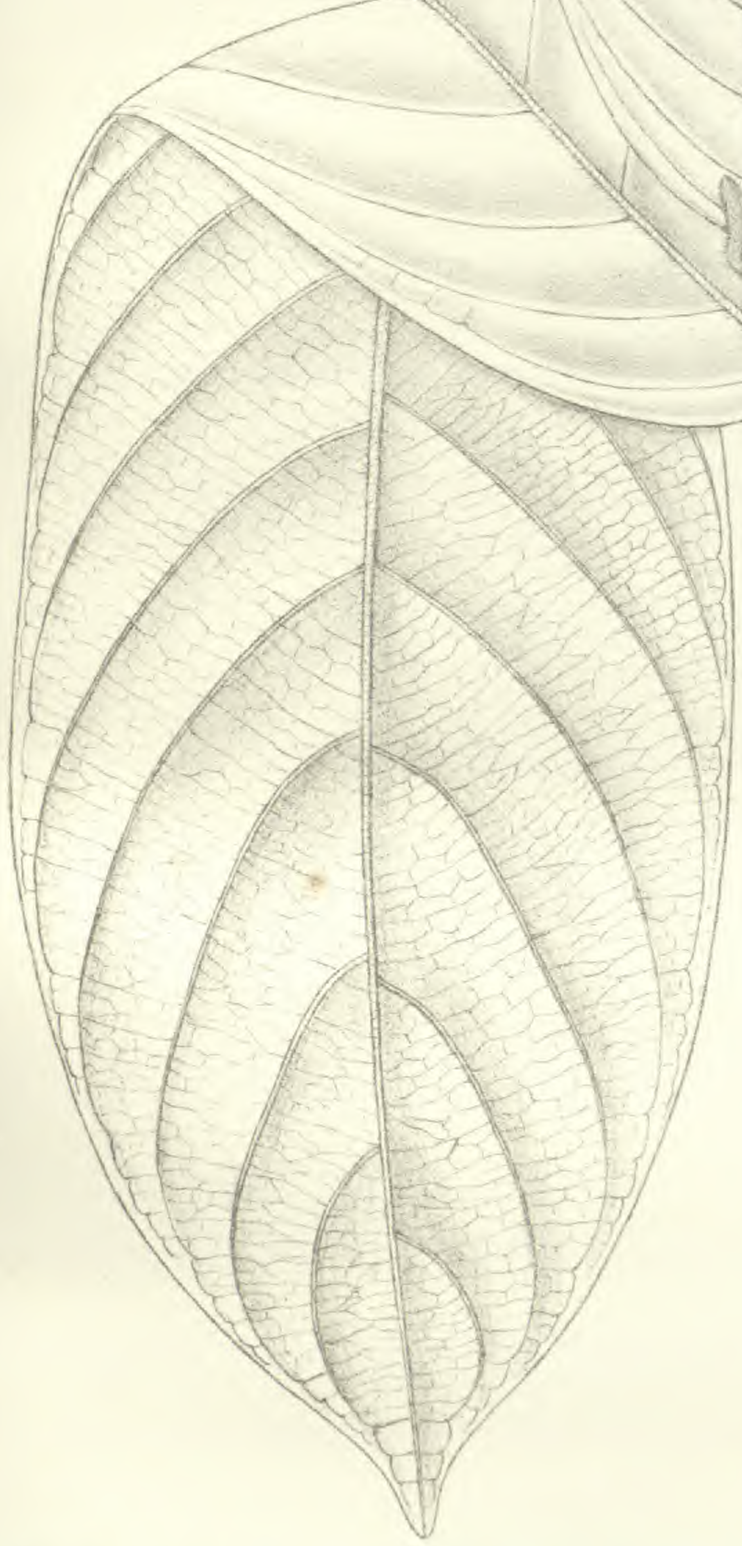

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Drawn by A.L. Singh.

GRIFFITHIA CUPULARIS, King.

Lith by A.C. Singha.

Drawn by D.N. Chowdory.

Lith. by K.H. Das.

GRIFFITHIA FUSCA, King.