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PALMS

OF

BRITISH EAST INDIA,

BY THE LATE

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Madras Medical Establishment.

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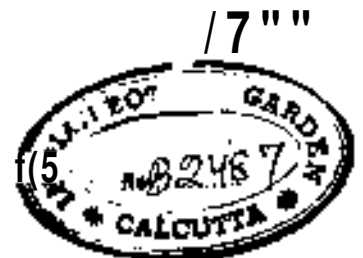
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PALMS
OF
BRITISH EAST INDIA.

ERRATA.

Editor's Preface, first line; after descriptions, insert *of*.

Page viii last line, for *what* read *that*.

Page xii { *CCalamus collihus* Griff;—after Fruit spadix, for *CLXXVI*. read *CLXXXVL*

[*Calamus leptospaduv*,—Lines 11 and 12 from bottom, omit as follows.

Portions of leaves CXCIV. A. From the Khasyah hills masculine spadix CXCIV. B.

Page 38 two last lines but one, for *Tab. CLXXV. A.* read *CLXXXV. B.* et vice versa.

„ 40 line 3 from bottom for *Flagillum* read *Flagellum*.

„ 42 „ 2 from top after A.B. insert *C*.

„ 60 „ 2 from top, omit A.B. and for *Tabs*, read *Tab*.

„ 95 „ 2 „ „ for *Tabs. CXCIII*, read *Tab. CCXIII*.

„ 101 „ 1 „ „ for *Petioloris* read *Pctiolaris*.

„ 133 „ 2 „ „ omit *Tab. CCXXVII. A*.

„ 134 „ 2 „ „ after A.B. omit *C*

„ 155 after *Areca disticha* *Tab. CCXXXIII*, omit *A*.

THE EDITOR'S PREFACE.

AS the descriptions species contained in the following work were written by the Author in English, in preference as he expresses it, to the common language of Botanists, the Editor thought it desirable that the definition of the Family, and analysis of the Sections, originally written by the Author in Latin, should be given in English also.

He therefore translated these parts into English, together with the Generic Characters &c. interspersed throughout the work, in order that the whole might be the better adapted to the class of readers for whom the Author, as he tells us in the first paragraph of the preface, intended the work.

In order to preserve the original words of the Author, and to guard against any omissions or misinterpretations into which the Editor may have fallen, the original of such parts as have thus been translated, is given in the form of an Appendix at the end of the work.

This appendix is of the more importance, as it affords the Author's general views of the natural divisions of the Family, no where else to be found in a connected form, and confined to Sub-families, Sections, and Genera, unencumbered with the details of species.

Most of the descriptions of species have been previously printed in the seventeenth, nineteenth, and twentieth numbers of the Calcutta Journal of Natural History. The Editor's duty has therefore been chiefly confined to the reprinting of these, and the incorporation with them of the necessary drawings and illustrations, together with such additional remarks upon species already known, and accounts of undescribed species, as were found interspersed in the Author's papers.

The Editor had at first intended to have added a Glossary of the scientific terms employed in the descriptions of Palms, in order still farther to meet the views of the Author in adapting the work as much as possible to the general, as well as the scientific reader. As however the technical terms employed, do not differ from those in common use in general botany, the reader will find them explained in all modern elementary books on that subject.

The Editor has however, (still acting on the views of the Author), ventured to soften down as far as compatible with scientific character of the work, all technicalities likely to deter the general reader from its perusal and thus becoming if he pleases, with moderate industry in a short time, perfectly acquainted with the names and distinguishing characters of all the Palms of this country.

Of the numerous drawings which constitute an important feature in this work, nine have been derived from Dr. Roxburgh's collection, and two have been contributed by Dr. Wight; all the remainder, considerably upwards of one hundred in number, are derived from the unpublished papers of the Author.

The additional species here introduced from the Author's MSS. and not included in his papers in the Calcutta Journal of Natural History, are as follows, namely *Calamosagus schaphiger* and *Calamosagus ochriger*, *Calamus acanthospathus*, *Calamus geminifloris*, *Calamus macrocarpus*, *Calamus geniculatis*, *Calamus acanthopis*, and *Calamus Wightii*.

Other species regarding which there seemed to be some doubt, together with the Author's investigations connected with *Nipa fruticans*, will be found in the 3rd part of his *Notula ad Plantas Asiaticas*, and *Icones Plant. Asiaticarum*, now in progress of publication and which, with present work, will constitute a lasting monument of the Author's Botanical fame, as well as of the enlightened policy of the Government of Bengal, by which these papers are given to the world.

Calcutta:

Sept. 3rd, 1850.

THE AUTHOR'S PREFACE.



The present attempt, will be found to include all the Palms of British East India that I have met with myself, or of which I have been able to procure such knowledge, as I considered sufficient for their determination. I wish it merely to be viewed as a slight sketch, to be filled up hereafter. This subject, so far as regards Systematic Botany, is one of considerable interest, and in order to meet the convenience of the Indian public, I have written the descriptions, in English, in preference to the common language of Botanists. This seemed to me the more proper, because English is the language through which scientific knowledge is communicated in this country, more especially in the Medical and other Colleges, from which all that is to be expected in the dissemination of this science among the Natives of India, must at present be derived. In order to adapt the sketch to this class of students, as well as to others, I have prefaced a few remarks on the general structure and organisation of the Family, as well as on the distribution of the species, and their uses.

The determination of the species having been difficult, indeed nearly insuperably so to me, in reference to the means possessed in India, the numerous names new to science proposed in this work, must be taken with some qualification. I shall never regret to see any of these names cancelled in favour of others *justly* prior, that is to say, prior by definition, and by publication. However imperfect the definition may be; and it must be confessed, that most of those of palms are necessarily imperfect, still it bears evidence of a wish on the part of an author, to do his duty by the science, for which moreover, he thus endeavours to show a proper respect. But I would not be disposed to waive my right, in favour of mere MSS names originating in indolence, and too often fostered by a courtesy of a very mischievous nature, inasmuch as the practice is directly opposed to proper observation, and due discrimination. Such names are in fact, only weak and temporary usurpations of authority.

The materials from which it has been prepared, are an extensive collection of palms made by myself and friends in various parts of British India, more especially at Malacca, and in Assam, and of a few found in the Botanic Gardens. To which must be added, the species figured in ROXBURGH'S national collection of drawings, and most of those described in his *Flora Indica*. The species of BUCHANAN HAMILTON, amounting to nine in number, I have not been able to determine, in default either of MSS, specimens, or drawings.

As* might be expected, I have been much assisted by PROFESSOR VON MARTI US* great work on Palms, so far as regards the Sections, and from DR. MOHLS' contribution to it, I have derived most of what relates to Structure.

In endeavouring to define the genera, I have been guided by ideas consonant, I think, with the general state of

Systematic Science, which appears to me to be founded on a due gradation in the value of characters. Such for instance as, that the higher groups of whatever rank, should be defined by major characters of distinction, and the subordinate, by minor characters of distinction. Hence, the genera are limited to such groups as present positive marks of distinction; and all such as differ in less essential or negative points, should make their appearance as subgenera of their respective genera. In my opinion it is inconsistent to apply to Genera, rules which are not applied to Families, in which extreme principles of primary division have not yet, I think, been advocated. Practically, I am satisfied, that the great end of Systematic Science, determination or identification, is much easier attained by bold synthesis, than minute analysis. *Calamus* therefore appears in this work, as an integral genus.

I have not considered it advisable to adopt the distinctive name of this Section or Sub-Family, proposed by DR. MARTIUS. For though applicable to a great peculiarity, still it is derived from a form indistinguishable from *Maurita*, which is itself to be considered as a genus less entitled to give its name to the group, than the complicated and extensive genus, *Calamus*.

There are few, if any sound marks of distinction between the genera of this section. *Calamus* which is by far the most extensive and complicated, has not invariably ruminated albumen; and by the presence of a lateral umbilicus, may be considered as passing into *Zalacca*, which has the umbilicus terminal. It likewise presents occasional instances of acidity of fruit, and the species represent even in habit, the characteristic forms of *Zalacca*.

Zalacca differs only from *Sagus* in habit, approximating to it however, in *Zalacca conferta*, by the bracts, the tegument of the seed, and the albumen.

Sagus, besides having the ordinary fruit of *Calamus*, with the ordinary inflorescence of *Zalacca*, passes directly into both, by those remarkable Palms composing its second Section. And if the ordinary opinions of their affinities with *Raphia* be adopted, the genus may be considered also as passing into *Calamus*, by means of the inflorescence.

Plectocomia, is at present perhaps more capable of definition, yet its habit is altogether that of *Calamus*, from which it differs probably in no irreconcilable manner. In its spathes it may be considered as approaching to *Sagus*. And in the hispid fruit, to *Zalacca*.

Eugeissona appears to be the most limitable genus. For although in the others with solitary flowers, the presence of the bracteoles may be considered as shewing the flowers to be terminal, yet this is with reference to the branches, not the spike. But as reconciling this peculiarity, it may be proper to observe, that the development is in all, centrifugal.

I have reduced *Dteonorops* to a Section of *Calamus*, from the common forms of which, it differs only in the comparative completeness and permanence of its spathes. These characteristics however, disappear in those *Calami* of the Section *Platyspathes*, excepting the great concavity of the spathes, and the contracted branches of the inflorescence.

The arrangement of the genus *Calamus* submitted in the following pages, will I think, be found practically useful, although in this respect, it is even in the Indian species, weakened by at least two sufficiently marked exceptions.

I have likewise been desirous of adopting the plan of putting in Italics, those characters what I consider distinc-

tive. By which, not only is the enquirer at once directed to the necessary words of distinction, but the author himself is thus led to distinguish such as he confesses to be unnecessary. This, as it must lead to the reconsideration of characters, and to, their due curtailment, appears to me the only mode by which it can be hoped to arrive at highly desirable brevity and perspicuity. The difficulty of the subject, and the limited state of my own knowledge of the species described, founded rather on casual observation, than on physiological study, will I trust induce the reader to make allowance for the imperfect manner in which these views have been here carried out.

Palms, although so diversified in structure, form one of the most marked Natural Families of Plants; they are therefore distinguishable at first sight, in all stages of their growth. By common consent, they appear to be considered as the most typical of Monocotyledonous Plants. LINNAEUS, and still later, ENDLICHER, styled them *Principes*, or the Nobles of their Class ; by VON MARTIUS, they are distinguished as the splendid offspring of Terra and Phaebus. And I believe they are mentioned by DR. LINDLEY in the *Fossil Flora of great Britain*, as possessed of as high or perfect an organisation as Dicotyledonous Plants.

Their relative perfection with other Monocotyledones may however, I think, be reduced to the size and woody nature of the trunk, the coriaceous texture and division of the leaves, and in many instances of the spathes or the modified leaves protecting their inflorescence. But as regards the flowers, except perhaps their tendency to separate sexes, they present few of the suppressions of development, cohesions, and other irregularities of parts, on which, in my opinion, considerations of relative perfection ought mainly to depend. The fruit however, is in many special cases more complicated than that of other classes. In their powers of perpetuating the species, they hold also a high rank, although this may be considered in some measure counterbalanced by their limited duration, and small power of reproducing the individual by grafts or buds.

They can only be considered as perfect as Dicotyledonous Plants, in being as perfectly adapted to their state of existence. In comparative perfection, it would not I think, be difficult to shew them to be decidedly inferior. They do not perhaps in the *career* of any one organ, present that variety of development which we observe among Dicotyledons, to which in fact they only approach in the division and texture of the leaves, and their often highly developed fruit.

The first peculiarity presented by the flowers of Palms, is their coriaceous texture, so different from other Monocotyledonous flowers, the absence of colour, and a general tendency in appearance, to the characteristic form of the flowers of grasses and rushes

They present but little deviation from the usual alternation of parts, very rarely presenting any irregularity in this respect. Although the two floral envelopes, namely, Calyx and Corolla, are more distinctly placed on two different planes, than is commonly observed in Monocotyledonous Plants generally, yet they present notwithstanding, little difference in the colour and appearance of these parts.

The Corolla is however, more developed than the Calyx. Both, generally have a striate appearance, due to the deposit and prominence of the *ferris*; generally, both are tough, coriaceous, and often siliceous.

While the *Calyx* is often imbricated, the *Corolla* is much more frequently valvate, perhaps always so in the male flowers, and in the female so generally, that the *Corolla* in those cases in which it is said to be imbricated, probably does

PREFACE.

not exist, the envelopes consisting in such cases, (as the cocoa-nut palm), of an imbricated series of bracts and sepals.

In *Corypha*, and *Borassus*, the consistence is less coriaceous than in others. Altogether, there are few marks practically applicable to Generic or Sectional distinctions, to be drawn from either of the two floral envelopes. #

The chief irregularity in the flowers, is the separation of the sexes, which takes place to a great degree. Indeed, only one Section, (which as regards the inflorescence, is less aberrant than the others), is characterised partly *by hermaphrodite flowers.

The separation of the sexes, is either complete in distinct individuals, or incomplete on distinct spadices, or still more incomplete on the same spadix. In the latter case, the males occupy the extremities of the spadix, and the females the base: when dioecious or sex-divided, the males are generally far more numerous than the females.

The male organs, have not appeared to me to present any thing remarkable, they are altogether of the ordinary type. The only curious circumstance I have observed, is the constant adhesion of the filaments to each other, and to the corolla at the base of its segments, so that its tube, whether it be short or long, is always lined by a layer, of combined filaments, which becomes distinct where the petals cease to be united.

The effect of this is, that those only have hypogynous stamens, which have tripetalous corollas.

The ovary before fecundation, presents little diversity or complication, † it is almost always composed of three-carpels more or less united, sometimes of two \ it is generally of thick consistence.

The number of cells to each component part of the ovary, is as it should be, one; and this contains an ascending anatropous ovule.

There is nothing remarkable about the style, or the stigmas, which are papillose surfaces lining the inner surface of the branches of the style, or the stigma is in some instances perhaps, sessile.

But the pistil presents little variety, and that confined merely to its surface in the sub-family *Calamina*, yet in its progress to maturity, it undergoes so many changes, that the fruit becomes an excellent source of generic distinction, and presents as much diversity as that of any other family.

It is almost always characterised by a tendency to the abortion of two of the cells of the pistil, and three-celled fruit are consequently comparatively rare.

The simplest form is exemplified in *Licuala*, and *Corypha*. In *Areca*, the fruit is more complicated by the development of fibres. In *Cocos* it reaches perhaps to its greatest degree of complication.

I am not able for reasons to which I have had, and shall have, frequent occasion to recur, to give an account of the actual number of Palms known up to this date, to be indigenous to British India. The number of species in ROXBURGH'S *Flora Indica* is 41*; of these, 23 have been represented in ROXBURGH'S drawings deposited in the Botanic garden, *i. e.* the proportion of 1 in 80 of the whole number of plants described by that author.

The number of species in the Catalogue of dried Plants of Dr. BUCHANAN HAMILTON, is 9,† or 1 palm to every 288 plants of other kinds collected by that Botanist.

* Referred to Phcenix, Wright**, *Corypha*, *Licuala*, *Caryota*, *Saguerus*, *Bmtinckia*, *Areca*, *Borassus*, *Cocos*, *Calamus*, *Sagus*, and *Nipa*.

† *Calamus* 4, *Licuala* 1, *Phoenix* 1, *Harina* 1, *Areca*, 2.

The number of species in the general Catalogue of the *Herbarium Indicum* distributed in Europe, are few, but it is to be gathered from DR. MARTIUS' great work on the History of Palms, that a good many species had been communicated to him from India; of these I cannot give an account, from the only copy of the work in question to which I have access, being incomplete.

So far however as my materials go, it may be stated, that at least—species are already published as indigenous to British India. The number in the present work, exceeds that number by—.

Of the probably total number indigenous to British India, I have no means of giving an approximate estimate. None, or almost none exist to the west of the river Gogra, but between the Gogra and the Mishmee mountains to the east, and along the whole frontier line from that point to Singapore, including the Khasya, Naga, and Tipperah hills, a considerable number may doubtless be expected. With regard to the Malacca Palms, which have added so considerably to the list, (though I may state, that I have collected almost all to which the Malays give distinct names), a considerable number of species doubtless still exist in the interior, and on the eastern Coast of the Peninsula, while many may also be expected from the western Coast of India itself.

Still, I do not see sufficient grounds for supposing with DR. MARTIUS, that British India contains so many unknown species, as will, in any sufficient degree, assist in swelling the total amount of the Family to 1,000 Species.

DESCRIPTION OF PLATES.

JN the following list; those plates marked with an asterisk are taken from the unpublished collection of Roxburgh's Drawing.: all others are from the Author's Posthumous papers, except two marked thus, f, which were communicated by Dr. Wight.

ZALACCA.

Zalacca edulis, Blume *Koombar* of Penang. Portion of a leaf and Spadix CLXXV.

Zalacca affinis Griff.—Portion of the Stem and the lower part of Leaf, CLXXVI. A. Portion of a Leaf and Spadix CLXXVI. B. Spadix and Fruit, CLXXVI. C.

Zalacca secunda Griff.—Spadix, CLXXVII.

Zalacca macrostachya Griff.—*Runjun* of Malacca. Portion of Stem, and the lower part of a Leaf, CLXXVIII, A. Portion of a Spadix CLXXVIII. B. Sketch of the whole Plant CLXXVIII. C.»

Zalacca glabrescens Griff.—*Saluk* of Penang; male and female Spadix, with the portion of a Leaf CLXXIX.

Zalacca conferta Griff.—*Koloobee* Penang, *Assam-paiya* of Malacca; portion of a Leaf CLXXX. A. Immature Fruit-spadix CLXXX. B. Mature Fruit-spadix CLXXX. C.

SAGUS.

Sagus Konigi Griff.—Part of the Spadix CLXXXI.

Sagus Icevis.—Spadix with Fruit CLXXXII.

DESCRIPTION OF PLATES.

CALAMOSAGUS.

Calamosagus latinosus Griff.—Spadix CLXXXIII.

Calamosagus (harinefoliusj Wallichiefolius Griff.—Spadix and portion of a Leaf CLXXXIV.

Calamosagus schapiger Griff.—*Rotang simote* Malacca, a complete leaf CLXXXIV. A.

Calamosagus ochriger Griff.—Parts of the flower CCXVI. Fig. I.

CALAMUS.

Calamus castaneus Griff.—*Rotang chochoor* Malacca; Spadix CLXXXV. A.

Male and female Spadices, CLXXXV. B. Fruit-spadix of the same CLXXXV. C.

Calamus collinus Griff.—Khasyah hills, on rocks at the lower part of the ascent to Churra Punjee. The upper part of a leaf and Fruit-spadix, CLXXVI.

Calamus macro carpus Griff.—Part of a Fruit-bearing Spadix, with a section of the Seed, CLXXXVI. A. Figs. I, II.

Calamus Jenkinsianus Griff.—Fruit and Section of the Seed CLXXXVI. A. Fig. III.

Calamus exUis Griff.—*Rotang gonoon*. The Seed CLXXXVI. A. Fig. IV., dorsal, ventral, and side views longitud. Section &c.

Calamus schizospathus Griff.—From the Khasyah hills; portion of the lower part of a Leaf, and two Spadices, CLXXXVII.

Calamus arborescent Griff.—Portion of a Leaf, and Stem CLXXXVIII. A. Spadices, CLXXXVIII. B.

Entire plant from a specimen in the Bot. Garden Jan. 1843. CLXXXVIII. C.

Calamus longisetus Griff.—Portion of a Leaf and Stem, CLXXXIX. A. Inflorescence &c. CLXXXIX. B.

Calamus acanthospathus Griff.—From the Khasyah hills; part of a Fruit-spadix, CXC. A. Fig; I.

Portion of a fruit spadix, CXC. B.

Calamus Royleanus Griff.—From Deyrah Dhoon. Upper portion of Leaf, and Fruit-spadix, CXCI.

Calamus Roxburghii Griff.—*CC. totang* Roxb.) Leaves and Spadices CXCII.

~~Calamus~~ *tenuis* Roxb.—From the banks of Jeels in the Sylhet district; portion of a Leaf and Spadix, CXCIII. A.

Spadices and portion of a leaf from Assam, Natural Size, CXCIII. B.

Spadices leaf &c. CXCIII. C*

Calamus leptospadix Griff.—Portions of Leaves, CXCIV. A.

From the Khasyah hills masculine Spadix, CXCIV. B.

From Assam. Fruit-spadix, Inflorescence, portions of Leaves &c, CXCIV. C.

~~Ca~~ *lamus fasciculatus* Roxb.—From the banks of the Boorak river in the north-eastern part of Bengal. The upper portion of a Leaf and Inflorescence CXCIV. B. (the latter doubtful, rather perhaps that of *C. tenuis*). Part of a Fruit-bearing Spadix, and long section of a Seed CXC. A. Fig. II. Inflorescence leaves &c, CXCIV. A.*

Calamus gractas ^{or Thvb} ~~JWAU.~~ ^{nyiff} ~~triff.~~ —Portion of the Stem, Leaf, Inflorescence, and parts of the Flower, CXCVI.*

Calamus floribundus ^{nyiff} ~~triff.~~ —From the confluence of the Noading with the Burrumputra, in Upper Assam, Part of Inflorescence and a Leaf, I/Al.VII.,

^{•*y} *Calamus latifolius* ^{Pnyh} ~~KOXD.~~ —Portion of the Stem, Leaf, Inflorescence, and one of the Leaflets; the latter being natural size, CXCVIH.*

- Calamus palustris* Griff.—Mergue Herb. no. 520. Leaf and Inflorescence, CXCIX.
- Calamus geminiflorus* Griff.—Inflorescence Leaves &c, CXCIX. A.
- Calamus verticillaris* Griff.—*Rotang Chinchin* (male called *Rotang Goonjull*). Malacca. Upper part of Stem with the bases of Petioles and portion of the Inflorescence, CC. A.
A branch of the Fruit-spadix. Nat, size, CC. B.
Portion of the Stem and the Inflorescence complete, half the natural size, CC. C.
- Calamus Draco*.—The *Jaruang* of Penang, Spathes CCL A. Fruit-spadix CCI. B.
- Calamus geniculatus* Griff.—The *Doodoo* of Penang. Part of a leaf. CCII. A. Fruit spadix CCII. B.
- Calamus longipes* Griff.—*Dodow* of Malacca. Base of a Spathe, part of a Stem and the Fruit-Spadix CCIII. A.
Mature Fruit-spadix, CCIII. B.
- Calamus Hystrix* Griff.—*Rotang sabote* of Malacca. Part of the Petiole and Leaf CCIV. A.
Inflorescence and Stem CCIV. B.
Fruit-spadix, Stem and bases of the Spathes, CCIV. C.
- Calamus leptopus* Griff.—*Rotang chinchin* of Malacca. Inflorescence CCV. A. The upper portion of the Stem with bases of Petioles, Spathes &c, CCV. B. Masculine Flower, CCXVI. Fig. IV.
- Calamus Mastersianus* Griff.—No. 1201 Assam collection. Inflorescence complete CCVI.
- Calamus ramosissimus* Griff.—From Malacca. Inflorescence complete CCVII.
- Calamus nutantijlorus* Griff.—Inflorescence and Spathes, CCVIII. *
- Calamus* (Demonorops) *grandis* Griff.—*Rotang sumambo* of Malacca. Portion of a Leaf, Stem, and a Spathe CCX. A.
Stem and spathe. CCX. B.
Bases of spathes and fruit and spadices, CCX. C.
- Calamus* (Demonorops) *intermedius* Griff.—*Rotang Chrysa* of Malacca. Portions of the upper and lower parts of a Leaf, CCXI. A.
Spathe, Petiole and portion of Stem, CCXI. B.
- Calamus* (Demonorops) *Lewisianus*, Griff.—*Kicham* of Penang. Portions of a Leaf. CCXII. A.
The upper part of a stem with Spathes, Petioles and Fruit-spadices, CCXII. B.
- Calamus angustifolius* Griff.—The upper part of a Leaf, a portion of the Petiole, and Inflorescence, CCXIII. A.
Portion of the Stem with the lower part of a Leaf attached, and different views of Spathes, CCXIII. B.
- Calamus* (Cymbospathe) *hygrophilus* Griff.—*Rotang Ayer* of Malacca. Portion of a Stem, the base of a Petiole and a Spathe complete CCXIII. C.
- Calamus* (Demonorops) *monticola* Griff.—The upper part of a Leaf CCXIV. A. Fruit-spadix, Spathes, the Petiole and base of a Leaf, all attached to a portion of the Stem, CCXIV. B.
Spadices, with Spathes and Spathules complete CCXIV. C.
- Calamus* (Demonorops) *calicarpus* Griff.—*Rotang chochoor* of Malacca. Mature and immature Fruit-spadices and a Spathe detached CCXV. A. The sheathing base of Petiole, views of Spathes, and a Spadix without the external Spathe CCXV. B. Fruit-spadices leaves &c, attached to the Stem CCXV. C—Mature Fruit-spadix, CCXV. D.
- Calamus racanthopisj* *Kirtong* Griff.—The leaf of this is the *Kochum* of Penang, and is a *Kaloobe* or *Zalacca*, the spadices are those of Demonorops. It is the *Rotang Kirtong* of Malacca. Spadices and portion of a Leaf CCXVI. B.

DESCRIPTION OF PLATES.

Calamus Wightii Griff.—Fruit-spadix with detached Fruit, sections of Seed &c, CCXVI. C.f

Calamus petiolaris Griff.—Male Flowers CCXVI. Fig. VII.

PLECTOCOMIA.

Plectocomia elongata Mart-Part of a feminine Spadix, CCXVII. A. Another more complete, CCXVII. B.

Branch of a Fruit-spadix, CCXVII. C.

Plectocomia Khasyah Griff.—Spadix, with fig*. 6,6, a mature Fruit, and section of the Seed, CCXVIII.

Plectocomia Assamica Griff.—Mature Fruit and section of the Seed. Figs, c, a, CCXVIII.

*Plectocomia Himalaya*TM Griff.-A branch of the Spadix, a portion of the Leaf, and the parts of the flower of a specimen from Darjeeling CCXIX.

EUGEISONA.

Eugeisona triste Griff.-Bertam of the Malays. Sketch of the entire plant at Ching hill Malacca, Oct. 1842. CCXX.

Portion of a Stem as well as of a Leaf detached CCXX. A.

Young Panicles CCXX. B. More advanced Panicles in fruit, CCXX. C.

CORYPHA.

~~Corypha~~ *Corypha lata* jtoxb, The entire plant, with a branch of the Spadix and parts of the Flower and Fruit CCXX. D.*

~~Corypha~~ *Corypha fastigata* jtoxb, Entire plant CCXX. E.* Branch of the Spadix, a Leaf, a Fruit, and Sections of the latter, together with Flower enlarged. CCXX. F.*

LICUALA.

Ucuala paludosa Griff.—Anglice Penang Lawyer, a complete Leaf CCXXI. A. Inflorescence CCXXI. B.

Apex of Stem with bases of Petioles &c, CCXXI. C.

Ucuala peltata Roxb.-Entire Plant, with sections of Fruit, the latter by the Author CCXXII.*

~~Licuala~~ *Licuala cordata* Mart.—Leaf and Petiole CCXXII. A.—Apex of Stem with a branch of Inflorescence, the parts of the Flower, together with sections of the Seed CCXXII B.

Licuala glabra yxila. Part of the upper portion of the Stem, an entire Leaf with portion of the Inflorescence and a portion of the Fruit-spadix with Fruit, Seed, and sections of ditto, CCXXIII.

Licuala longipes win. An entire Leaf with the upper part of the Plant, showing the form of the Leaves and In-

florescence CCXXIV. A.—Upper part of the Stem and Inflorescence CCXXIV. B.

~~Licuala~~ *Licuala trivKylla* Griff.—Entire plant in Fruit, with a section of the Seed &c, about J size, CCXXV.

LIVISTONA.

Livistona Jenhinsiana Griff.—Leaf CCXXVI. A. Inflorescence with Spathes complete, together with Fruit, and the parts of the Flower magnified, CCXXVI. B.

Livistona spectabilis Griff.—Sardang of the Malays. Entire plant with a portion of the Fruit-spadix, the Seed and a section of the latter, CCXXVI. C. This beautiful Palm is 50 or 60 feet high.

Livistona Sinensis Mart.—Entire plant from a specimen in the Botanic - Garden Calcutta, CCXXVI. D.

CHAMJEROPS.

Chamarops Khasyana Griff.—Leaf, with portion of the Petiole, and apices of divisions of the Leaf detached natural size CCXXVII. A.

Fruit-spadix, with Seed detached, and a section of a Seed magnified CCXXVII. B.

PH(ENIX

Phoenix acaulis Roxb.—An Entire plant, the feminine Inflorescence detached. Nat. size. CCXXVIII.*

Phoenix sylvestris Roxb. The *kujjoor* of Bengal. Portion of the a branch of Fruit-spadix, Vegetation of the Seed, the young plant and Sections of the Stem CCXXVIII. A. 1. Young plant, the first frond having appeared above ground. 2. Do. Do. the vaginae removed, shewing the attachment of the frond to the axis. 3. Sections of the axis, the round marks indicate the situation of vascular fascicles. The tissue is close and grumous. 4. Section of a radicle, shewing the existence of large cells between the centre and the cuticle, and the origin of a young radicle from the central part. 5. Seed. 6. Longitudinal section; nearly the whole of the horny part is converted into loose cellular spongy substance. 7. Transverse section of the unexpanded part of the process which is sent off from the hilum, agreeing in structure nearly with the radicles. 8, Expanded part of do. the difference in appearance dependant on the expansion.

Phoenix paludosa.—Feminine Spadix, portions of the Petiole and a Leaflet CCXXIX. A.

An Entire plant from Nature, with a masculine Spadix detached CCXXIX. B.

ARECA.

Areca triandra.—Entire plant together with a young plant, also shewing the Structure of the Stem CCXXX. A.

Areca Cocoides. *Penang Punowur* of Malacca.—Entire plant CCXXX. B. It is almost as tall as the Cocoa-nut Palm* Trunk annulated, thick below and sensibly diminishing upwards. Leaves spreading. The tree of which I only saw a single specimen to make the sketch from, was so crowded with others such as Cocos, that I did not get a good view of it. Its appearance, when near, is different from that at a distance, judging from another specimen seen at *Sawment malim* (here also represented) which presents a Zamianine or Taxine aspect; the leaflets appearing all to be ascending, secund, and the leaves premorse.

Areca Malaina Mart.—Portions of the Stem with Fruit-spadices and Spathes CCXXX. C.

Areca Dicksonii Roxb.—Inflorescence and parts of the Flower as well as Pinnules CCXXXL*

Areca gracilis Roxb.—*Girgoa* of Assam. An entire Leaf CCXXXII. A.—Leaves and Fruit-spadix CCXXXII.

B. See the observations on the varieties of this species p. 155. Portions of the Stem with Spikes \$ nat. size CCXXXII. C.

Areca paradoxa Griff.—Fruit CCXXXII. C. Fig. II.

Areca disticha Roxb.—Upper portion of the Plant and a portion of the Stem with Spikes in fruit and flower CCXXXIII. A.*

Areca tigillaria Jack.—*Nibong* of Malacca. Entire plant CCXXXIII. B.

Areca horrida Griff.—*Bhyass* of Malacca. Entire plant CCXXXIII. C*

SLACKIA-

Slakia geonomaformis Griff.—Upper part of the Stem with branches of Inflorescence, together with the Entire Plant CCXXXIV.

ARENGA.

Arenga saccharifera. *Anowe* Malacca. CCXXXV. A. This of all Palms is the most beautiful. Its stem is adorned with bundles of black, fibres incircling the petioles, and surmounted by a large dense dark green crown. Some of the pinnules, are horizontally, and other ascendingly curved. The fibres are a most useful material for cordage.

Arenga Westerhoutii Griff.—*Langkup* of Penang. Middle part of Leaf CCXXXV. B.

Lower part of Leaf CCXXXV. C. Apex of a Leaf CCXXXV. D.

Arenga Wightii Griff.—Spadix complete, the parts of the Flowers, together with part of the Fruit-spadix and sections of the Fruit CCXXXV. E.t

CARYOTA.

Caryota (pbtusa) obtusidentata Griff.—Part of a Leaf. CCXXXVI. A. Branches of masculine Spadix CCXXXVI. B.

Caryota sobolipera Mart.—*Tukuss* of Malacca. Entire plant in Flower CCXXXVI. C.

HARINA.

Harina caryotoides.—Entire plant CCXXXVII.

Harina oblongifolia Griff.—Male Spadix CCXXXVII. A. Female Spadix CCXXXVII. B.

Fruit-spadix of specimens received from Major Jenkins CCXXXVII. C.

Harina (ORANIA) *nana* Griff.—Leaves and Spadices CCXXXVIII. A.

Leaf, Inflorescence, and parts of the Flower, together with a Fruit-spadix, and sections of the Fruit and Seed. CCXXXVIII. B.

MACROCLADUS.

Macrochodus sylvicola Griff.—E&ooZ of Malacca—Part of a Leaf, and an Entire Planf. CCXXIX. A B.



PALMS

OF

BRITISH EAST INDIA

BY THE LATE

WILLIAM GRIFFITH.

PALMACE ^.

They are ligneous perennial plants, increasing by the growth of new matter at the apex. **ROOTS** slender, numerous, cylindrical, simple, or branching in the form of a dense inverted conical mass of fibres, increasing by the growth of new matter at the points.

TRUNK arboreous, ligneous, cylindrical, often simple, seldom forked, often climbing, naked, and ringed, or rough from the dilated petiolar sheaths or scars, (in one genus, *NIPA*, rhizomatous.) **LEAVES** plaited, coriaceous, fan-shaped or pinnate, and in the erect species closely inserted together, forming a terminal crown; in the climbing species, they are inserted at distant intervals along the stem. **PETIOLE** in some elongated and whip-like, its sheath often formed of reticulated fibres, and with the petiole, is armed with spines or thorns; **LAMINA** large, fan-shaped or pinnate, originally in the young state plaited, then often when mature, longitudinally torn in the direction of the secondary veins, pinnules longitudinally veined, coriaceous, often clothed with ragged wool, or scurf. **INFLORESCENCE** terminal or axillary, in some varieties spadiceous. **SPADIX** often branching, sometimes enclosed within one complete spathe, or covered by several incomplete imbricated spathes, and sometimes flagellate or prolonged and whip-like. **FLOWERS** small, either monoecious, dioecious or polygamous, rarely hermaphrodite, sometimes seated in a cup-shaped depression in the substance of the rachis, inconspicuous, membranous or coriaceous, solitary or double, (both being masculine) or treble, in such case one feminine is placed between two masculine, or aggregate: in monoecious species the feminine are placed towards the base, and the masculine towards the apex of the spadix. **PERIANTH** double, both trifid, more or less coriaceous, glumaceous, seldom coloured, persistent. **CALYX** three sepalous, sepals either distinct or more or less united, aestivation often valvate. **COROLLA** three petaled, petals somewhat like the sepals, distinct, or more or less united, aestivation often valvate.

STAMENS hypogynous, or alternately adhering to the corolla, as it were, perigynous; often six, of which three are opposite to the sepals, and three opposite to the petals; seldom indefinite, and more rarely three in number, but often rudimentary in feminine flowers. FILAMENTS often monadelphous at the base. ANTHERS introrse, bilocular with a longitudinal dehiscence. POLLEN elliptical, or between elliptical and spheroidal, longitudinally cleft; sometimes bristly.

PISTIL free, very often composed of three carpels; carpels more or less united; and existing in a rudimentary state in masculine flowers. STYLES corresponding in number with the carpels, but sometimes fewer, more or less united. STIGMA simple. OVAERY single, free, three celled, (rarely one or two celled) or three, one celled. OVULES often solitary, erect, anatropous, ascending.

FRUIT solitary or triple, either berries or drupes, often one seeded, in one tribe, the scales are reversely imbricated, in another the putamen is provided with three pores. SEED often solitary, ALBUMEN either horny or cartilaginous, solid or hollow in the centre, either even on the surface or more or less ruminant. EMBRYO monocotyledonous, round or pulley-shaped, erect, often situated behind, remote from the hilum and imbedded in albumen. PLUMULE included, inconspicuous; the germinating extremity of the cotyledon being produced in a pre-existing cavity, which is formed and increased by liquefaction in the centre of the albumen.

Palms Comprise The Following Subdivisions.

I. CALAMUS.*

LEAVES, PETIOLARY SHEATH often armed with straight, subulate or curved spines^ LAMINA pinnate, (in one genus round or fan-shaped.) LEAFX-KT* often linear, margin and upper surface bristly. INFLORESCENCE spicately or racemously paniculate, SPATHES except in one genus (CERATOLOBUS,) many, incomplete. FLOWERS polygamously monoecious or dioecious, both sexes valvate, tribracteate, solitary or in pairs, when both are masculine, or one is feminine, the other, either hermaphrodite or masculine. PERIANTH striated with veins. COROLLA indurated, often cuspidate. STAMENS 6, seldom 12, in one instance they are indefinite. OVARY three celled, scaly or husky. OVULES solitary. FRUIT solitary, from 1 to 3 seeded, often dry, scaly; scales horny, often shield-like, reversely imbricated. ALBUMEN furrowed on the surface, excavated internally, or uniform. EMBRYO placed at the back or near the base.

They are shrubby, and often climbing or arboreous palms, mostly tropical, their northern limits in India being about the 29th or 30th degree of north latitude.

The greater part of this sub-family belongs to British East India. Very few American species have been found, and these, for the most part belong to aberrant types.

USES³ the arboreous trunks of a few are rich in Sago. The slender stems of shrubby and of climbing species, supply Walking-sticks, material for Wicker work, and other purposes of Art. The leaves supply an equally simple and convenient Thatch for houses.

* This name is here proposed, because *Calamus* appears to have the best claims to be considered the typical genus. *Lepidocaryum* moreover, which has hitherto given its name to the division, is not, I think, distinct from *Mauritia*.

† The terms here applied to the armature of these plants are not to be taken in their strict sense, which is not properly applicable to the general Monocotyledonous structure. If the thorns are of considerable size, I call them spines; if small, and especially if hooked, I call them aculei.

SECT. I. *Leaves Pinnate.*

1. ZALACCA.

INFLORESCENCE spikately paniculate. SPIKES amentaceous. BRACTEOLES membranous, woolly. FLOWERS in pairs. TEGUMENT of the seed berried. ALBUMEN excavated at the apex. Perennial almost stemless palms, without a flagellated prolongation of the petiole.

2. SAGUS.

INFLORESCENCE spikately paniculate. SPIKES amentaceous. BRACTEOLES membranous, woolly. FLOWERS in pairs. ALBUMEN surface ruminated. FRUIT composed of a single carpel. Arborescent palms flowering only once, and without a prolongation of the petiole.

3. CALAMOSAGUS.

INFLORESCENCE spikately paniculate. SPIKES amentaceous. BRACTEOLES membranous, woolly. FLOWERS solitary. ALBUMEN surface ruminated and excavated at the apex. LEAFLETS wedge-shaped, gnawed at the end. LIGULA large, and above, boat-shaped. Perennial climbing palms. Petiole prolonged and whip-shaped.

• 4. CALAMUS.

INFLORESCENCE spikately or racemosely paniculate. SPIKES (sometimes racemes) filiform, masculine compressed, in two rows. FLOWERS solitary. BRACTEOLES smooth, and united with the masculine flowers into a cup. ALBUMEN excavated, or ruminated on the surface. Perennial palms, often climbing, and often with the spadix or the petiole extended to a whip-like prolongation.

5. PLECTOCOMIA-

INFLORESCENCE racemosely paniculate, the branches of which are tail-shaped. SPATHES in two rows, imbricate, persistent. SPIKES filiform. FLOWERS solitary. FRUIT rough scaly. ALBUMEN uniform. Perennial climbing palms. Petiole prolonged.

6. EUGEISSONA.

INFLORESCENCE paniculate. FLOWERS solitary, terminal. BRACTEOLES numerous, imbricated and stalked. STAMENS indefinite. ALBUMEN solid, with six external grooves. Perennial almost stemless palms, without a prolonged petiole.

SECT. II. *Leaves Fan-shaped.*

7. MAURITIA.

Natives of Tropical parts of America.

II. CORYPHITNLE.

LEAVES often fan-shaped, rarely pinnate. INFLORESCENCE axillary, seldom terminal. SPATHES several, incomplete, sheathing, rarely single and complete ; secondary spathes sometimes wanting. FLOWERS hermaphrodite, seldom polygamous, rarely dioecious. OVARIES three, distinct or partly cohering. FRUIT a berry or a drupe,

generally solitary, one ovary only being matured, 1-seeded. ALBUMEN horny, equal, solid or excavated in the centre, or having an entering cavity lined with the tegumentary coats, or the surface itself is sub-ruminate. EMBRYO dorsal, seldom situated at the base. Either perennial or flowering only once, shrubs or trees.

SECT. I. *Leaves Fan-shaped.*

SPADIX in perennial species axillary, in species flowering only once, terminal, large. SPATHES many, incomplete, sheathing. FLOWERS sessile, solitary, or often clustered, colourless and inconspicuous, 1-bracteate. COROLLA valvate, petals 3-6. STAMENS 6, in tripetalou^ flowers free, hypogynous, in others perigynous, having the filaments often united into a ring adhering to the throat of the corolla. ANTHERS versatile OVARY often vertically sculptured. BERRIES drupaceous, olive-coloured, red or blue. SEED externally smooth, or (in CHAMIEROPS) vertically sulcate. ALBUMEN excavated in the centre, or having an entering cavity lined with the outer teguments, or (in CHAMIEROPS) externally furrowed, sometimes ruminate.

Inhabitants of tropical parts of America, New Holland, and Asia, especially the eastern Archipelago, and India beyond the Ganges. One species however belongs to the shores of the Mediterranean, and another to Affganisthan.

Their leaves are employed for *Fans* or *Punkahs*, and the dried leaflets serve for writing on.

1. CORYPHA.

INFLORESCENCE terminal. SPATHES secondary and tertiary, as many as there are branches of the spadix. FLOWERS hermaphrodite, clustered several together. COROLLA three petalled. STAMENS hypogynous. BERRY almost juiceless. ALBUMEN either hollow in the middle or solid. EMBRYO near the apex. Large trees flowering only once. LEAVES fan-shaped, palmately divided.

2. LIVISTONA.

INFLORESCENCE axillary. FLOWERS hermaphrodite, clustered several together. COROLLA tripartite. STAMENS perigynous. FRUIT a drupe. ALBUMEN with a cavity communicating exteriorly, and filled with the integument. EMBRYO about the middle of the dorsal face. Perennial trees. LEAVES fan-shaped, palmately divided.

3. CHAMIEROPS.

INFLORESCENCE axillary. FLOWERS polygamous, several together. COROLLA tripartite. STAMENS hypogynous. FRUIT a berry. SEED with a longitudinal furrow. Perennial shrubs or trees. LEAVES fan-shaped palmately divided.

4. LICUALA.

INFLORESCENCE axillary. FLOWERS hermaphrodite, solitary, or two or three together. COROLLA tripartite. STAMENS perigynous, filaments at the throat combined into an annulus. FRUIT as in LIVISTONA. Perennial shrubs. LEAVES fan-shaped, pinnately divided.

SECT. II. *Leaves Pinnate.*

SPADIX axillary, compressed, often exserted or projecting beyond the spathe, SPIKES fasciculate, often simple. SPATHE single, complete, coriaceous, with two keels, opening in three valves, the posterior being deciduous. INFLORESCENCE axillary. FLOWERS dioecious, MASCULINE (always having a rudimentary pistil) angular. CALYX 3-toothed. STAMENS hypogynous, often 6, sometimes 9, and seldom 3 in number. ANTHERS adnate. FEM

having 6 sterile stamens. CALYX as in the male, PETALS 3, round, fleshy, coriaceous, convolutedly imbricated. OVARIES distinct. STYLES distinct, recurved. STIGMA sub-simple. BERRY often oblong, red, becoming blackish, ALBUMEN sometimes rumiifited. EMBRYO central, or near the base.

Perennial, dwarf, stemless, shrubs or trees, often gregarious in dry arid places. TRUNK rough from the scars of fallen leaves. PETIOLES flattened or depressed below, above compressed and covered with copious fibrous flakes. PINNULES often fasciculate or in clusters, in several rows, rigid, shining, conduplicate or channelled, veins translucent parallel-striate, seldom solitary, in two rows, flaccid or flat; the lower surface spinous.

The palms composing this section, are inhabitants of the north western parts of Africa, and especially of the tropical parts of Asia, their northern limits being about the 30th degree of latitude.

The stems of some are rich in Sago, others in vinous juice, (Taxee) and in Sugar. The fruit of some (PHCENIX DACTYLIFERA) is highly esteemed in Persia and Arabia, as an article of food.

III. ARECINJE.

LEAVES pinnately divided, seldom twice pinnate. INFLORESCENCE axillary, and terminal, centripetal, or centrifugal. FLOWERS monoecious, dioecious or polygamous. SPATHES several, incomplete, or one or two complete, seldom none. STAMENS 3, or indefinite. PERIANTH Feminine flowers imbricately convolute, seldom with a valvate estivation. OVARY 1 to 3-celled, 1 to 3 OVULES. FRUIT either a sort of berry or drupe, 3-celled or generally one-celled by abortion, deeply 3-lobbed. ALBUMEN horny, ruminant, even. EMBRYO generally situated near the base. Perennial, shrubby or arboreous palms, flowering but ~~not~~.

SECT. I. *Leaves pinnately split, or pinnate, Spathes 1 or 2 complete. Female perianth, convolutedly imbricated. Fruit often oblique.*

Elegant, shrubby or arboreous, often graceful and reed-like palms, flourishing in shady places. CROWN often large. LEAVES pinnately divided (some deeply bifurcate), or pinnate, LEAFLETS reflexed, often obliquely acuminate. INFLORESCENCE always centripetal, or partially centrifugal. SPADIX axillary, paniculately, or racemosely divided, rarely undivided, often broken, sometimes coloured. FLOWERS monoecious or polygamous, disposed in two rows. STAMENS 3, or indefinite. Feminine flowers often situated in pairs between two masculine. STIGMA sometimes three lobbed. FRUIT either slightly drupaceous and equilateral, or somewhat like berries, and obliquely formed.

These palms belong to the tropical parts of Asia, more especially the eastern Archipelago, the South Sea Islands, and India. The northern limit of Indian species is about the 37th or 28th degree.

USES, the albumen or kernel, is astringent, narcotic, and intoxicating, that of *Areca catechu* is (with quick-lime, and the bruised leaves of *Piperis Betel*) an essential ingredient in the well known masticatory, Indian Pan, for which this species is generally cultivated.

ARECA.

SPATHES 1-2 complete. FLOWERS monoecious in the same spadix; STAMENS 3, or indefinite. OVARY 1 to 3-celled, one seeded. FRUIT drupaceous, seldom an oblique-shaped berry. LEAVES pinnately divided, or pinnate.

BENTINOKIA.

SPATHES 2, inner one complete. FLOWERS monoecious, and placed in distinct spadices, their bases being immersed

or imbedded in depressions of the rachis. STAMENS 6, OVARIUM 3-celled, with one ovule. BERRY oblique. LEAVES pinnate.

SLACKIA-

SPATHES 2, incomplete, sheathing. FLOWERS monoecious in the same spadix, bases of the flowers imbedded in depressions of the rachis. STAMENS 6, filaments united at the base.

SECT. II. *Leaves pinnate, or bi-pinnate, divisions jagged. Inflorescence centrifugal. Spathes several, incomplete, imbricate, sheathing. Female corolla valvate.*

Perennial shrubby or arboreous palms? LEAVES pinnate, or bi-pinnate, furnished with a fibrous net wrapped round the base of the petioles; primary or secondary leaflets variously gnawed, linear, or often cuneate, often disposed in fascicles \ beneath, often white. SPADIX either axillary or terminal, (at least in monoecious species,) evolution inverse. SPATHES many, imbricated, incomplete, covering the peduncle. SPIKES often pendulous, rising at the points.

FLOWERS monoecious (or sometimes polygamous) on the same, or distinct spadices, or dioecious, masculine binate, with, or without an intermediate feminine flower. SEPALS 3, imbricated, PETALS three. STAMENS often indefinite. ANTHERS linear, adnate. COROLLA in the feminine valvate. OVARY 2 or 3-celled, with as many ovules. OVULES solitary. BERRY 1 to 3-seeded, ALBUMEN even, (in CARYOTA ruminated.)

They are inhabitants of woody mountains in tropical parts of the world, especially the eastern Archipelago, The northern limit of the Indian species being about the 27th or 28th degree, and within an elevation of 4,000 feet above the sea.

USES, the undivided trunks are employed for Viaducts and House-posts, and when excavated, they are used as Aqueducts. When split, the outer tough parts of some are employed as poles for drawing water and the like, while the lighter tissue of the centre of others is rich in Sago. The fibres which clothe the petioles make superior Cordage, which is not injured by exposure to water or moisture. The Palm Wine, or juice which flows from the stem of others, is a refreshing and wholesome beverage when fresh, fermented and distilled, it affords Alcohol, and when evaporated, it affords Sugar.

SECT. III. *Flowers Monoecious on the same Spadix.*

CARYOTA.

LEAVES twice pinnate. STAMENS indefinite. OVARY 1 to 2-celled. BERRY 1 to 2-seeded. ALBUMEN ruminated.

SECT. IV. *Flowers Monoecious in different Spadices.*

AEENGA.

LEAVES pinnate, leaflets linear, once or twice auriculate at the base. STAMENS indefinite, OVARY three celled. Berry depressed, triangular, 3-seeded. ALBUMEN smooth.

HARINA.

LEAVES pinnate, leaflets wedge-shaped. FLOWERS sometimes dioecious. STAMENS in some 6, OVARY 2-celled. BERRY two-seeded. ALBUMEN smooth.

IV. NIPINÆ.

RHIZOMATOUS. LEAVES Pinnate.

Y. COCOCINÆ.

INTERIOR SPATHE woody, complete; FEMININE, COROLLA imbricated. DRUPE 1-seeded, putamen 3-porous. LEAVES pinnate.

VI. BORASSIN^AB.

SPATHES incomplete, several; MASCULINE, STAMEN amentaceous. FEMININE, COROLLA imbricated, BERRY 3-seeded. SEEDS pomaceous, their apex 1 porous. LEAVES palmate.

The following table exhibits the leading characters of the ORDER, in the connected form in which the several minor groups of which it is composed, are treated of in this work.

PAT AV/III171?

f OVARY covered with scales
J or stiff hairs. FRUIT scaly.
Scales reversely imbricate,
LSPATUBS several, incomplete.

SECTION I. ... f SPIKES round...*
< SAG us... Flowers in pairs, seed dry albumen ruminant.
(BRACTEOLES woolly.)
LCALAMOSAGus...Flowers solitary? Seed dry, albumen hollowed out at the apex and ruminant.

SECTION II. ... f SPIKES filiform, male
only compressed,
distichous. BRAC-
TEOLES without wool:
sexes almost always
on different spikes.
f FLOWERS solitary.

CALAMUS. ... SPADIX an expanded pani-
cle, rarely confined by boat-
shaped spathes. SPATHES not
persistent. FRUIT with smooth
scales. ALBUMEN pitted on
the surface, or ruminant.

Sect 1. *Coleospathes*. Climbing or erect, spadix diffuse,
spathes persistent, tubulose, small, or incomplete,
Sect 2. *Piptospathes*. Climbing. Petioles often whip-shaped,
Sect 3. *Putyspathes** Climbing. Petiole whip-shaped,
spathe flat, the tube being small or obsolete.
Sect 4. *Cymbospathes* or *Demonorops* Climbing or erect.
Petiole whip-shaped, spadix contracted, spathe boat-
shaped.

PLECTOCOMIA...Spadix with tail-shaped pendulous branches. Spathes persistent, concealing the flowers.
EUGEISSONA . Flowers terminal with many imbricated bracts. Stamens indefinite. Albumen 6 grooved.
CEHATOLOBUS. Spathe one, complete.

CORYPHDLE...

f FLOWERS hermaphrodite,
seldom polygamous, rarely
dioecious. OVARIES three,
distinct or partly cohering.
FRUIT generally solitary, one
ovary only being matured, 1-
seeded. ALBUMEN equal, solid,
or hollow in the centre, or
excavated on the surface.
EMBRYO dorsal.

SECTION I. ... (LEAVES
Fan-
shaped)

f Palmate-
ly divided
Pinnately
divided

CORTPHA... <many. Flowers hermaphrodite, several together. Corolla three petalled. Stamens hypogynous.
(Berry almost dry. Albumen hollow in the middle, or solid. Embryo near the apex.)

LIVISTONA... (Perennial trees. Inflorescence axillary. Flowers hermaphrodite several together. Corolla three-
parted. Stamens perigynous; fruit drupaceous. Albumen with a cavity communicating ex-
ternally and filled with the integuments. Embryo about the middle of the dorsal face.)

CHAMJSROPS 5 Perennial. Inflorescence axillary. Flowers polygamous, several together. Corolla three parted.
(Stamens hypogynous. Fruit a berry, seed with a longitudinal furrow.)

*ICUALA... (Perennial. Inflorescence axillary. Flowers hermaphrodite, solitary, two or three together,
Corolla three parted. Stamens perigynous; filaments at the throat combined into an annulus.
(Fruit as in Livistoua.)

SECTION II....LEAVES Pinnate, ... PHOENIX, ... Perennial trees and shrubs.

ABECIM.....

f FLOWERS mono-dioecious, or
polygamous. SPATHES several
incomplete, rarely none. STA-
MENS three, or indefinite, hy-
pogynous FEMALE perianth
convolute imbricate, rarely
valvate. OVARY, one or three-
celled. FRUIT generally by
abortion one-celled. ALBU-
MEN ruminant or equal. EM-
BRYO generally basilar.

SECTION I. ... f SPATHES one, or two,
generally complete.
< FEMALE perianth con-
volute imbricate.
L FRUIT often oblique.

f ARECA... r Spathes one or two complete. Flowers monoecious on the same spadix. Stamens either three
or indefinite Ovarium one to three celled. Fruit drupaceous, in some an oblique berry. Leaves
(pinnately split, or pinnate.)

BKNTINCKIA... f Spathes two, inner one complete. Flowers monoecious on distinct spadices, their bases imbricated
< ed in niches. Stamens, six, Ovarium three celled. Fruit a Berry? exceedingly oblique. Al-
bumen solid. Leaves pinnate.

SLACKIA... C Spathes, two, incomplete, sheathing. Flowers monoecious on the same spadix, their bases
immersed in niches. Stamens six, filaments united at the base. Ovarium three celled. Fruit
(drupaceous exceedingly oblique. Albumen ruminant. Leaves pinnately split.)

CABYOTA f INFLORESCENCE
j centrifugal, SPATUES
I Female COROLLA val-
vate.
t leaves bi-pinnate. Flowers monoecious on this same spadix. Stamens indefinite. Ovarium one
(or two celled. Berry one or two seeded. Albumen ruminant.)

ARENGA*... CLeaves pinnate; leaflets linear, one or two auriculate at the base. Flowers monoecious on
different spadices or dioecious. Stamens indefinite. Ovarium three celled. Berry with a de-
(pressed triangular apex; three seeded, albumen equal.)

HASINA (Leaves pinnate; leaflets cuneate. Flowers sometimes dioecious. Stamens sometimes six.
(Ovarium two celled. Berry two seeded. Albumen equal.)

I. ZALACCA.

*Rumph. Kb. Amboin. 5. p. 115. *. 57. /.* 2. *Reinwdt. Blume in Syst. Veget. ed Schultes 7. pt. 2. p. 1333. Wall. PL Asiat. Rar. 3. t. 222—224. Martins Palmae. p. 200. t. 118. 119. 123. 136. et 159. /.* 2. *EmM. Gen. PL p. 249. ivb. 1737. Calamus Zalacca. Goert. 2. p. 267. *. 139.*

GENERIC CHARACTERS.

SPIKES terate, amentaceous. FLOWERS imbedded between two paleaceous velvety bracts, MASCULINE in pairs, FEMININE solitary, or situated along with a neuter flower. STAMENS 6. OVARY covered with scales reversely imbricated. FRUIT one to three-seeded. SEEDS baccate or like berries. ALBUMEN excavated at the apex. EMBRYO situated at the base.

HABIT. Spreading almost stemless leafy palms, without the whip-like elongations of the petioles, the PETIOLE together with its SHEATH, are both armed with several series of rigid spines. LEAFLETS often disposed in tufts, and placed at various angles with the midrib, apex of some nodding, of some straight, both regularly alternate. SPATHES incomplete, scarios, striate, variously split and torn. SPADIX either simple or branched. SPIKES sessile, and nearly enclosed by the spathes, or they are pedicellate and protruding from beneath the spathe. BRACTEOLES united into cup-shaped depressions forming partitions between an imperfectly ternate disposition of the flowers. FLOWERS either dioecious or polygamo-monoecious. FRUIT often scaly, apex elongated, cleft, or rough.

OBSERVATION. The Genus is allied to that of *Sagus*, but differs from it in habit, (except *Z. conferta*) in the berried form of the seed, and in the albumen being excavated at the apex. To the Genus *Calamus*, these Palms approach in various ways.

They may be conveniently subdivided into two Artificial Sections.

FIRST SECTION. *Dioecious. Feminine flowers solitary.*

Zalacca edulis, Reinwdt.

„ *affinis*, Griffith.

„ *secunda*, id.

SECOND SECTION. *Polygamo-monoecious, or Dioecious. Feminine flower placed along with the neuter.*

Zalacca macrostachya, Griffith.

„ *glabrescens*, id.

» *conferta*, id.

i. ZAXACCA EDTTUS.

TAB. CLXXV.

Petiolis infra medium pinniferis, spinis robustis (fuscescentibus), pinnis fasciculato-interruptis setoso-acuminatis margine spinuloso-setosis, spadibus masculis nutantibus ramosis, ramis elongatis alternatim spioigeris, spicis sessilibus stepius distantibus quam spathas fere duplo brevipribus, fructibus kispidis obovato-pyriformibus vel ovato-cuspidatis.

Zalacca edulis, Reinwdt. Syst. Veget ed Schultes 7 pt. 2 p. 1334. *Zalacca Rumphii*, Wall. Pl. Asiat. Rar. p. 14
Zalacca Wallichana, Mart. Palm p. 201. t. 118, 119, 136.* *Calamus Zalacca*, Roxb. Fl. Ind. 3 ». 773

This is a tufted short stemmed palm. *Leaves* varying in size; in marshy shady places being 18 or 20 feet in length in dryer places, not exceeding 10 or 12 feet. *Petiole*, for five or six feet from the base, only bearing spines, which large, and generally palmate; the spines of the upper or leaf-bearing part, are often solitary. *Pinnules* or leaflets interruptedly fasciculate, they are first ascending, then curved downwards, oblong-spathulate, lanceolate, and tapered into a long subulate bristle, they are 3-keeled above, the margins furnished at intervals with short bristles. The 1st of the largest leaflet is 16 or 18 inches, breadth 4 or 5 inches.

Spadices axillary, about 2 feet long, nodding, branched, covered with scarious, split, and lacerated spathes. Each branch, and each spike suffulted by a spathej the main ones being longer than the branches, the partial, shorter than the spikes which are about two inches long. *Bracts* rounded, short striate. *Bracteoles* densely villous.

Flowers (male) of pink colour. *Calyx* three-parted below the middle. Segments of the *corolla* oblong, mucronate spreading.

Filaments white adnate to the corolla, as high up as the sinuses of its segments, then free, short and stout. *Anthers* attached near the middle. Rudimentary anthers of the *female*, consist of three oblong processes.

Female flowers were not seen. *Fruit*, which is generally sparingly produced, sessile, sub-ovate, with a stout conical apex, and of a reddish brown colour. The *spadix* in fruit is very ragged from the remains of the spathe, and if many fruits are developed, is decidedly nodding or drooping. *Seeds* three, or by abortion two or even one. The shape varies with their number. Their covering or coat is baccate, and consists externally of a thin membrane, which belongs to the fruit. *Albumen* horny, with a pit at the apex, the surface is wrinkled, and brownish-red from adhering tissue: on one of the sides is a round umbilicus, to which the terminal cavity or pit will be found to point. *Embryo* basilar, the apex of the cotyledon reaching nearly to the lower part of the terminal cavity.

HAB. This species is common in swampy places about Malacca, the Tenasserim Provinces, as well as in Burmah. It is the *Salac-koombar* of Penang, according to specimens kindly presented to me by Mr. W. T. Lewis, Assistant Resident Councillor of that settlement. Male specimens of this species exist in the Botanic Garden Calcutta but no female plants.

The Malacca plant will probably be found to be different from *Z. edulis*, when sufficient attention has been paid to the female inflorescence, the shape and surface of the fruit, and the structure of the seed.

Supposing that there be only one species, three varieties would appear to be presented as follows.

• Gastners figure as well as that of Rumphius cited under the generic character, belong according to Professor Von Martius (Palme, p. 202) to *Blumeaua*.

f It is doubtful whether the direction of the pit at the apex does not depend upon the shape of the seed, which is due to the number developed.



Salacca edulis

VAR. g. Spadices very long and attenuated almost into a flagellus; lower spathes large, imbricated, in two rows. Branches of the-spadix a good deal divided, their spikes or aments alternately approximate, but are not confluent; their spathes are about equal in length to their aments.

VAR. p. *Koombar* of Penang. Spikes (male) distant, half enclosed in ventricose spathes, equalling them in length.

VAR. ;. Spadices finale) a good deal elongated without being attenuated, much branched, sometimes distant, sometimes crowded, occasionally assuming the form of VAR. p; sometimes proliferous at the apex. The lower spathes of moderate size, spikes or aments twice as short as their spathes.

Z. *Wallickna* of the H. C. Botanic Garden.

2 ZALACCA AFFINIS.

TABS. CLXXVI. A.B.C.

Petiolis a radio supra pinniferis, spinis longis gracilibus albis, pinnis interrupte fascicules spathulato-lanceolatis acuminatis apicem versus e
 mar₂ine setigeris, spadice raasculo inferne ramoso spathis distichis linbriato, ramis abbreviat₂es quamspathae brevioribus, spicU ramorum
 congestis, distichis fructibus ovatis mamillato-cuspidatis (glabris.)

The description of this species is derived from specimens of two entire leaves, a male spadix, part of a female spadix in flower, and two fruits obtained from my collector Emanuel Fernandez.

The *Leaves* are altogether smaller, and the stalk more slender than those of any of the other species; their length is twelve or thirteen feet; the pinnules being confined to the upper half or thereabouts, of the stalk.

Spines very long, comparatively slender, and disposed in irregular, incompletely transverse sets, the longer spines deflexed, the others spreading in various directions; those of the pinniferous portion solitary and somewhat deflexed.

Pinna or leaflets interrupted, sub-ascending, otherwise with the ordinary direction; those of each fasciculus rather crowded, often almost opposite, outline decidedly falcate, spathulato-lanceolate, acuminate,* scarcely cirrhose, the acumination having few setae, the upper surface presenting three stout prominent veins, the under about twelve, all much less prominent than those of the upper surface.

The male *Spadix* appears to be about one and half feet in length; it is imbricated, with the usual scariose, mealy, variously split and lacerated spathes; the general form being subulate. The lower axes of inflorescence are branched, those above the middle simple.

Spikes generally under an inch in length, (those of the branches crowded together) with about twelve rows of small flowers disposed in pairs, their lower halves immersed in the tomentum of the spikes.

Bracts rather roundly cordate, membranous, distinct, comparatively small.

Flowers two to each bract, both male, separated from each other by a membranous perpendicular partition (part of the bracteoles) penicillate at the apex. A narrower, conduplicate, equally penicillate one on the outer side of each flower.t

Calyx three-parted nearly to the middle, segments oblong, concave.

Corolla attenuate at the base, three-parted below the middle, segments oblong-lanceolate, acute. *Stamens* six, united to the corolla, and (to each other) at the base of the segments.

Filaments free, very short, subulate. *Anthers* oblong. A rudimentary *Pistil* occurs.

The female *spadix* (in the specimen examined) is about three inches long, suffulted by a much longer lacerated spathe, aa-1 is also to a considerable degree covered by the spathelles, which are much longer than their respective spikes, much imbricated, and lacerated.

The lowermost *spikes* appear to be three or four-flowered, the uppermost, one-flowered: at the base of each within the spathelle, is a broad close-clasping bract. And round the base of each flower is also a deeper more concave *bract*, and two *bracteoles*, the margins of which are posteriorly united into a short cup, with very villous margins: part of them distinct, forming a partition and much less villous.J

*> The uppermost are not uncommonly incised at the apex, when both margins bear setae. This is also the case with *Z. edvUii* case witu *Z. edvUii*

† The bracteoles in this also appear to be originally united into a two-celled cup in one of the cells of which a flower exists, the arrangement described appears to be the result of pressure and distention.

J But these parts seem to vary much, as also the length of calyx in *Z. edvdu*.



Zalacca affinis Griff.

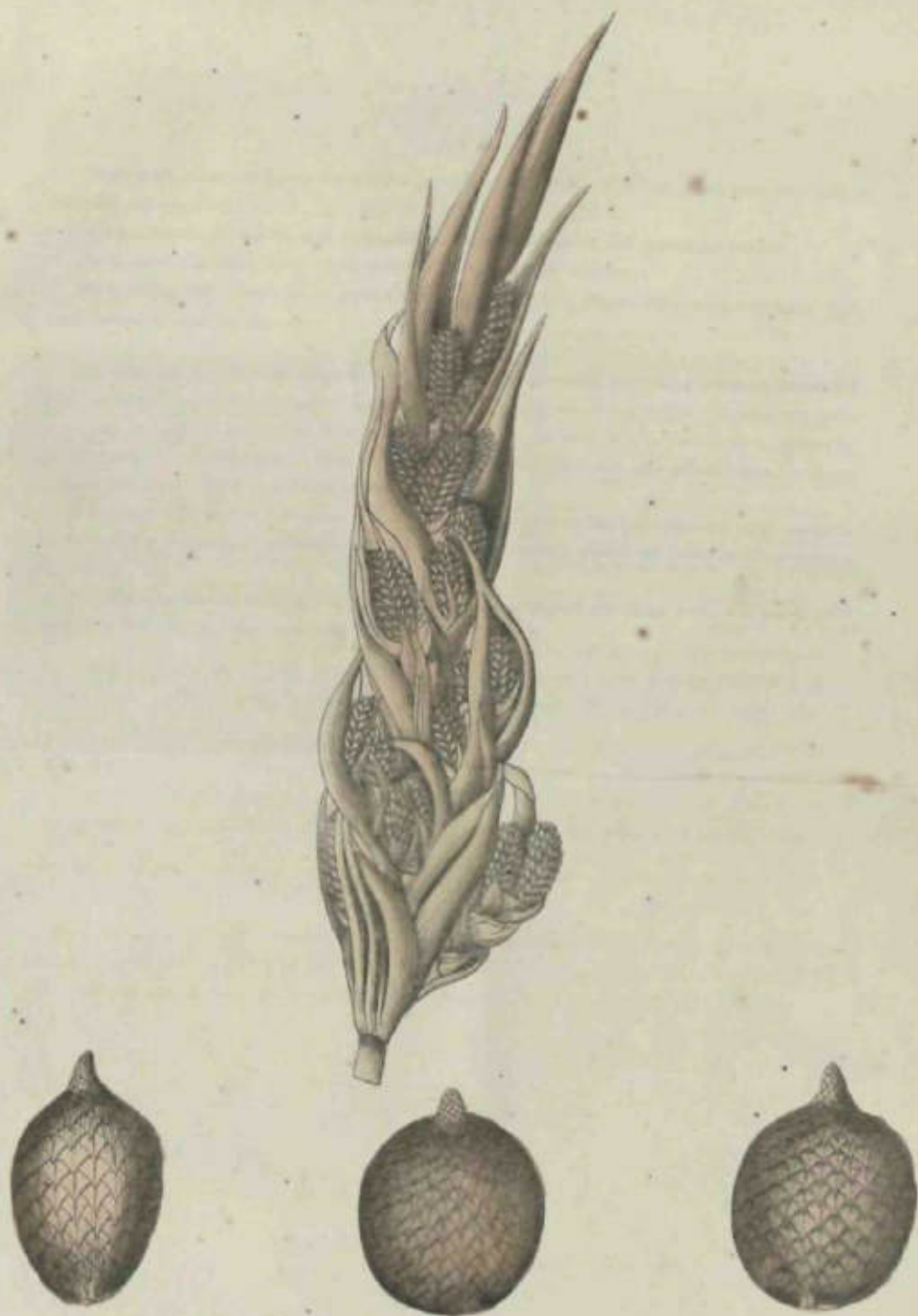


Salacca affinis Griff.



Lalava macrostachya Griff





Talacca affinis Griff



Salvia *sp.* *sp.*

. s. ZALACCA GLABRESCENS.

TAB. CLXXIX.

Pinnis continuis anguste-lanceolatis cirrhoso-acuminatis, spadice ramosissimo, spiels secundis (masculis et femineo-neutris) longe pedioellatis^
bracteis latissimis undulatis villum parcum obtegentibus, ovario strigossimo.



This is another species for which we are indebted to the kindness of Mr. Lewis, who forwarded to me portions of a leaf and spadix in flower, under the name *Salak*.

Petioles slender, trigonal below the leaflets, with an appearance of having been armed with a simple, even row of spines on either face. The uppermost spines of the under face are slightly curved upwards, short and stout on the upper triangular part, lower down, is a row of larger solitary spines.

Leaflets not interrupted, narrow, lanceolate, from twenty to twenty-two inches long, by two and a half broad, cirrhose-acuminate, margins towards the apex with a few setigerous teeth, veins as in *Z. edulis*; the terminal part of the leaf bilobed, each lobe deeply four and five cleft.

Spadices much branched, each branch bearing a spike; generally with one terminal spike. The young spikes or aments slender, owing to the broad shallow bracts looking as though they were annulate. Mature female-neuter ones stout, three or four inches long, with an obvious spiral arrangement. The spadices are less covered than in most of the other species by the primary spathes, the branches are entirely covered with loosely sheathing spathes.

Bracts of the apex, (which is attenuate cuspidate), and base, empty, broad, margins undulate, *Bracteoles* and *septum* large, shortly woolly at the points. No wool visible externally.

Male spikes cylindrical, about the same length, but much smaller in diameter, wool very little developed. *Bracteoles* obsolete or nearly so.

Male flowers in pairs, both of equal size, projecting very little beyond the bracts. *Calyx* three-toothed, teeth rounded. *Corolla* three-parted nearly to the middle, tapering below, (a considerable part of this taper portion is torus, or rather internode), segments broadish, oblong. *

Stamens united to the corolla as far as the base of the segment. *Filaments* (free) short. *Anthers* oblong. No rudiment of a *Pistil* *Flowers* of female-neuter spikes in pairs, one large, and one small. Smaller flower neuter, longer and larger than the male flowers, and more oblique, but otherwise much the same. *Barren stamens* six, united high up to the petals, filaments (free) of middling length, subulate. *Anthers* small, sterile. Within the attenuate base, an ordinary rudiment of the female.

Flmoers large, solitary, in the bud ovate, with a hard thorny point. *Calyx* (of the bud) alftost ovate, three-toothed afterwards split irregularly.

Corolla a little longer than the *calyx*, three-parted to the middle, segments very pointed and pungent.

Sterile stamens six, adnate to the corolla as high as the sinuses of the segments.

Ovary oblong, with retrorse scales; parietes thick, succulent, 3-celled. *Ovules* solitary, erect, anatropous. *Style* short. *Stigmas* 3, connivent into a Cone.

Fruit ovate, two and half inches long, one and three-quarters broad, perhaps somewhat compressed, surrounded at the base by the corolla variously flattened out and split, apex distinctly mamillate-cuspidate; the scales very many, more highly imbricated than ordinarily, more pointed, furrowed along the centre, of rich chesnut colour, browner towards the margin; towards the base, or where they become recurved on either side, they present a more prominent convexity than usual. (The pulp destroyed by insects.)

Seeds one to three, small in comparison with size of the fruit, being about nine lines long, seven broad, and five in thickness, oblong, plano-convex, umbilicate at the apex, black on the surface; without any lateral umbilicus, cavity or pit, vertical.

HAB. Found by Emanuel Fernandez an intelligent Portuguese, at Malacca near Ching, where it is known under the name of *Salak Batool*; which means the true *Salah*.

3 ZALACCA SECUNDA.*

TAB. CLXXVII.

Petiolis-, spinU-, pin»~, »P«'«cibus masculis subnutantibus spathi. tndique vestitis, spicis pedicellatē exserti* secundis, pedicellia spatulij
ginantibus irobriatis, bracteis (spicarum) distinctis suprerois et infimij vacua. * - is va-

The specimens from which this description has been drawn up, consist of male snadicM U, «.
the flowers, and a spadix niton* flows from tte MMma w o M ft, This last lias Jb ^ifces sfender, often more
exserted, and the villosity more developed.

Spadkes about two feet long, slightly curved, *closely* imbricated with the scarious, striated, split spatks.

" ^ ^ ked, exserted; stalks nearly as long as the spathes, also covered with imbricated spathes, the
ermost of which resemble those of the flowers, except in not producing any villosity. Tie *spikes themselves*
i TI w t and a half, and three inches long, and scarcely half an inch in diameter, thebractsboth of the apex and base,
appearing to be empty.

Bracts rounded, distinct, and presenting on the outer side of each flower, a tuft of hair.

Flowers densely crowded, so that their disposition is not at first apparent, the buds depressed at the apex.

Calyx tripartite to about the middle, scarious, and striate, segments oblong, concave.

Corolla (not seen in an expanded state) about the length of the *calyx*, divided not quite to the middle, the seg-
ments being oblong, and concave.

Stamens united to the petals as high as the base of the segments. *Filaments* (free) obsolete. *Anthers* oblong.

I have no information regarding the leaves, but the habit of this species was noted to be that of *Z. edulis*.

HAB.—In forests about Kujoo, in Upper Assam. The Mishtnee mountains, and on the lower ranges of hills on
the borders of Upper Assam.

This species in the character of the stalked spikes, approaches to *Z. Blumana*, Martius. Dr. Martius however
t tes that his plant has the spadix alternately and distichously branched, that the pedicels are from one to two inches
^'furnished &t ^ base with a *spathe*. The flowers also are described as scarcely exserted, and the bracts as con-
fluent at the base.

* Placed liere provisionally.

6. ZALACCA CONFERTA.

TABS. CLXXX. A.B.C.

Pinnia lineari-ensiformibus strictis margine setoso-spineacentibus, spicis (masculis vel femineo-neutris) confertis, fructibus (confertis) turbinatia glaberrimia.

This is a stout, and less tufted palm than any of the others I have seen, generally forming wherever it occurs, an impenetrable jungle.

The *petioles* are sometimes 18 or 20 feet long, and without leaflets for about half their length, they are stout, rather round on the lower surface, but flattened above, and armed (except on upper flat part) with white slender spines, disposed in a fasciculate manner.

The *leaflets* are regularly alternate, quite straight, almost ensiform, two feet long, by two and a half inches broad, rigid, three-carinate or veined, above subulate, apex acuminate, margins and apex both very bristly; the upper leaflets or pinnules, have bristles also on the three primary veins or carinae, of the upper surface.

The *spadices* are about a span long, sometimes a foot long, crowded with cylindrical *spikes* about six inches long, and seven or eight lines broad, among which occur, *spathes* of the ordinary structure, but more lanceolate than usual. The *spikes* are polygamous on different individuals.

Male flowers in pairs, accompanied with the usual bracts, and bracteoles, the latter being exceedingly villous, and connate, or which means the same thing united at their base into a sort of bi-ocular cup.

The *calyx* is composed of three oblong sepals, distinct nearly from the base.

The *corolla* also is composed of three petals, hard, and almost woody, about twice as long as the calyx.

The *stamens* are 6 in number, united below to the corolla, *filaments* short, robust, sanguineous; *anthers* oblong-ovate, and large. Rudimentary *pistil* not observed.

Female-neuter, *spikes* more lengthened, the bracts more acuminate, each of these suffults or supports, two flowers, the smaller one neuter, generally alternating in each series, the other larger, female. The *sepals* are oblong and roundish. The *corolla* three-parted below the middle, segments acuminate. Rudiments of six subulate *stamens*.

The *ovary*, with the style, inversely turbinate, scaly, three-celled. The *ovule* solitary. The *style* stout, with three acute, recurved branches, the inner surfaces of which are transversely lamellar.

The *fruits* are crowded into an irregular formless mass, sometimes of considerable size. Each fruit is turbinate, the scales perfectly smooth, with irregular denticulate margins, and a waxy shining aspect. Their colour is of a light tawny-greenish tint: mesocarp white, spongy-cellular. The *seed* is broadly turbinate, and the *albumen* adheres strongly to the pulp, which is thick, and very sour to the taste. The *embryo* is basilar.

HAB.—These palms flourish in very shady wet places in the great forests of Malacca, as at Ching and Katawn, where they are found in flower and fruit during most part of the year. It is the *Asam-Koomber* of Penang, and the *Asam-paiah* of the Malays of Malacca.

OBS. This species is distinguished even when out of flower, by its habit, the direction of its pinnules or leaflets, the bristly caring of these, and their slender short white spines. But when it is seen in either flower or fruit, it is at once known by its crowded thyrsiform spadices.

I have not yet ascertained, what distinction is indicated by the two Malayan names bestowed on this species, from which it is probable, at least so experience tells me, that there are two distinct kinds, both presenting the same unusual sort of inflorescence, which is analogous to that of the genus *Elais*.

I have specimens marked doubtfully, *Asam-pakh*, in which the leaves are three feet long, nearly opposite, and closer together, with the central carina of the upper surface bristly above the middle, the spines of this are fiiscescent. And I have others, marked also doubtfully, in which the pinnules or leaflet are much smaller, distinctly alternate, and distant, with appearances of being interrupted, but otherwise agreeing with those of *Z, conferta*,



Jalacca L., u. Y., //

4. ZALACCA MACROSTACHYA,

TABS. CLXXVIII. A.B.C.

Pinnis interrupte fasciculatis (fascicula distantibus) lanceolato-spathulatis acuminatis-simis infra medium setoso-serratis, spadibus elongatis apice nutante humifusis, spathis distantibus, spiels (faerineo-neutris) pedicelutis, ovario strigosissimo, fructibus irregulariter oblongo-ovatis cuspidato-rostratis hispidis.

This palm resembles *Z. edulis*, like which it assumes a tufted form, but is however, a stouter species.

Petioles or leaf-stalks lengthy, strong, and without any leaflets for seven or eight feet above the base, but more highly armed than *Z. edulis*, with the characteristic spines of the genus, the larger of which are in oblique, and nearly complete verticils encircling the petiole.

Pinna or leaflets more interruptedly fasciculate or clustered than in *Z. edulis*, their direction always curved downwards or nodding, the shape being much the same as in that species, but on the whole perhaps they are larger.

Spadices very long, so much so in fact as to reach the ground, on which the spikes of flowers are frequently to be found, and often immersed in water, which abounds in the favourite localities of this species.

Peduncles in those parts which are not covered by the spathes, are clothed with a thick brown wool.

Spathes of the usual nature, but much more distant; they are generally longer (except the lowermost) than the solitary aments.

Spikes three inches long, and an inch nearly in diameter, stalked; the stalks of the lowermost very long, and all provided with smaller spathes. *Bracts* rounded, tinged with pink colour. *Bracteoles*, at least of the hermaphrodite flower, rounded, distinct, villosa-ciliate.

Flowers of a lilac-pink colour; one large female flower is placed in the axil of each bract, and by the side of this, is a much smaller neuter flower.

Calyx of the larger flower three-parted, the divisions extending down to the middle of the segments, which are oblong, concave, and not very rigid.

Petals united to their middle, (below which they are white), oblong, erect or nearly so, very rigid and almost siliceous.

Stamens effete or sterile, the filaments united to the corolla high up.

Ovary oblong, very strigose with subulate erect hairs, and towards the base it is covered with pointed fleshy scales, 3-celled, substance thick and fleshy.

Ovules, one in each cell, erect, anatropous.

Style short, three-parted the division extending down to the middle, branches irregularly ob-cuneate or in other words, reversely wedge-shaped; the stigmatic surfaces are of blood-red colour.

The smaller, or neuter flowers, appear to be irregular in situation, and not unfrequently wanting, and present the rudiment of a pistil, and the stamens are reduced almost to the filaments, those opposite the petals, are much larger than the others.

Fruit obliquely oblong-ovate, attenuated into a point, three inches long, one and a quarter inch in diameter, covered with scales, presenting hispid or rough recurved points. *Pulp* white, more spongy than that of *Z. edulis*.

Seeds large, more deeply furrowed than in *Z. edulis*: all those examined were abortive, not even presenting any



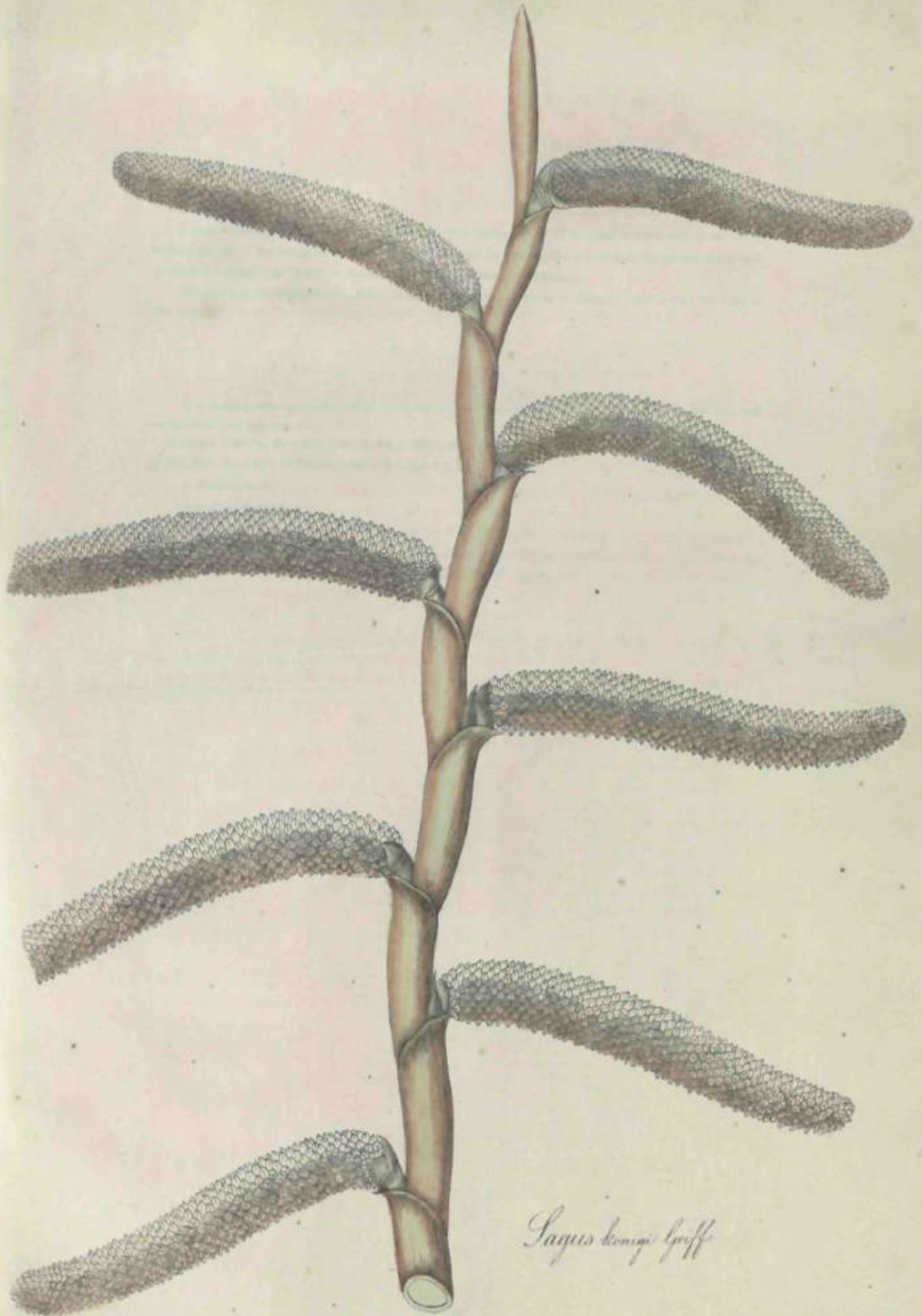
Dalacca conferta Griff.

albumen, although otherwise perfectly formed; the cavity was found to be filled with a fetid fluid; like the seeds of *Z. edulis* they are covered with a fine membrane which belongs to the fruit, since it forms the septa round the barren ovules.

USES. The fruit is eaten like that of *Salak Batool*. The petioles of the leaves when, split are used for tying on *Atap* or House-thatch, composed of the leaves of *Nipa frvticans*, and are also made into Baskets, and other descriptions of Wicker-work.

This very distinct species will be at once recognised by its spadices, by its distant solitary spikes, not altogether cuerted from the large icarious spathes, which as well as the fruit resemble those of *Z. edulis*.

HAB.—In marshy, damp and exceedingly shady places, at Ching near Malacca. It is the *Rungtm* of the Malays of that place.



Sargis keningi Griff

It appears to differ from *S. Rumphii**; of Professor VON Martius, chiefly in the spadices being smooth, and in the teeth of the calyx; but taking the phrase "spadicibus laevibus" in what appears to have been the general acceptation in which it was employed, it may be the *S. Rumphii* of Willdenow, f and Blume. J

Rumphius' figure of *Sagittaria*, *Hb. Amb.* 1.1. 17. quoted by all authors as *S. Rumphii*, gives a very fair idea of this species.

S. Rumphii U, petiolis spadiceisque armatis, floribus exsertis masculino et femineo, dentibus calycis ovatis acutis, staminibus floris foeminei anantheris, fructu depresso globoso.

S. Rumphii WM. *Sp. Pl.* 4. 404? *Roxb. FL Ind.* 3. 623? *Sagittaria* seu *Palma farinaria*. *Bumph.* I 72. t 17. 18. *Ham. Comm. Hb. And**, in *Mm. Warn. Soc.* 5.318. *Metroxylon Rumphii* *Mart. Palm* 214. t. 102. 159.

f Hortus Kewensis.

\ In adnot: *Mart. Palm*, 215.

2 SAGUS LAEVIS.

TAB. CLXXXII.

Inerme, floribus minutis villo obteotus hermaphrodite, ovariiis tribus medio cohascentibus, stylo nullo, fructu globoso vertice depressiusculoue.

S. laevis. Rumph. Hb. 1. 76. fide. Jack. Jack. Mai. Misc. Mem. 3rd in Hook. Comp. Bot. Mag. 1. p. 266. Ham. Comm. in Hb. Amb. 5. 320. Sagus inermis. Roxb. Fl. Ind. 3. 623 ?

" This valuable *Tree* rises to the height of about twenty feet, and is generally surrounded by numerous smaller and younger plants, which spring up around it after the manner of the Plantain *fMusa sapientumj*.

The *stem*, which is about as thick as that of the Coconut tree, is annulated by the vestiges of the fallen leaves, and the upper part is commonly invested with their withered sheaths.

The *leaves* resemble those of the Coconut, but grow more erect, and are much more persistent, so that the foliage has not the same tufted appearance, but has more of the graceful ascending curve of the *Saguerus Rumphii* • they are pinnate, unarmed; the leaflets linear, acute, carinate, and smooth.

The tree is from fifteen to twenty years in coming to maturity, the fructification then appears, and it soon afterwards decays and dies.

The *inflorescence* is terminal; several *spadices* rise from the summit of the stem, enveloped in sheaths at their joints, and are alternately branched. It is on these branches that the *flowers* and *fruit* are produced and they are generally from five to eight inches in length. They are of a brown colour, and closely imbricated with broad scariose scales, within which is a quantity of dense ferruginous wool, in which the minute flowers are imbedded and completely concealed. Each scale supports two *flowers*, which are hermaphrodite, and scarce larger than a grain of turnip-seed.

The *Perianth** is six-leaved, of which three are interior, the leaflets nearly equal.

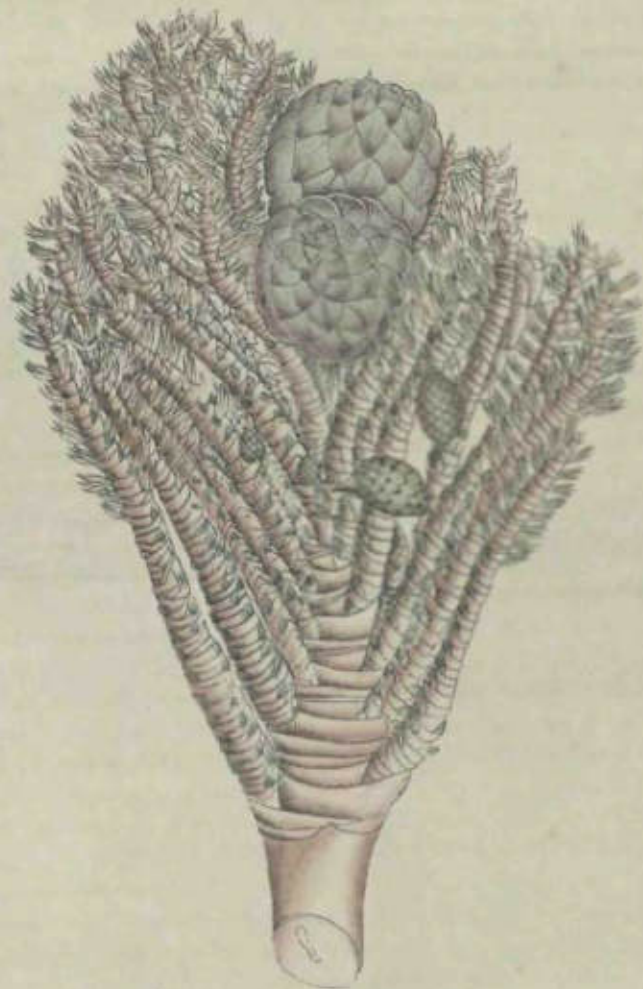
Stamens six; *filaments* very short; *anthers* oblong, two-celled.

Ovaria three, connected together in the middle, each monosporous. *Style* none. *Stigma* s

Fruit single, nearly globular, somewhat depressed at the summit, but with a sW* * * acute > mucro or point in the centre; it is covered with scales which are imbricated from the top to the bottom and shinia greenish straw colour, of a rhomboidal shape, and with a longitudinal furrow down their del* S> of a scales, the rind is of a spongy consistence, and the fruit contains a single seed of a Irregular Rhap> and having the *umbilicus* situated laterally a little above the base of the fruit Th* * * progress of the fruit t, maturity is very slow, and is said, according to the best information I can obtain, to ooe py t t appearing of the spadices to the final ripening of the fruit. During the period of infl oU ***** from *** ** spadix are brown, and apparently quite bare. Afterwards a number of small green k rescence, the branches of the scales, which go on enlarging, till they at length acquire the size of a small a i nob * appear above the brow.. on each branch. W. B., few fTM<< me to m M, m j

HAB.—Sumatra and Malacca, W. Jack.

OBS.—In habit and character this tree recedes considerable from the true *Palmk* it- p i o l > a b a t i o n b y radical shoots exactly in the same manner as the common cultivated Plantain is noo, r ar , . * p i o l > a b a t i o n b y radical shoots and s no reserve in the true Palms.



Pinus borealis

The terminal inflorescence, and death of the tree after fructification, is another peculiarity. It is allied to *Cakim* by its retroversely imbricated fruit.

This species of Sago is abundant in many parts of Sumatra and at Malacca, and is employed in the preparation of Sago for food. Considerable quantities are made at the Poggy Islands, lying off the west coast of Sumatra, where, in fact it forms the principal food of the inhabitants. The Sago of Siak is remarkably fine, and is also, I believe the produce of this species. At the Moluccas the spinous sort is considered superior to this, but I am doubtful whether it exists in Sumatra. For making the Sago, the tree must be cut before fructification commences, as it then becomes hard and dry. The process of making it has been so often described, that it is needless to repeat it here."

—W. JACK. loc. cit.



HI. CALAMOSAGUS.

GENERIC CHARACTER.

SPIKES round or terate, amentaceous. FLOWERS hermaphrodite, solitary half co
 MENS 6. OVARY covered with scales, three-celled STYLE ,,1, 1 t
 . ucceuea. &i xu<i subulate or tapering to a mint a.
 dry scaly. SEED perpendicularly excavated. ALBUMEN ruminated or furrowed on
 or uncertain in its position. EMBRYO vague

HABIT. Perennial climbing Palms, natives of the Mountains of the Mala
 petiolar sheath armed with straight conical prickles. LIGULA lanre • u 7T
 shaped above, widely extended with the petiole below. L * TM al ^ te, ^ 1 ^ ^ ^ ^ b o a U
 margins, gnawed and eroded from the middle upwards, below glaucous. The inflo
 or *Sagus*. Spathes many, incomplete, unarmed. * Orescelle ls ^ e that of *Zalacca*,

O»s:=ThiB g^TM l. the leuveauf C ^ o*, orH_oriB() the habit of *Calamus* and the seed of
 but it is distinguished from all these in the form and development of the
 of the petioles "GULES or leafy expansions at the base

The generic character requires some modification, as wiU be seen from the descri_n f
C. oehriger, of which specimens were received by me from Malacca after the b
 The alteration required is chiefly however as regards the form of the liwla IT ^ ^ ChataCter Was ^ w n up.
 8» «, which appear to vary remarkably

i. CALAMOSAGUS LACINIOSTJS.

TAB. CLXXXin.

Petiolo (partis lamellifene) aculeis sparsis uncinatis armato, pinnis petiolatis cuneato-obovatis, medium supra varie et argute ineiso-dentatis, spicis patentissimis palmaribus gracilibus, pedicellis spatha inclusis apicem supra vaginulam brevem ferentibus.

The specimens from which the following description of this species is afforded, consist of portions of both a leaf and a spadix. It is a dioecious ? flagelliferous, and to a great extent, a climbing species.

The *petiole* is angular above; below, it is slightly convex, and armed with scattered, hooked and short, white, dark-pointed thorns.

The *leaflets* are attached to the midrib by distinct stalks; the stalks are much compressed, and about half an inch long, while the leaflets are about seven inches long, by three and half inches broad, and plicate; those leaflets which compose the lower half of the leaf, are distinctly cuneate or wedge-shaped, and quite entire, but those composing the upper portion, are half-ovate, and variously jagged, with their point prolonged into a lengthened acumen; they are glaucous, and coriaceous, the under surface presenting as many distinct veins, as there are large incisions.

The *spadix* is much branched, and covered with imbricated smboth spathes, with short, oblique, acute, and sub-erect limbs. The branches of the spadix are axillary, widely spreading, and similarly covered with spathes, from which the spikes project.

The *spikes* are cylindrical, from three, to three and a half inches long, and three or four lines broad, having a woolly appearance; their pedicels are almost entirely enclosed. The *bracts* are rounded and imbricated, the lowermost are empty; the wool appears altogether to take the place of bracteoles.

The *flowers** are solitary, half immersed in the wool, which is exceedingly dense. The *calyx* is short, quite immersed in wool, with three broad, acute teeth. The *corolla* is deeply tripartite, its segments are oblong, spreading, and exerted.

The *stamens* are six in number, and are united to the corolla at the base of its segments. The free portion of the *filaments* broad, and very short, united into a very short annulus. The *anthers* are large, linear, and sub-sagittate or somewhat arrow-shaped at the base.

The *Ovary* occupying the tube of the corolla, is surrounded by the filaments, and covered with toothed scales; after fecundation it becomes quite exerted.

The *style* is subulate, rather long, and minutely three-toothed at the apex. The *fruit* is turbinate apiculate, and the scales are greenish, with brownish margins.

* The flowers appear to be solitary, for they correspond with the central line of their respective bracts, and I have not seen any rudiment of others in the very dense wool surrounding the base of the flower.

The seed presents a large excavation situated superiorly, and filled with a brown cellular substance.* The albumen is of a horny consistence, and ruminated. The embryo is vaguely placed, and of an ob-conical shape,

This species appears to be intermediate between *Calamus*, *Soyw*, and *Zalacca*, having the habit of the former the inflorescence of the second. and in some as also the succeeding, through *Zalacca glatrescens*, and *Z. tecunda*.

I observe, that a gummy matter is secreted from wounds in the spadix of this species.

HAB.-In woods along the sea-shores of the Islands of the Mergue Archipelago. Marck 1835 Meraue H b
No 1104.

* My MS. written on the spot says, « Exeavatio supera maxima, materie cellulosa brunnea replata/»



Salacca glaberrima Griff



Salacca umbata .0,,



Calamosagus lacinius.



Waeca fajU &*



Calamus agave wallichii Griff.

i SAGUS KONIGII.

TAB. CLXXXI.

Petiolis armatis, spadicebus inermibus, floribus exsertis hermaphroditis vel masculo et hermaphrodito, dentibus calycis cordato-rotundatis, stylo conico elongate.

Metroxylon Sago. C. Konig. An.Bot. 1. 193. pi. 4. M. laeve. Mart. Palm. 215. (wd. syn. Rumph. et Roxb.) Sagus Rumphii. Hort. Kew. 5. 281 ?

The appearance of these palms is somewhat peculiar, and not like that of *Cocos nucifera* or cocoanut. The following description is derived from specimens of the spadix just before the expansion of the flowers.

Panicle alternately branched, the branches spreading, and covered with appressed spathes.

The *spikes* are amentiform, alternately bracteate, about a span long, somewhat recurved, surrounded at the base by broad imbricating bracts. The *peduncles* are included, bearing a bi-carinate spathe with, very woolly margins. The *bracteoles* very woolly.

The *flowers*, are placed in pairs, one being male, the other female, almost sessile, the upper third exserted from, or projecting above the bracts and wool.

The *calyx* is infundibuliform, striate, attenuated at the base into a short pedicel, tri-dentate, with the margins of the teeth sub-membranaceous : and the teeth themselves tinged with reddish brown.

The *corolla* is about one third longer than the calyx, striate, and coriaceous, with the exserted part of a reddish colour.

The *stamens* of the male flower are the largest; the *filaments* are flat, broadly subulate, monadelphous to some distance upwards, and united also to the corolla ; the *anthers* are large, attached high up by their backs. A rudimentary *pistil* occurs, consisting of three oblong bodies, precisely like very rudimentary carpellary leaves.

The *hermaphrodite flower* of each pair, is situated on the right (looking at the spike in front). The *stamens* are smaller than in the male, united to the corolla up to the base of its segments.

The *ovary* is roundly oblong, the upper half being covered with a few large scales. The lower half being naked, and very thin. In this part there are three ovules, ascending, anatropous, but it is difficult to ascertain whether the ovary is three-celled or not, from its great tenuity. The *style* is conical, trigonal, and tri-dentate at its apex, the teeth being ovate and stigmatose on the inner surface.

The *fruit* when very immature, is between turbinate and globose, pointed by the style, and covered with scales, of a green colour, with ciliated edges. The *seed* while it is yet very immature, is erect.

HAB.—This tree, called *Rumbiya*, is cultivated about Malacca, generally on the edges of rice swamps. It is very common about Rumbiya, between Malacca and Ayer Punnus, whence the name of the place.

OBS.—The specimens were brought to me when at Malacca, under the name of *Rumbiya*. No leaves came with them. It appears to differ sensibly from *S. lavis*, of Dr. Jack, in the pairs of flowers consisting of a male, and a hermaphrodite, in the size and exertion of the flowers, the coadunate ovaria, and the comparatively long style.

I may also mention that the common *Rumbiya* of Malacca, (which is I believe identical with this) has distinctly caiamine spines on the petioles.

2. **CALAMOSAGUS HARINÆFOLIUS.**

TAB. CLXXXIV.

Petiolo (partis lamelliferae) aculeis sparsis uncinatis armato, pinnis cuneato-obovatis medium supra obtuse dentatis et erosis, spicis. spithamseis directione irregularibus, pedicellis pauUo exsertia apice vagina ore lacera obtectis.

The specimens affording the description of this species, consist of the portion of a leaf, and an immature spadix. The *leaves* resemble those of the preceding, but the teeth and incisions are less deep and obtuse, in which respect it presents the same difference from the preceding species that *Caryota obtusidentata* does from *Caryota urens*. The shape of the *spadix* is much less like that of a genuine *Sagus*, than that of the preceding, the branches are more slender, and they are covered with long smooth spathes, with lacerated mouths.

The *spikes* are a span long, Ky⁷ four lines in diameter, though they seem very immature; generally they are just exserted or raised from the sheath, but occasionally the pedicel is lengthened; the lateral pedicels are plano-convex, bearing a long spathe about the middle, reaching to the base of the spike. The *bracts* are broad, and longer than the very dense wool.

Although very closely allied to the preceding, I have no doubt but that this species, when it becomes better known, will be found to be quite distinct. At present the differences are confined to the obtuseness of the teeth of the pinnules, the direction and length of the spikes, and the large bracts on their pedicels.

I have never seen the living plants, the specimens were procured by my Malay Collector from the interior of the Province of Malacca.

HAB.—Malacca, brought to me from a place called *Kussan*, under the name of *Rotang Simote*.

* The species has been inadvertently named on the plate *Wallichicefolius*, under which name it was first described by the author. *Cal. Jour* Nat. Hist** Both names however occur indiscriminately in the Mss. and of the two, we prefer *harincefolios Ed.*

3. CAX.AMOSAOTJS SCAPHIGEU.

TAB. CLXXXIV. A.

Vaginia aculeolatis ligula maxima pariter acateolata aursum acaphoidea, petiolo iaferne nudo acul* ~~du sparis zelturiz armat~~ ~~o* ^**~~ ~~oile~~ ~~graciliUBO~~
deciduo ! pinaia sessilibus anguste cuneatis, cum terminali biloba, margiae apicem ye
eraua eroao dentato et denticulato.

This description, is taken from the upper part of a specimen not in flower wV- u
name of *Rotang Simote*, and from which, part of the generic character has been taken.

It appears to differ from the preceding species in the shape of the pinnules, which ~~Ch " * * >> €~~ and in the petioles being smooth.

The stem is slender, about three or four lines in diameter.


The petiolar sheath, in the exuerted part, for about the length of si* inches, are armed with a few cattered conical prickles, and are generally spUt along the back into a rete or fibrous net, which, between the petio, e and the sheath, is prolonged into a large lifule of the same coriaceous texture, and similarly armed with the rt<rtth UouU in its UKm two-thirds boat-shaped, and closely half embracing the next sheath.

The Jetiote is two and a half feet long, and the young ones are prolonged into ftageU or whips; the naked part below the leaflets, is fifteen to seventeen inches long, roundish and armed on the back with . few . ^ ^ prickles, such prickles as occur among the leaflets, are more hooked, and are disposed in a single row.

The pinnules or leaflets are distant, the lower ones are approximated more closely together ti< u
The pinnules or leaflets are distant, the lower ones are approximated more closely together ti< u
ae -i thir gnaal shape big ^Z^^^ZrZX^^
erose^entate. of a thick substance, <> * > e more clong^ the terminal ones are I b ^ " ^ " * " Som o
foratt of « * . - H - ' * . , - ^ " ^ Z terminal truncate mar^ n they are ^ * ^ * — . and bi., o beU.
above the middle they are truncate, and a



Femalis large, also oblique.

Calyx is divided to the middle, scarious, very striate, segments oblong obtuse. Corolla (expanded not seen), **to.ta.w.o.a.** 

Barren stamens six, much like those of the neuter flowers.

Ovary very *triangulose* with erect stout hairs,* (of which the lower are the shorter), ovate conical, with a stout neck similar *vered with hairs, ...*
neck of the ovary, three-parted, segments lanceolate, stigmatose inside.

Obs. This species, would appear to approach *Z. secunda*, in the branching of the spadix. It is the only species I am acquainted with, in which the wool of the bracteoles is so little developed as not to be visible externally. The spikes consequently have a smooth aspect.

HAB.-Penang where it is called Sotofc.

* Those hairs are flattened and a little dilated at the base, upwards they become subulate, and have a fibrous appearance.



Calamagrostis Schaphigeri Hoff

4. CALAMOSAGUS OCHRIGER.

TAB. CCXVI.

Scandens, vagiais inermibiu, ligula ochreiformi, petiolis flagelliferis dorsa per totam longitudinem aculeia binatis ternatis vel prehensilibus, pinnis 8-10 cuneatis, margine supra medium eroso, et obtuse dentato et denticulate, spicis gracilibus 6-unciatibus.

The description of this species is derived from two specimens of the upper part of the plant in flower. It is a climbing, palm of a general glaucous tint. The diameter of the *stem*, including the sheath, is only five or six lines.

The *sheathes* are unarmed! and produced beyond the base of the petiole into a short, truncate, ochreiform, closely embracing, brown process.

The *leaves*, including the flagellus, are about two feet long.

The *petiole* which bears pinnules or leaflets from the base, is angular, somewhat flattened, and the under surface is armed with distant, stout, claw-shaped prickles, generally disposed in clusters of two or three together, these are continued into the *flagellus*, where they are closer than they are, on the lower portion of the petiole. The young petiole is covered with a ferruginous pubescence.

The *pinnules* or leaflets are ten to twelve in number, irregularly alternate, on short, flattened, ferruginous foot-stalks, leathery, cuneate, and about six inches long, by three wide, margins throughout the upper two inches of their length, eroso-dentate, and denticulate, the teeth ending in short, rather obtuse points. The upper surface presents about six primary striate veins, of which the central is subcarinate; between these, the under surface is striate white.

The *inflorescence* proceeds from the axils of the upper and smaller leaves, and is terminal, forming a panicle of three, to three and a half feet long. In the specimens examined, it consisted of three main branches, the lowest divisions of which are from the axils of still smaller leaves, so that the stem is really branched, each *branch* being about two and a half feet long, covered with long closely sheathing and limbless *spathes*. From the axils of these arise the spike-bearing branches of a similar structure, but much more slender, from a span, to a foot long, and like the main-branch, flexuately undulated.

The *spikes* are slightly exserted, that is to say, project a short distance above the surrounding secondary spathes, they are from five to seven inches long, and slender. The *peduncle* is not adnate to the axis, it is compressed, and bearing when exserted, a small sheathing tertiary spathe. The lower bracts are empty; those of the flowers are broad, almost limbless, and suffulging a single flower, otherwise their sinuses are filled with a shorter wool than in *C. lacinosus*.

The *flowers* are solitary, oblong, hermaphrodite, with an obvious spiral arrangement. The *calyx* is short, and three-toothed. The *corolla* is divided nearly to the base, into three oblong segments. The *stamens* are six in number; the *filaments* are short, stout, subulate, and unite* below to the base of the corolla; the *anthers* are linear, sagittate, and adnate.

The *ovarium* is oblong, or conico-oblong, half covered with denticulate scales, the conical upper half is angular, sulcate, and horny: from the centre of the ovarium a very short *style* arises, ended by a papillose *stigma*; the ovarium is incompletely three-celled. Ovula three, erect.

Obs.—This species is certainly distinct from *Calamococcus harisefolius*, which is again evidently distinct from *C. scaphiger*. It is distinguished from *C. laciniatus*, by the obtuse erosures of the pinnules, and the slender spikes, and from *C. harisefolius*,—by strong binate or ternate aculei or prickles, which are disposed throughout the whole length of the petiole with the shortness of the toothed margin of the pinnules, their coriaceous, less

the transverse veinlets, and the slender small spikes.

plicate nature, the absence of

found by my collector, E. Fernandez, under the Malayan name, *Rotang Donan*.

HAB.—Malacca, where

IV. CALAMUS.

*Linn. Gen. ed. 6. p. 173. Gaertn. fruct. et son, 2. p. 267. t. 139. fexcl. 0. ZalaccaJ. Roxb. Fl. Ind. 3. p. 773. fexcl. C. ZalaccaJ. honcs. 14. t. 28-29. Suppt. 5. *. 16. 17. 18. Juss. Gen. PI. p. 37. Syst. Veg. ed. Schultes. 7. Pt. 2. No. 1496. p. 1332. Mortiiw PaJro.jp. 203. t. 112. 113. 116. / 2. 3. 4. 128. 160. Endl. Gen. PI. p. 249. No. 1736, Lam. £»c. Meth. t 770 fted. C. ZalaccaJ.*

Palmijuncus. Rumph. Hb. Arab. 5. p. 97—120. fexcl. Palmijunco laevij t. 51—56. 57, / 1. 58.

Tsj&u-tsjúral et katd-tsjúrel.. Rheede, Hort. Mai. 12. t. 64. 65.

Daemonorops. Blume in Syst. Veg. ed Schultes. pt. 2. p. 1333, obs. 1. Martins Palme, p. 198. t. 117 et 125, / 1. Endl. Gen. PI. p. 249. No. 1740 r<wZ. syn. RumpUi?)

GENERIC CHARACTER.

SPIKES, or sometimes racemes, filiform, paniculate. **FLOWERS** monoecio-dicecious, that is to say, having male and female flowers on distinct spadices of the same plant, very often solitary. The **MASCULINE FLOWERS** are supported by bracts and cups, the latter each formed by two united bracteoles. The **FEMININE FLOWERS** are tri-bracteate. **STAMENS** 6. **OVARY** more or less covered with scales. **FRUIT** almost dry, one-seeded, rarely two-seeded, scaly; scales reversedly imbricated. **ALBUMEN** ruminant or foveolate on the surface. **EMBRYO** situated near to the hilum.

HABIT.—They are perennial, spreading shrubs, or small trees, erect, or often climbing.

STEM, at intervals where leaves are sent off, covered with their sheathes.

PETIOLARY SHEATH, variously armed with spines very often placed in rows, (in one case verticillate or whorled), flatly subulate; colour often variegated, sometimes very long.

PETIOLE variously armed above with spines or prickles, often extended into a whip-like thong or prolongation, the lower end of which is covered with palmate, hooked, prehensile prickles.

LEAFLETS alternate, in regular order, or fasciculate, linear, or oblong linear-lanceolate, in very few instances cuneately lanceolate, and often subulately lanceolate, often rendered rough by means of somewhat sharp or sub-pungent bristles disposed towards the margins and the veins.

SPADICES axillary, often diffused, having the peduncle often cohering with the contiguous back portion of the sheath, or imperfectly extra-axillary, often armed, and often with the apex prolonged like the petiole, or with all such prolongations abortive.

SPATHES externally variously armed with spines, prickles, or bristles; or many are deciduous, the lower ones only being persistent, or all are persistent until the decay of the flowers, plain, boat-shaped, or tubular, remaining permanent with the fruit.

OBSERVATION.—This extensive and difficult genus requires much more extended examination than it has hitherto received, its limits at present do not appear to me at all well marked. It passes into *Sagus* through *Calamosagus*, and more distinctly perhaps through *Raphia*, into *Zalacca*, by means of *C. fasciculatus*. One or two species in which the albumen is scarcely ruminant, have a lateral foveola or umbilicus. It is perhaps, not sufficiently distinct. Calamus is now divided I believe for the first time into Sections, by means of characters derived chiefly from the inflorescence.

The sub-division indicated by Prof. Martius, into species with lori, and species with flagelli, would not include those which present neither of these kinds of cirrhone elongation, of which besides, both modes may occur in one plant.*

Few of the species hitherto published appear to me determinable, such for instance are *C. humilis*, *erectus*, *extenuatus*, *quinquenervius*, and *pencilatus* of Roxburgh, perhaps all those of Loureiro. and the following in Martius' great work on Palms, viz. *C. aureus* Reinw., *concinus* Mart., *ruber* Reinw., *calappunux* Mart., *platyspatius* id., *Helectropittm guruba*, Haenk. *Melanacanthos* Mart., *nitidus* id., *Hdenkeanus* id., *ciliaris* Bl., *discolour* Mart., *asperrinus* Bl.

• The only account of this extensive genus, embracing all its known species, is that of Prof Martius, who, in *Vis sol. d'd k* Palm, after describing six species, gives short characters of the remainder, amounting to 46 or 52 altogether. This great Botanist divides them into those species which have the leaves flagellate, and those in which, by abortion of the spadix, the vagina is flagelliferous. But these conditions co-exist, so that the distinction does not form a good practical mark for subdivision. This illustrious Author does not appear to have had sufficient materials to enable him to distinguish even approximately, the numerous Sections of this particular genus. I find it useless therefore, to attempt to refer the species in my possession, to any of those previously described, except such as were figured.

Indeed the characters generally given, are so short, and regard so many different points at different times, that there is scarcely any contrast. The inaccessibility too, even in cases where figures have existed, has not I think, been sufficiently attended to.

The Following is the mode in which this Genus is here disposed of.

SECTION L CALEOSPATES.

Climbing or erect. SPADICES diffused. SPATHES all persistent, tubular, limbs small or obsolete.

«. Erect without whip-like prolongations.

<i>Calamus castaneus</i>	Griffith,
„ <i>collinus</i>	id
„ <i>schizospathus</i>	id
„ <i>macrocarpus</i> §	id
„ <i>arborescens</i>	id

p. Often climbing, furnished with whip-like thongs or prolongations, SPADICES either abortive or fertile, with an extended apex.

<i>Calamus longisetus</i>	Griffith,
„ <i>Ornatus</i>	id
„ <i>flagellatum</i>	id
„ <i>acanthospathus</i> §	id
„ <i>axilis</i> §	id
„ <i>Royleanus</i>	id
„ <i>Roxburghii</i>	id
„ <i>Rotang</i> §	Roxb.
„ <i>tenuis</i>	Roxb.
„ <i>leptospathix</i>	Griff.
„ <i>fasciculatis</i>	Roxb.
„ <i>gracilis</i>	Roxb.
„ <i>mishmeensis</i>	Griff.
„ <i>floribundus</i>	id
„ <i>insignis</i>	id

y. Climbing. PETIOLE prolonged into a whip-shaped thong.

<i>Calamus latifolius</i>	Roxb.
„ <i>geminijlorus</i> §	Griff.
„ <i>palustris</i> ,	id

§ Additional species from the Author's JIss. of which descriptions were written subsequently to his publication on the subject, in the *Cat Jour. Nat Hist. No. XVII. April. 1844.*

SECTION II. PIPTOSPATHES.

Climbing. PETIOLE often flagellate, SPADICES pointed, diffused. SPATHES 1, seldom 2, below persisting until the withering of the flower. SPATHES of the branches all deciduous.

- Calamus verticillaris* Griff.
- „ *Draco* Wild.
- „ *geniculatus* Griff.
- „ *longipes* id.
- „ *Hystrix*, id.

SECTION III PLATYSPATHES,

Climbing. PETIOLE always whip-shaped. SPADIX diffused. SPATHES flat, all persistent until the withering of the flowers. SHEATH small or obsolete.

OBS. TO this section belongs the *Katu-tijurel* Rheede, Hort. Mai. 12 to 65, referred by Roxburgh to *Calamus latifolius**

- Calamus leptopus* Griff.
- „ *mastersianus* id
- „ *ramosissimus* id

SECTION IV. CYMBOSPATHES.t

Climbing or erect. PETIOLE often whip-shaped. SPADICES contracted. SPATHES cymbiform or boat shaped long time persistent, the two external overlap the others. SHEATH obsolete.

- Calamus nutantiflorus* Griff.
- „ *Jenkinsianus* id
- „ *grandis* id
- „ *intermedium* id
- „ *Levrisianus* id
- „ *angustifolius* id
- „ *hypophilus* \$ id
- „ *monticola* id
- „ *calicarpus* id
- „ *petiolaris* id

* This species may be distinguished as *Calamus Rheedei*. PETIOLE and SPADIX

linear lanceolate.

f Dwnonoropsof Martius and Blume.

¹¹ *mod with pri_ck|ei

• ***9Ltn <J|U|ntly (*Calamus*)

i. CALAMUS CASTANETJS.

TABS. CLXXXV. A.B.C.

Humilis, spinis petiolorum plurimis valde inaequalibus parum seriatis, pinnis sequidistantibus (plurimis) linearibus (long, bipedalibus lat. uncialibus) vena central! superne dentato-setigera centrali et lateralibus utrinque inferne aetigeris, spadicibus sapius inermibus, masculo supra decomposite* elongato apice pendulo-nutante fructus quasi ambitu flabelliformi, calyce bracteam triplo-superante corollam subeequante* staminibus distinctis, floribus faeraineis conico-oblongis, fructibus rotundis vel oblongis (castaneo-rubris), cuspidatis.

This is a Palm with a short erect or decumbent stem, forming thick bushy tufts. The diameter of the stem with its sheaths, is about three inches. The specimens from which the following ample description has been drawn up, consist of entire male plants, several portions of male and female spadices, and an entire spadix in fruit. •

The *sheaths* are rather short, and highly armed with spines, disposed in very long lines; the longest spines being nearly two inches in length.

The *petioles* are channelled to a considerable distance upwards, their naked portion is from three to five feet long, that is, to the point where they begin to bear leaflets; they are angularly rounded, and armed, especially on upper side, with stout and very unequal spines. The margins of the channelled part, are densely armed with bristles, disposed in short oblique lines. The pinniferous part is nine or ten feet long, convexly triangular, the convex side being armed with stout, solitary, and distant spines, pointing downwards; the upper angular part being smooth, or armed about the middle with short teeth.

The *leaflets* are very numerous, alternate, generally approximate, often nearly opposite, linear, two feet long, by nine or ten lines broad, and subulately acuminate at the apex. Above, on the upper surface they are rendered carinate by the prominent middle vein, which bears bristles towards the point. On the under surface the bristles are confined to the central vein and a lateral one on each side. In some, the bristles are very long, and the margins are sharp and cutting, from appressed bristly teeth; the apex is hispid with bristles, strong, and very acuminate.

The *spadices* are axillary, the peduncle in one specimen is armed, as are likewise some of the spathes slightly, but they are generally unarmed, concealed by spathes, and much branched, the male being decomposed. The spathes are scarious, not much split, and generally quite smooth; limbs erect.

MALE *spadix*, two or three feet long, and branched; the branches are variously nodding, pendulous and slender. The flower-bearing branches are compound; the spikes are bifarious, the lateral ones are one inch long, the terminal, two or three inches, and often scorpioid. The uppermost branches are simple, or nearly so.

Male spikes much flattened, quite distichous, the bracts are highly imbricated, roundly cordate, and amplectent. Concealed within the bracts, is a cup with two evident teeth situated posticously, where it is also bicarinate from pressure.

The *calyx* is long, sub-cylindrical, slightly angular from pressure, with three rather short, half-ovate, acute teeth. *Corolla* a little longer than the calyx, divided below the middle into three linear-lanceolate, somewhat spreading segments.

The *filaments* are united to each other, and to the corolla as high up as the base of its segments: they are free, and as long or longer than the petals, their points being introflexed in the bud. The *anthers* are linear and exerted. Rudimentary pistil large, oblong, and composed of three abortive carpels.

FsMALt spadix nhev broader than long, especially when in fruit; it is in length about one foot, in breadth one and a half foot. The flower-bearing branches are simple, about six inches long, and rather stout. The spathes are less imbricated, because they are placed more distant than in the male, and are likewise larger and more leathery.

Flowers solitary, each with two unequal amplexent bracteoles, the outer of which, from not being appressed to the inner, leaves on one side a small niche.

Calyx as in the male, but more cylindrical.

below the middle into three linear-lanceolate, acute, with effete or abortive others.

the stemless ««'»>ch developed, but included,

Ovar, attenuate at the base, where it is smooth, at the apex it is attenuated into a stout, cylindrical, rather long style, divided nearly to the middle into three spreading or recurved branches, very papillose inside, scales small with irregular margins. Ovula lodged in the smooth base.

The immature fruit is chocolate-colored, round or oblong, seven lines long by and half broad, with a stout cuspidate or pointed apex, the upper half of which is grey; one-celled. The scales are small, with pale edges, the central furrows of the scales being well pronounced, and appearing to form as many continuous longitudinal furrows. The seed when very immature, is plano-convex, with a depression on the flat face; tegument black and fleshy.

HAB.—In thick jungles about Malacca, as at Pringitt, Ayer Pannus and by Emanuel Fernandez, with the name *Rotang chocchor*, as that by which it is

From whence it was sent to the Malays

OBS.—This species appears to vary a good deal, both as regards the arming of the

which is not always decompound, as well as in the fruit.

It may be at once known by the strong, very unequal primary spines of the

which have a tendency to become red in drying,—the short compressed, scorpioid, long linear, the flowers of which are very close together, and by the expanded flabelliform shape of the fruit-bearing

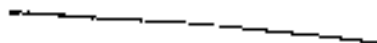
The following varieties of this species may be noticed,

VAR. ..—Upper angle of the petiole armed with short thorns, fruit bl

,, p.—Upper angle of the petiole unarmed, fruit roundish.

Fig. 2, t. 58 of Rumph. *Herb. Amb.* 5, gives a fair idea of its fruit and fig. 1, t. 55, of the same part of the male spadix.

It possibly may be *C. ruber*, Reinw. *Martius Palmae.* 209.



TAB. CLXXXV.A. Portion of male and female Bpadicea *C. Cattaneui*

TAB. CLXXXV.B. Male spadix of ditto.

TAB. CLXXXV.C. Female spadix of ditto in fruit.







Calamus castaneus Griff.



Calamus castaneus Griff.



(Hf/llllt.t, ll,,, - l).':

2 CALAMUS COLLINUS.

TAB. CLXXXVI.

Pinua (apicis) lineari-lanceolata (long, linear-lanceolata, lat. linear-lanceolata) supra tricarinata carinis setigeris subtus levibus et glabris, pedunculo ipadicis decompositi spathae infima armata, calyce bracteae longe superante corollata subequante, fractibus oblongis apice mammillatis.



The specimens, from which the following description has been drawn up, consist of a portion of the end of a leaf, one entire spadix in fruit, and a portion of another not in fruit.

The *petiole* is somewhat round and unarmed.

The *leaflets* or *pinnules*, are either alternate or nearly opposite, the largest are about fourteen or fifteen inches long, and nearly one and a half inch broad, linear-lanceolate, with a tendency to be spatulate; the upper surface is distinctly tricarinate, carinae setigerous: the lower surface is smooth, and the margins bristly ciliate, especially towards the apex, which appears to be obtuse.

The entire specimen of the *spadix* is about twenty inches long,* the branches are distant, and with the exception of the lowermost, which has two branches, the others are simple. The peduncle below the first branch, or rather spathe, is compressed, and armed with the usual form of spines. Above this, the spadix presents no armature, is slender and deflexed.

The *spathes* are smooth, except the lowest, the remains of which present spines, its tubular part being about an inch long, the limb is lacerated and truncate.

The *spikes* are from three to five inches long, and flexuose.

The *bracts* are not very closely imbricating, their limbs are shorter than usual, and almost annular; the upper *bracteole* annular; the under one is attached behind, or adnate to the spike, and bicarinate.

The *fruit* is about twelve lines long, by seven in diameter, surrounded at the base by the calyx and corolla, which are nearly equal in length, and much longer than their respective bracts; apex obtusely mammillate; the scales are very large, of chestnut brown colour, with pale membranous margins; the central furrow is broad and well developed. Seed one. Albumen ruminant.

HAB.—Khasya hills, near Mahadeb, at an altitude of about 1800, or 2000 feet. It is also found in Upper Assam.

OBS.—This species appears to be closely allied to the succeeding, the terminal part of the leaf of which, differs however from this species, in the leaflets or pinnules presenting only one rib or carina above, and in their being smooth on both sides. The spathes too, of *C. macrocarpus*, are always much lacerated, whereas in *C. collinus* they appear to become truncate.



* From this specimen, it would seem to approach the »Section *Piptospathae*, but the spathes are evidently not deciduous, the tubular bases still remaining.



TAB. CLXXXVI. Pinnules, and spadix in fruit.



3 CALAMI'S MACROCARPTT8.

TAB CUOCXVL A. rV 111.

The *•pecitm* from which *ttU d<x-ri>tiuii u tukuii, toiiswU* of the upper part of *u fruU-tpadix*, a daarticJ spike *tmd MfWI lou« fruiU*.

Tfat wptulii ieenu to be little more than * foot long, with *Uort lubuUr lacerated *•palhe**. united iimartln the base A* «Lu tfr Mk«l f«rt«i of the peduncle, with daw-iihaperl *tout thorns. The «(*rr is much ttiWTff*M, and anued with very *harp ddlesed tbenw. The dtouched »/»ir is «ix inc!*cs long, «tout and covered Kith scariouu truncate *bmctt*, vtrioiuly «»lil. T!K *ipike** of tie *pex of the upadix, are one or two iuche* long.

*Fruit biUriou**. aurroutkd At the boic by the calyi uid cuolla, which are nearly eijua] in length, (llu* latter luuchr *plit) *nd by t»nvu «t*intfw««i t««u l/tac-t*, the ioerof which last i» cup.atiapcd, upmost jadcrd^l in the t»utcr, «hkli i* IHCWUWW next the axU. Then *n BOOK appearance* indicating an additiunal flower

Ovate oblong, 1J inctaw lung, by 1 inch brawl, Nntutly nuuiunillato-cu«<ii(tilte. Tlic *tcatrg* arc *nrf lurgi*¹, [»(the larger there are tut tetiesl. deeply and broadly erued, of a wliiluU odiroleueou* colour, with a black introuargiuiul line, ««d C«ic edge*. Ciutilajinou^ tiorny, and abuiJIV- -SwJ «»^r. errcl, of black colour, wirh a Uiickub succultut *cusjiid iilleuiinwil*.

The *albumen u* horny, much ruiuuaiated, tlic proeHC* crowded, reaching to about half its depth, and rilled with rwinouu-lookingj mi-brown IMHM.

This fia« fpecim, which »ppnwcb« to the wze of it* fruit, «nJ Ik Ivgr Kalea by which thit in covered, to Jin-A^, » evidently allied to ft coUiww, and *tckUotpath*t*, and alw to C, *Ktaylttm*.

U.Stkr Koi«hj»TBh*. one of th* Bootea Ikwan, from whence it was v«y kindly Mat to M ny my friend Major Jrnkiu*.

The following i* the de*crii«ioti of a fruit (Td>- CUCXXVI. A. Fig. 11.) lent afpantdy by Majtir Jenkins, vhfca prutably beloogn (o the name fpeci«.

This fmil U rifipChaH 11 i«h« long. MM) 8 HM broad, .toutly tnamillate at tike ap«. Scale, ray larp (of the kv«Ht the« are about *tn •*/»»> *»tb * d«p*, and very broad oeotoal furrow. Colour ochroleucom, with minutely denticulate whi.i.h edp». »nd • br«d dark brown inlro^ & inai BM.

6e«d one. of the WK »h*|^ with tfr fruit it*«Jf, oi * bUckwb coJotjr, axd u far u can be judged aSW tfer *dry vota**, *bmsate*. All***** homy. cartiUMPumu, and excwdin«ly ruauate, Oabryo cavity lar^ obl^ue, and near thf ba«.

-HIT locality id which llw pl«» " « foutul> rrwu « Mt « lbl* (TM^ w*» Uk, n, " w* »peci«t. hut tl* »p«i« !
closely allied to *C. Jenkinsianus* and also *C. Flagillum* as in rumination.

TAB. CLXXXVI. A. Fig. I. Upper portion of spadix of *C. macrocarpus* with ripe fruit. Fig. II. Detached fruit perhaps of the same. Fig. III. Detached fruit of *Calamus Jenkinsianus*.



I



JV



III



II



Culami.



Calamus schizospathes Griff.

4 CALAMUS SCHIZOSPATHUS.

TAB. CLXXXVIL

Pinnis equidistantibus linear-lanceolatis (long, bipedalibus lat. 1½ uncialibus) supra 1-carinatis subtus seorsum venam mediam setigeris, spatibus omnibus inermibus primariis varie fissis & fibroso-laceris, ramis approximatis inferioribus decoinpositis, floribus distantibus, calyce bractea duplo longiore quam corolla duplo brevior, staminibus distinctis inclusis.



The specimens from which the following description was drawn up, consist of parts of leaves, and male inflorescence.

Petiole triangular, its under flat face being armed with ternary or solitary stout deflexed spines, of whitish colour with black points.

Pinnules alternate, rather distant, the largest being two feet two inches long, and one and a half inch broad, linear-lanceolate, coriaceous, subulately acuminate, paler below than above but not glaucous; the mid vein is prominent above, and below bearing towards the apex a few large bristles; the margins are provided with bristly teeth; and the points are as usual hispid.

Spadix one and a half, or two feet long. *Peduncle* covered with spathes having long, much lacerated, and striate limbs. *Branches* approximated, suffulted or propped by short lacerated split spathes, longer than the internodes, and distichously branched; the upper branches simple.

Spikes four or five inches long, with a tendency to gyration, scarcely or slightly compressed. *Bracts* amplectent, also split, each concealing a short three-toothed cup, broadly emarginate behind, anteriorly oblique.

Flowers distichous, comparatively distant. *Calyx* oblong-ovate, longer by half than its bracts, with three, rather short, broadly ovate, acute teeth, very much striated. *Corolla* twice as long as the calyx, and divided almost to the base, where it is attenuated, the segments are oblong lanceolate, and sub-acute. *Stamens* shorter than the corolla. *Filaments* united to the corolla as far as the base of its segments, distinct, rather long, subulate, flattened, and smooth. *Anthers* large, linear-oblong, and about as long as the filaments. The rudimentary *pistils* consist of three narrow carpels, scarcely at all united.

HAB.—Khasya Hills: also Darjeeling, where it was procured by Collectors.

OBS.—This species is closely allied to the succeeding, from which it differs in the pale colour of the armature, —the larger leaflets or pinnules green underneath,—the split lacerated sheaths, and the flowers, which are less closely and strikingly bifarious than in any of the others of this Section.

It also approaches in its leaves to *C. longisetus*.



a CALAMUS AKBORESCENS.

TABS. (LXXXVIII A. B.)

Trimco ereelo undo 15-90 peJili, i>innii e^uiJistADlibui linear i-UnoeuUii* (long. U noculiUu Lu.] uncial'ibm) iibtui ilW.li*. r<n< c<ntr<li
 utrinific setiger*, !p*dicibi» »ipn deaxnpoiilJs lungo [wmluiis, tpithi) priauriit iriuiti*, e*lyc* brictaa lonfitudio* gutm corolt* triple
 brcviore, lUmiDihu) bui monadelphis.

This is a very elegant Palm in wine cases stoloniferous, forming at the base, apparently from off-sels very thick leafy tufts, from which arise elegant *stems*, fifteen or twenty feet high, two or three inches in diameter, and annulated; the internodes are seven inches long, and of green colour. The inflorescence, consisting of elegant ascending, gracefully curved leaves.

Petioles for two or three feet from the base, highly armed with Urge black flat spinet, intermixed with small ones, in oblique, often nearly complete series, spreading; in every direction; the pinniferous part of the petiole is trigonal, covered with whitish scurf, and armed underneath with nearly complete verticil* or circle* of *pin*-Spines, solitary or in pairs, also exist on the upper angle toward* the base of the pinniflorous part.

Pinnules or *leaflet** very widely spreading, alternate or often sub-opposite, rather distant, linear-lanceolate, the largest being eighteen or twenty inches long, and ten or eleven lines broad, acute, or acuminate into a cirrrose bristle; they are of dark green colour, shining above, and white below; the central vein above sub-cannate, and front the middle upwards on both sides furnished with distant stout bristles, margin* very blunt and pungent, also are the points, which are sometimes bifid.

Spathes about five feet long, pendulous, much attenuated towards the apex; the [uncle* where naked, are smooth, compressed, greenish, and shining. *Spathes* from four to six inches long, tubular, clavate, with *split* or *two* three inches long, often blackened, withered, and armed with scattered imbricated bristles. The uppermost, which are nearly or quite ungued. The lower flowering bracts are often de-composed, and two or three feet in length; the upper simple, their spathe shortly, inverted, unarmed, imbricated, and blackened, *Spathes* or six inches long, the younger one* rather flattened, with a tendency to be gyrate, and when in flower, to turn in an inverted direction. *Bracts* rather closely imbricated,

Flowers rather Urge, greenish, oblique, *surrounded at the base by a short cup, concealed in the bract, oblique in front, emarginate *sub-bicarinata* behind. The calyx scarcely longer than the bract, ovate, and shortly; the middle, not striate; the lobes slightly scurfy. *Corolla* three times* longer than the calyx, down to which it is divided into three oblong-lanceolate, acute, ascending lobes, which are united in the calyx*, *Ktthj* *Hfnn* united to the corolla, up to the height of the lobes. *Filaments* thence shortly exserted, (two filaments* are *d* to the anther*), angular, smooth, at length with the corolla* *Mktm* luvv. nierted



Calamus arborescens Griff



Calamus arboraceus Griff



Calamus arborescens Griff

Rudimentary pistil longhand angular, consisting of three abortive carpels united to the middle, often with bifid points.

Female unknown.

HAB.—Pegu from whence the male plant was obtained by the Rev. Dr. Carey, and introduced into the Honorable Company's Botanic garden Calcutta in 1810, in which Buxoo, the head native gardener informs me, it has been called *C. hostillis*.

OBS.—This is a very handsome and well marked species, distinguished by its erect stems, dark brown almost black spines, and the leaves which are white underneath, long, and pendulous, and by the male spadices with the primary spathes armed. I should have been inclined to refer it to Roxburgh's *C. erectus*, had the whiteness of the under surface of the pinnules been mentioned in his description. It is closely allied to the succeeding species, *C. longisetus*.

Calamus arborescent, TAB. CXXXVIII. C, TAB. CLXXXVIII. A., Pinnules, portion of stem, and petiole, of ditto. TAB. CLXXXVIII. B. Male spadices of ditto.

NOTE.—The foregoing five species of *Calamus*, belong to the *erect*, and *eflagellate* portion of the 1st Section, COLEOSPATES.

I here subjoin short descriptions of three other species, which are probably also referrible to this group.

a. *C. ERECTUS* Roxb.

Shrubby, erect, no flagelli. Leaflets rather remote, equidistant, opposite and alternate, linear-lanceolate. Spines sub-verticillate. Spadix decomposed. Berries oblong.

Sun-gotta, is the vernacular name of this plant in Silhet, where it grows with an erect trunk, like the true palms, of about 15 feet in height; when divested of the sheaths, from three to four inches in circumference, and the joints from two to three inches long. The poorer natives use the seed, as a substitute for that of *Areca*.

(3. *C. HUMILIS* Roxb.

Shrubby, not scandent not flagelliferous. Leaflets lanceolate, smooth, many-nerved. Spines few, but long and strong.

A native of ChittagODg.

\ *C. SCIPIONUM* Mart.

Caudice robusto, articulis tripedalibus subulatis rutilis nitidis; frondibus breviusculis, vaginis rhachibusque aotieatis, pinnis——; *spadice crasso decomposito, ramulis brevibus paucifloris; baccis*——

C. Scipionum, Lour. Flor. Cochinch. I. p. 210. No. 3. Edit. Willd. I. p. 260. Lam. Encyclop. VI. p. 304. No. 3. Rees. Cycl. No. 3. Schult. Syst. Veg. VII. 2. p. 1326. No. 2, (exclusis synonymis Pluk., Rheed., Rumph) Spreng. Syst. Veg. II. p. 17. No. 9. *Arundo Rotang*, Pis. Mant. p. 188. c. icone (fide Loureiri.)

Hac species scipiones suppeditat omnium elegantissimos, colore rutilo vel obscurius lutescente ac nitore insignes, unico plerumque articulo constantes.

H A B . - I » sylvis PemnsukB MdaUmm extraquepartefreti McOacoentit.wdedbundatderin Simt et in Europam exportator: Laureiro. In CocMnchina dieUu/r "Heotau." Martius.

This last species, *C. scipionum* Mart., I imagine, is the well known Malacca cane. The plant does not appear to occur about Malacca itself, and I was informed that the canes are imported chiefly from Siak, on the opposite coast of Sumatra.

< CALAMUS LO> dISETUS.

TABU. CLXXXIX.A.B.

Subcaulis erectus, spinis petioli rectis (lyri*) tdfioribuj wrulia. *stigm* If uncitlitm*) plur
 supra nitentibus l-carinatis, vena centrali Wbtut jctu ItiDBmiiu *A<H>tj, *ipfclau*
 maris infimis armatis secundariis glabris abbreviatis quasi truncatis, spinis rectiusculis compressis.

This is a tufted utemless species, with the habit of young specimen* of *C. arborticu*.

*Leave** stighUy arched, often with the blade turned ed^ways, their toUl length ia 11 or 12 feet. *PttioUt* armed throughout the lower naked part, (which is about three and half, to four feet in length), is armed with seriate, unequal, Oat spines, of black colour, arising from a white base. The vagina is armed with longer but lew seriate spio». <>^d presents aim, especially towards *the*, margin«. BUM *ti* hrktlw. Toward* th# sprx of the petiob, the spine* are solitary, and confined to the lower convex &ce.

FmnniM or *Irajtiti* Jasciculate, but from the fascicle* not being distant, thu » not to apparent at first sight as it is in aofee others, plurifimrious. some crossing orer tke others, all are arched and nodding, two feet in length, one la* and seven lines in breadth, coriaceous, convex and shining above, with one carina or rib, and oonutionally • lateral bristle-bearing vein on each tide; underneath, the central vein presents verry long bristles; margin* setowly dentate, apex hi«<iil

Sfditm very long, whip-shaped, nodding, and pendulous. flajjellu* Uuiuu'u«e_t or tnuuiuj over the neighbouring shrubs, awl •rined with tlw uiual prickles. *Branch*** pendulous, distant.

Spat,,, with very long sheath*, and lacerated scaiSous Lmbs, the >rimar> ones an armed bJow »*^ • w u t
 prickle* Ulu those of the ipadix, above with a few slender straight spines, those of the branches truncate and unarmed.

Sptket about six inches long and about two incites distant, distichous. *Br*tl\$* annular, ampkctenl, with «*«*⁻ IT any limb. Cup concealed by the bract-, oblige, emarginate behind, where it adheres to the spike.

FnttffM closely bifanous, oblique and curved. *Calf** a UIUe longer than the bracts, with thrrr, »hort. half onte teeth *Vvrotla* MiHy three Umes longer, tube narrow, nearly as long as the calyx; argfients linear oblong. Ai w t u six, apparently attached to the faux or throat of the corolla, but in ntutr only adhering M u*ual 10⁽¹⁾ cohering f«rta of thecorolJ*. *PUtmtmU* about as long as the petals. ^ W i deeply sagittate, rrmittic. The above, Jssrrr*~" of <»» H«*tn has biwn ukm (row dnsd spsciaaM.

Rmdmnt of *piitiUum* ryindrical tripartite, nearly as long as the tube of the corolla.

H*»,—The Mak Plant is sa*d to hart ban mtnduwl to the Botanic Garden, whm it flowers m the cold season, from IVgu, with *C. «r** *rescens*.

OM —This speciM » clotdy "latod to *C. wkmnai*, from young sp*cim«» oT *mUdk*, rt is icartrlj J>^{stin}

^ u - Bi n fl | Mght The armature is much the mine, olherm.e its leaflet*.*U h .rt nrvc «hitr underneath, awl



Calamus longicaulis Griff



Culamius longicaulis Griff

the flagelliferous spadix, abundantly distinguish it. In the Calcutta Garden, it appears to have been founded by *C. arborescens*, so that although it is ornamental, and easily propagated by its off-sets, from its densely tufted appearance arises, yet it does not appear ever to have been than one plant in the Garden.

From the succeeding species, *C. ornatus*, it is abundantly distinct, though it agrees with it in the great length of the spadix.

7 CALAMUS OHNATUS.-

Btume in % (. Vtg. ed, Sckultea. 7 pi. 2. p. 1326. Martiut. Palm. p. 201 | 116. fg. 2.

SUU* (*iulvit*) petioJi piuatfari omi.tw (Jbii). pinnil wpklirtutifan Ul<ri-knC<Ulk <kng. J-^ ptJiEbM UL *i uncialibus) supra 3-5
carinatis <ri>> •"•MH «TM» V 0 " «*»<<•• 'P*II"* tons™'''''' HHS-jwdiii, ipithii Ubtitow loopwmlu u until r»U p<<<* (sub-
quaternis) distantibus, spicis scorpioides-reflexis.

The sjfci im. ii examined was an entire, flowering apex of a famlt |>Uat. It is a ttout sjxxhcti, the diameter of
tin- sheath* being about two inches.

Shmtfu swollen under ibe base of the petiole, and armed with * rather complete aerie* of flat <ptne*; I^{ather}
-hort, and much broader than is usual in other appecies. Tlvj oakal luer portion of the *petioU* which i* about three
feet long, i< somewhat fiat, and channelled broadly towards the axil, uul inurh armed ; the apim uf the lower fan:
memblinj? those of the vagina, but are smaller; those of the upper face are irregular and tubulate from • *tout bast¹,
the nidrr cotvBt &cv of the pixinifroua part, which U nine or im |W< long, wj ooavulr *UigOOld*, ** *MTflted* with
float hooked {<rkk.lt*.

TU ^muUtor imfitU are nth* dkUnt, Imrgr, liucar-IMnccoUU; two, w two and quarter fert ha?, by two and
a tjuarter inchen broad, r>thcr obtiue, genera]]! bifid or two-parted at the apes, underneath they •« gUttee*** : the
upper surface tricuriuatc or thrw-Kbbed, lliiir tniit vein w fiimiahotl with cluut puugvat *mitw* toward* the ape*, as
also the margin*; apex bhpid

Xpmdu U fjrmt length (aiktea to dtjhtwn AM* long}, a> u*ual adheriuj to the next .heath, the lowwt one in the
•perimeti w iborlWt <nd fla^Ufcjtm, lh< one rameauUely abuxe, fluwtr-twring, and Dfdwed mlo a Vw_g flagellus
•even or eight feet in len^h, and armed with tint u*ud pricktea. It be*n four branchea, at aboat two and half feet
dktMoe from e<ch other, the two lowed intenuxtet are entirely covered by the k-n- tubular •heatba, the two up-
|H n.*>-t with tk- psdoatB fspuMd for a few iocbttat the ba*e, where they are unarmed and plano-convex.

Spathet without liiuln. tboae of the |tageilu» are incotupicuoiu, and all arearmed, the ipinea on the lower f<c<
being like tlio* of the vaginM, but uoaUer; the real deflexed, not wry rtrong, and tubulate from a atout oblitue ba**

Brmdm of the »|>adix end, bue cooaled to Uw orifice* of the aheaUa, bemhng alternate, •corpoid. •<>*
tpikes, two to tiiroe inche> in length. Space- between the (fiikt* oompictl by abort, Ux, trueate, amooth t{*Ui*-

* There is another Malacca species found about Ching, which appears to approach this. The following is a description of it from
living specimens out of flower. -

A large climber. Stems green, armed on the back with very broad, deflexed, either serrate or solitary spines. Flagellus very long. Lipula
distinct. Petiole near the base armed with marginal, straight, distant solitary spines; otherwise armed along the dorsum, with a row of distant
solitary hooked prickles. Pinnae or leaflets alternate or sub-opposite, linear lanceolate, two feet long, two and half inches broad, acute, with five
prominent bristle-bearing veins above.

Utm-lw dense forests, at Ching.

Spikes stout, somewhat compressed. *Flowers* in bud distichous, but not flatly bifarious; under each is a > d y sheathing bract with a short limb and shortly ciliate 'margins; outer *bracteole* obliquely cup-shaped, emarginate behind; the inner furnished with a conspicuous disk-like oval space on one side.

Calyx of stout texture, (Along, ovate, sub-oblique, shortly three toothed. *Corolla* ovate, tripartite below the middle; segments ovately lanceolate. *Stamens* six in number, large, effete or abortive, united as usual to the corolla and above this monadelphous.

Ovarium oblong obconical, with numerous rows of very minute scales. *Style* stout, conical, divided nearly to the base into three stout, lanceolate, inwardly stigmatic branches. *Ovules* solitary.

OBS.—This is a very well marked species, especially by its stature and inflorescence; it appears to be more nearly allied to *C. schizospathus* than any other.

HAB.—In forests Malacca, as about Durion ToonguU, where it was found by E. Fernandez. Malayan name, *Rotanq RuqaBodak*.

8. CALAMUS FLAGELLTJM.

Scandens, vaginis albido-furfuraceis armatis spinis longis subulatis setisque spiniformibus innumeris. Petioli (brunneo-furfuracei), parvis nodis
iculi dTulibu uincntM, tt j>U Duxrotwribai lurpiulibu*. Iopr. JnUr plum uuU> dcntUta tuiga, pians sub-oppoitis linsri-
lu>cMliti<, lomy. bJp*a,ljt.M << ,,J(,, JfL 1 } noM, <<rIm .upr. et wbtui Y>T>> mdii Mfi. Sp*,IU* 8-10 pedali, pendulo-nutanti,
if*Ihii tubul<i. ihBTM Nnpr*», *b>d>Ua m l * imit. *t tpinU MOU touting r.liqui. (nt pMlmttula.) ami
is uncinatis validis, se-



The description of this sped** is derived from the entire upper portion of » male plant, it is a stout climbing rpvrit*. tbr diunrtcr of tlw Jtpn, inchidin; the>heal», bring IJ to J? 'lia<>. 7V /Aw/A/ <*> cowwd with thick white scurf and armed with long itout irrute, yet dttinct dc6exed scurfy spine*, »ubuUte from « brood flattened bue, *ntl bctwi the •erica of tbeae, it m provided with innumenble black tpiiteMent brittlo of »ll sizes. L- f*la very Wgr. Leat-n, 6 to 7 feet long.

P?(w(* in Uw towtr united put which n 13 or U inches Jon<. deeply channelled. *nA irrvrd ftions the centre cf tin dontun with • solitary TO* of hrge hooked prickle*, lionc, the mvgia* with facicld one#, bdfgt almort *» lw>* u the Urger one* of the iheattw. Pinnifrou» put convex bif<r>l, above covered with brown scurf, armed below with rwginaj toUtary or bi.teruto prickle*, and a row of irregular orw along the middle of the doreuftt, "ome being tooth-vhaped and imall, others ckw^hvpd and placed in ihrw*, the mitral one much the kingwt; above, wi with these central one* alone.

Pinmutn at Uafitt mtuipcute the iarfert being almo-i the lowwt 3 or 3 incrw long. I? or 18 line* broad. B-nemrl*nccol*te, Urmthety. and mibuUMy acujninalr, above with a carin* bearing ttoul almMt tlwrny distant bristle*, underneath liniilarly briftly, Margin with ipinwceot brutlei, apei bi<i.....

Bpmdis 9 or 10 ftwt long, united U> the next theath newly u high u the ba<< of tl* petiole, with from 6 to ft distant branches.

tya/An tubular, tlw \amvnao0t t{ or 2 Act long, comureMed. almoct tww edgod, tnned below on 0m domujn with drflexttl rather stoat unequal rpint*, the marguul ones beinjf the longest, above armed all over with smaller prickles.

TI» other* "id specially the <po>ed part of the pedunelM, armed with stout claw-ihaped prickle*.

Brand** pendulous, secund or given off from one side, unarmed, slender, adnalc to the peduncle hij;h up. erro KHMtime* abov* the mouth* of theipalhe*.

Bm*tkn tubular, truncate, unarmed, mouthi mere <*> lea* laceralr Lower divisions branched, upper divisions branched, upper i<p<-/
ph, » or tO inch* l<Jf. <>>>>< to the brttch a. high aa the mouth of the .pttber

js^rr, di,tichou». curvtd dowuw>nU. BrncU »mplectenl with a half lanceolate limb, concealing a deep ^ rather obli^v truncate and po..icou,y «U.le to the »,,.

CWH oblon*. divided to about the middle into 3, waU aegmentt with nwrnbraou* marpru O>roU> twice * long. dMd*d nearly to the ba*e Mo *** turow .UJ*nor<bi* aegmmu. Simmn. 6. a. usual united to law bw of tbt ooroUa <<i •< *** ^ ^ WmM1 »,, fflw) lubuUt,, ilK)rtcr thwi <>• <^ ^ " ***** Im^mr. <tt<-hed b? tb. akklfc P<<<< ?<U<*- Rud'B^t of the flattta. large. cowi.unB of three tbortive <rp,IUrv l<T.e..

Fruit, (specimens from Major Jenkins) oblong-ovate 13 lines long, 9 lines broad, surrounded at the base by the spread out and more or less split perianth, the petals of which are more or less deficient, stoutly and mammillately cuspidate at the apex. Scales very large, very deeply furrowed, whitish or of red fuscous colour, margins whitish with a brown intro-marginal line; the whole having a handsome sagine aspect.

Seed one, oblong. Tegument black, sub-baccate with a dichotomous obscure raphe ? Albumen horny ruminate. Embryo basilar.

Major Jenkins says this is the fruit of the large *Pakhouri Bet* of Assam, and in another communication states it to belong to the whip-bearing Bet, *C. Flagellum*.

Its characters are to a considerable extent those of *C. (Minus)*.

HAB.—According to Major Jenkins, it is found at Golaghat on the Dhunseeri river.

This species, for which I am again indebted to Major Jenkins, is allied to *C. ornatus*, between which and *C. Umgisetus* it should at present be placed. It is also closely akin to *C. schizospathus*, which may probably be one of the same section.

9. CALAMUS ACANTIOSPATIIS.

TAB. CXC. A.B.

Spinis petioli—pinulis—spadicis (5 pedalis) pedunculo basi compresso spinis et aculeis subulatis armato ceterum liberum, spatha inflexa
durw cniuti aculeis tail onwi* sparsis valde .''••* reliquis parce armatis seu inermibus cecarinatis, ramis distantibus inflexis compositis,
fructibus elliptico-oblongis apice mammillatis, (castaneis).

The description of this description U derivtll *irwn* two fpectmeot 01 entire iVuit-bcmring »|«dk«i.

SjMdU »bout HI fert long. Upcted it the end into i ^elliu. *PttttacI** ibort, compres wd n rmed on the
edges and lower *fax* with uDequil, •tnught, iubuUte «piu» ind pnekbs, tboie of the ed^i being the longest,
otherwise in the parti not cowed by the •ptfhm it u manned.

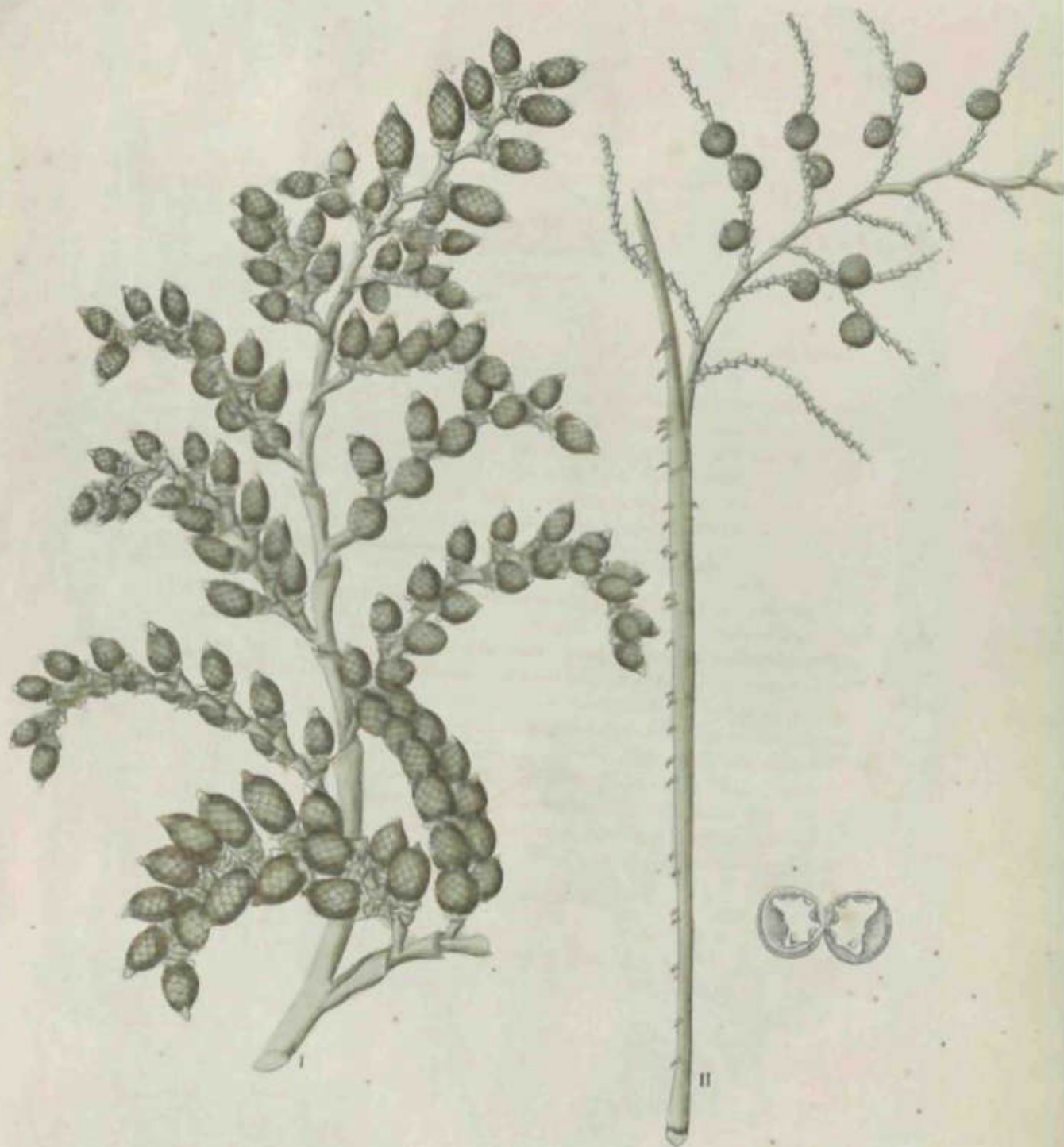
*Spath** with obwletelinibt, the low«t .boat »fp«i loos, ooropw-cd, k»«W •»««^{th*} centre of the back
and ciceptbR the *hort rrect hilf Unceoble limb, wmed with rtni^t prickki b«»ing «»ictl ta«^ The other spathes
u« •boiler, more cbvite, without an <***»« cmriui or k«l w»d otUjr aighllr « « . w uppermost, quite
unarmed.

Branches j«t exerted ta the, * *. foot or a span d^nt, A. lowest being about a span long, decom-
pound. *Spathr.* .hcthin,. ^her U.. « « * th. lowest ** - inch ta* Lower divisions compound, with
several .prwdinp ipik», with «mil«- but much .mailer di«tluu« spathes, uppermost internode often abortive
as in certain grasses.

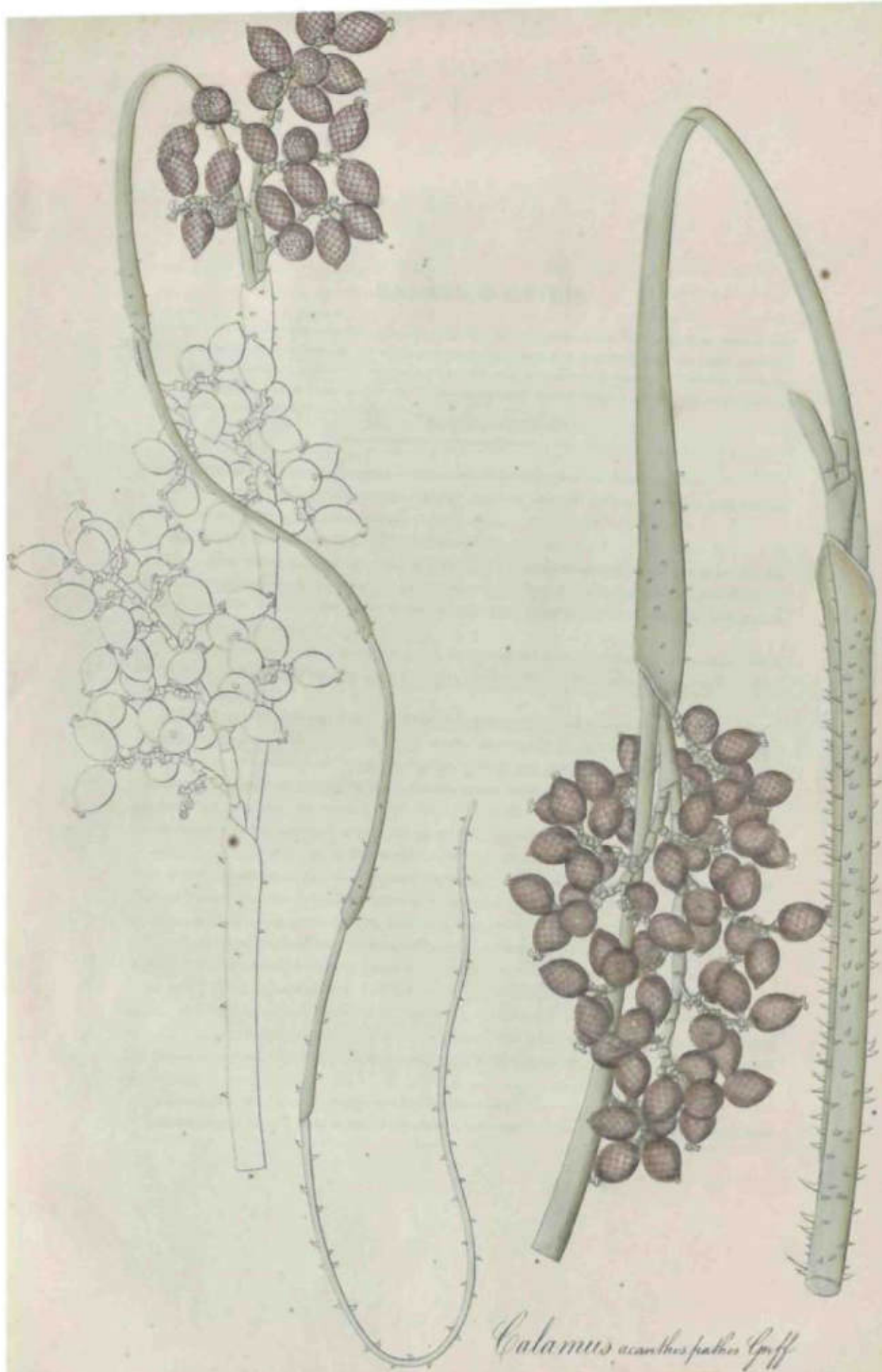
Fruits minating short stout stalks, suffulted or propped by three annular amplexent bracts, and
of the perianth, elliptic-oblong, with the mammilliform apex seven
..... *Scales* with a broad shallow central furrow, and dark edges. *Seed*
(apparently berried), erect, convex on one face and conspicuously areolate with foveolæ, on the other convex, with a
cen: umbilicus, from which the areolæ seem to radiate. *Albumen* horny, cartilaginous, on a long section reniform
with areole, that proceeding from the umbilicus being much the largest and
filled with a mass of cellular substance. *Embryos* basilar.

This species does not appear to me allied to any other I have met with. In the division and direction of the
branches of the spadix, it approaches to the section *Pipospathe*. This peculiarity together with the very
frr.iu«t co«i«l prickles on lower spathes, seem to me its chief characteristics.

Her.—Khasya Hilt.



I. *Calamus acanthospathes*. Griff
W *Calamus fasciculatus*. Reab



Calamus acanthospathos Griff

10. CJLLAMUS EXILIS.

Vaginarum aculeis irregularibus sparsis, petioli partis nudae marginalibus et dorsalis, parte pinnifera dorsalis uncinatis piunis aequidistantibus linearibus (long. 6-7 unc. lat. 4 lineal), venia tribus ucrinque aetigeris, spadice 3-4 pedali, flagello excepto subinermi, ramis decompositis, spatha infirma ancipitibus apuleata praesertim secus margines, reliqua irregulariter aculeolatis. Corolla fl. fava, calycis longitudine fructibus oblonga stipitatis cuspidatis, fuaceaeuti-bruimeia, seminaibus oblongis sulcatis, sulcis e chalaza depresso veras embryonam pseudo centraleni arcuatim convergentibus.

The following description of this species is derived from the upper part of a fruit-bearing stem.

It is a very slender species, the *stem* without sheaths being only about the thickness of a goose quill, with the sheaths three and a half to four lines in diameter.

Sheaths armed with scattered unequal somewhat hooked prickles.

Leaves about two feet in length: the lower naked portion of the *petiole* being about six or seven inches long, flat convex and armed along the back and margins with similar, but more hooked prickles, the lower marginal ones being longer and straighter than the others; in the pinniferous part, it is furnished with a row of solitary hooked prickles along the centre of the dorsum.

Pinnules or *leaflets* equidistant, linear, very narrow, six or seven inches long, four lines wide, acuminate; above, with three ribs or keels, bearing a few stoutish bristles; underneath with three veins bearing smaller bristles, margins and apex bristly.

Spadix three or four feet long. *Flagelli* or *thongs* of the upper undeveloped spadices, three feet long. *Peduncle* adnate to the next sheath high up, as high indeed as the puckered base of the petiole, the free portion appears, to be very short; the remaining part except the flagellus, which is very slender, is unarmed. The lowest *spathe* arises close to the base of the peduncle, is four or five inches long, compressed, with a few prickles here and there, and rather long ones along the margin; mouth obliquely truncate. The remaining spathes smaller; not compressed, almost fistulous, and armed towards the mouth with a few small prickles.

Branches of the spadix three or four in number, adnate to the peduncle to an inch or more above the mouth of the spathes, lower divisions three to five-flowered, the upper 1-flowered, covered with cylindrical truncate spathes. The inner *bracteole* cup-shaped, with a cartilaginous callous on one side.

Fruit spreading oblong, attenuate at the base into a short stalk, concealed in the cylindrical broad-based trifid *Calyx*, with which is a *Corolla* of about the same length, divided to the middle into three, erect, now more or less split segments, and six *stamens* without anthers, united as usual to the corolla. The apex is cuspidate by the persistent base of the style. *Scales* of moderate size, of the larger, there are about eight rows, fuscous with brown margins and points. *Seed* erect, *tegument* greenish baccate viscous, oblong, the lower half is furnished with a longitudinal very deep furrow, (the *fasdculusj* reaching to about the middle on both sides: on one side it ends, is a depression (the *chalazaj* from which several curved lines pass, converging to the centre of the opposite face, at which is the site of the embryo.

Albumen horny not ruminant. *Embryo* near the base, transverse.

The structure of the seed is unlike that of any others known to me. Although the embryo seems central when

the surface is viewed. A longitudinal section shews that the excavation occupied by the funiculus reaches close to it, so that it becomes sub-basilar. The appearance of it* being central is due to the growth of the albumen downwards on either side of the hilum. The rib correspondingly becomes very incomplete. See Tab. CLXXXVI. A. Fig*. IV. *a* dor*, *b* ventr. *c* longit. Also Martius. Palm. t. 116. f. xiL 3, 4.

HA B—Malacca Goonong Ladang. obtained by E. Fernandez. Malayan name *Rota**, Gonoon.

OBS.—This species will range near *C. aeanthopatkut*. It is not improbable to limit that it may prove to be identical with *C. melnhami* Martius, Palm. p. 207. t. 116. f. 3. which he described as bearing flagelliferous pedicels, provided with live villi, on either side bearing bristles, and simple spikes. This may arise from his specimen having been one of the terminal pedicels. The appearance of the flagellus in Martius' Plate - 'Palm. f. 3.' is quite that of the flagellus of the pedicel. The description of the flowers etc. may be almost exact *P*lwujw*c*t equestris, lib. Amb. p. 10. t. 56.* gives a *kit* idea of its inflorescence.

ii. CALAMUS ROYLEANUS.

TAB. CXCI.

Vaginarum spinis solitariis compressis petiolorum superioribus uncinatis, pinnis aequidistantibus linearibus angustissimis (long. 10-11 uncialibus latitudine uncialibus), superne carinis 3 longe setosis, spadice utante aculeato, spathis parce armatis, corolla calycem subaequante, fructibus pisiformibus cuspidatis (albis).

This is a small elegant species, forming impenetrable bushes. The parts from which the following description is taken, consist of an entire young mutilated leaf, portions of more perfect leaves, and of a spadix in fruit.

Sheaths bi-auriculate at their mouths, armed with solitary long subulate spines, less flat than usual.

Petiole in the lower part armed with similar but smaller spines, in the pinniferous part these become aculei.

Pinnules or *leaflets* numerous, approximated, often nearly opposite, linear, acute, ten or eleven inches long by half an inch broad, above tricarinate, the carinae or ribs bearing distant long bristles; margins with frequent, short, appressed, bristly teeth.

Spadix nodding or pendulous? plano-convex where not concealed by the long, tubular, limbless, slightly armed spathes; convex face armed with solitary prickles. *Branches* a span or foot distant, about a span long, and expanded, owing to the very spreading nature of the spikes. Spaces between these covered with lax, truncate, sub-mucronate smooth spathes. From above the apex of these, arise the spikes, which are rather slender, two or three inches long, and loaded with fruit.

Fruit (immature) ovate-roundish, about the size of a large pea with a distinct cuspis: scales white, rather large, with an indistinct central furrow, paler margins and brown points; each is suffulged by a minute scale-shaped bract and two minute bracteoles, of which the inner is the larger, and by the *calyx*. The *calyx* has a short cylindrical solid base, divided to the middle into three oblong segments. The *corolla* consists of three lanceolate segments, equal in length to the calyx; *stamens* six.

I am in considerable doubt regarding this species, which is that alluded to by Dr. Royle, as agreeing with Roxburgh's *C. Rotang*. *Illustr. p.* 396. But it differs from Roxburgh's drawing of that species, 1st in the arming of the petioles and sheaths, 2nd in the spines being solitary and long, and not mere aculei or prickles, 3rdly in the shape of the leaves, which are more linear, 4thly in the corolla, which appears to be of the same length as the calyx, and lastly in the fruit which is pisiform, and not ovate.

It cannot be referred to *C. Pseudo-Rotang* of Martius,* because that is described as having the sheaths and

* *Pseudo-Rotang*. Aculeis vaginarum et petiolorum albido-tomentosorum subulatis rectis, pinnis lineari-lauceoluffis fasciculato-aggregatis, Bpathis aculeis reduncis urmatis, baccis pisiformibus apice breviter rostratis. (Character e MARTIU).

C. Pseudo-Rotang. *Mart Palmce p.* 209. *t.* 116. / 6.

HAB.—Throughout India in wooded places.

MAIUTUS, whose description I subjoin, states that this differs chiefly from *C. Botany* by the broader fasciculate pinnae, the whitish tomentum of the petiole, and the straight aculei half an inch or an inch long, spread or recurved, and the smaller, globose, shortly beaked fruits. It agrees in armature and fruit with *C. Roykmus*, from which it differs chiefly in the fasciculate pinnae, and the tomentose petioles. This last character however is (perhaps) a doubtful one, and dependent on the degree of exposure of the part, to external agencies. I am moreover in possession of a specimen I believe from Assam, which I am disposed to consider ROXBURGH'S *C. Rotang*, in which, the younger petioles, and especially the sheaths, are covered with a brown tomentum;

Molts covered with white tomentum, fasciculate pinnae, and spates armed with hooked .pin«. In fruit it appears to be similar.

Under these circumstance*, I have considered the species a distinct one. I believe the only species that extend* so far north as to come within the limits of the Schoniopon; and Deoon Flora, and I have therefore dedicated it to a well known investigator of that region.*

HAH.—In the denser, moister part of the jungles of Dehm Dhuait. chiefly towards the caitem extremity of the valley, at Kurmi.

" Calamus Pseudo Rotang: caudice scandente; frondium scirposearum pinnis linearibus lanceolatis, fasciculato-aggregatis, aculeis vaginarum rhachiumque albido-tomentosarum subulatis rectis spatharum locorumque reduncis; spadicibus composito-ramosis, aborticis loriformibus; bacca globosa (magnitudine Pisi).

DUTtl t Calamo Rotang praesertim pinnis fasciculatis latioribus, rhacheca tomento albido-fuscido et aculeis rectis (unguem ad pollicem longis) patentibus vel r»rtru, bacca minoribus flobotii, apice breviter rostrata. Squamae baccarum testaceo-lutescentes, imo margine exarido ferrugineo. Nucleus fere dimidiato-globosus, hinc convexus M. Irritw gyroso-tuberculatus, inde planiusculus atque in areolam profunde depressus. Embryo basilaris. Albumen cartilagineum squabile.

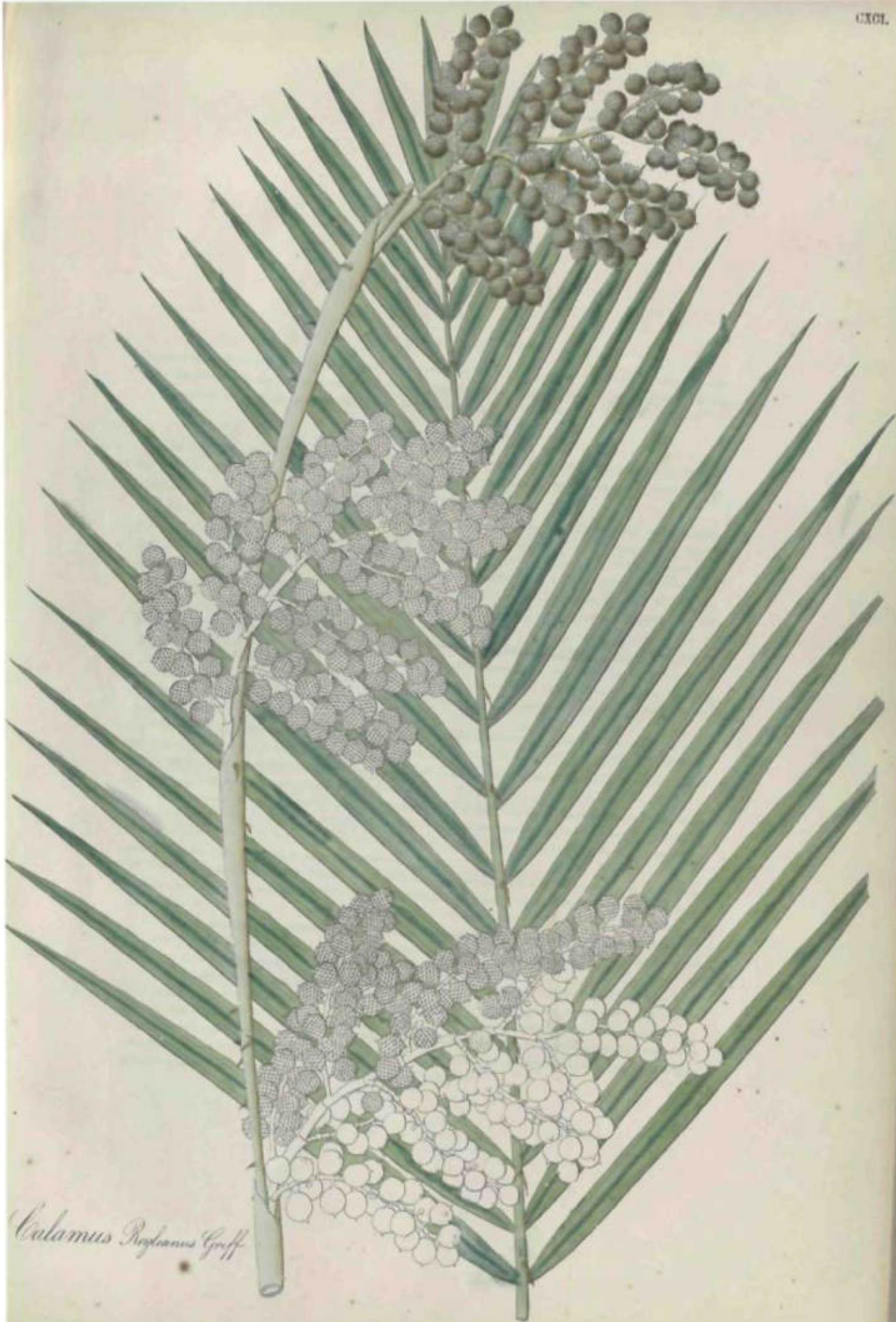
Vrm* f* eastern India orientalis plagam, locis sylvestribus » jr. in Coremandalis: ad Moalmyne in Martabanis, ad furiam Iraculdi prope rupes Pinggi in Paga." MARTIUS.

* I add Dr. MARTIUS' character, etc. of another Indian species of this intricate part of the genus.

" Calamus Guruba, HAMILTON: caudice scandente; frondium scirposearum pinnis oppositostantibus concavis linearibus acutis, rhachibus ferrugineo villosis, aculeis rhachium spadicumque masculorum decompositorum reduncis, villosis compositis trifidis, quam petala lanceolata duplo brevioribus; loris 7—; bacca—?

Species praecedenti et C. Rotang pro alia affinis, sed villo rhachium et bacca minoribus facile distincta.

Prope Jalpiperi in India provincia Rumpora, lat. *- *». m. Jp« i 1800, detexit CL. HAMILTON." Mart. Palis. p. fl 1.



Calamus Rugosus Griff

12 CALAMUS ROXBURGHIL*

TAB. CXCII.

C. Rotang. Roxburgh. *FL Ind.* 3, p. 777. *Icones.* 14. t. 28.

Vagiarum petiolorumque glabrorum aculeis parvU solitariis sparsis, petioli faoiei ioferioris uncinatis, pinnis requidistantibus lincari-lanceolatis spadice basi et flagello exoepto inormi nutaato, spatha iaftna pares aculoata, corolla calycem duplo superante, stylis sub-clavatis, fructibus oblongo-ovatis apico in cuspidem attenuate (albis). *Char. en. lame, fioxb. citato.*

The following is Roxburgh's description of this species. *Root* fibrous. *Stem* jointed, climbing to a vast extent, enveloped in the thorny sheaths of the leaves; with them it is about as thick as a man's little finger; when they are removed, it is in thickness, and every other respect, a common ratan.

* None of the synonyms usually assigned to this species appear to have sufficient reference to it. Thus *Calamus, petrous* LOUREIRO is considered by MARTIUS to be a distinct species: *Tsjeru Tsjurel* of RHEEDIS is the *C gracilis* of ROXBURGH. *Palmijuncus calappartus* RUMPH. is the *Calamus calaplurius* of MARTIUS; and the *Phaniscorpiurus*, etc. of PLUKBNET, is referred by HAMILTON to his *C. Heliotropium*. The figures of RHEEDJS *Hort. Mcdab.* 12. t. 64. 65. and PUJNKENET, *Aim.* 1106/. 1. 2. Hb. *Amb.* V. p. 98. t. 51. which represent two distinct species, have been always referred, except by MAUTIUS, to *C. Rotang*, a species founded on the *Palmijuncus calapharius* of HUMPH, (now, *Calamus calaphartus*, MARTIUS). It is therefore perhaps advisable to abolish the name *C. Rotang*, (which is besides, a generic, not a specific name), and the whole of the synonymy given by WILLDBNOW and succeeding authors.

The Synonymy given by Dr. MARTIUS, *Pulmoe.* 209, is perhaps only correct in citation of LAMARK'S figure, (t. 770 f. 1.) referred by LAMAÏK to LOURBIRO'S *C. scipionum*. For PLUNKENET'S figures is cited by HAMILTON under his *C. Hdiotropium*, and ROXBURGH'S drawing represents the fruit of his *C. Botany* to be oblong-ovate, and white, not round, with chestnut-coloured scales as MAKTIUS, *Op. cit. lob. cit. t.* 116. / viii, describes it. This same drawing does not agree in the spathes with LAMARK'S figure, sufficiently well to convince me of their representing the same species.

It is to be regretted that ROXBURGH quoted WILLDENOW as the authority for this species, his definition not being in any way applicable to it, and being evidently drawn up from *Palmijuncus calapharius* of RUMPHIUS, none of whose figures would Dr. ROXBURGH quote. Of the *Hb. Amboinense*, the only figures that resemble the species under consideration are t. 53 (*Palmijuncus albus*), which however is not of this section, and especially t. 55. / 2, A. B. (*Palmijuncus viminalis*), which is of this section.

LINNÆUS' *Calamus Rotang*, *Syst. Plant 3rd ed.* 1. 463, is a collection of all the species then known: the real *Rotang* is founded on the plant of BURMAN, *Zeyl.* 36. *Fl. Zeyl.* 468. PLUKBNET, *Almag.* 53. *Piso, Mant.* 188. BAUHIN *Pin.* 405, and *Tsjeru tsjurel* of RHEEDB, *Hort. Malib.* 12. 1211. 64. 65. So that it includes at least two species. Seven of the eight varieties founded on RUMPHIUS' plants are now referred to as many species, and the eighth belongs the *Zalacca*.

WILLDBKOW'S *C. Rotang* is much the same as that of LINNÆUS, but not so accurately defined, since it includes RUMPHIUS' *Palmijuncus calapharius*, from which indeed he seems to have drawn his characters; although nothing can be more distinct than its figure, from those of RHEEDB and PLUKENET.

Palmijuncus v&rus, Draco, niger, viminalis, and albus, equestris are made so many species of *Calamus*, but WILLDENOW expresses doubt as to their authenticity, and in a note says he has rejected, from their insufficient, marks *C. scipionem, amarum, and dioicum* of LOUREIRO, though he quotes his *C. petreus* without doubt under *C. Rotang*.

In *Rees Cyclop*, POIRETS' authority is adopted. His chief change is the substitution of *C. petreus* LOUR, for *Rotang* of LINNÆUS and WILLDBKOW (to this he quotes *Tsjera tsjurel* and *C. calapharius*), and the adoption of LOUREIRO'S *C. scipionem, amarum, dioicum, C. secundiflores.* SCUULTES *Syst. Veg.* 8 p. 13, 22, frames his character of this species from RUMPHIUS' *Palm, calapharius*, he quotes WILLOBNOW and LOUREIRO *C. petrous* for the same. In a note he states that *P. calapharius* alone refers here, he doubts *C. petraus* and states that RHEEDB'S plant certainly differs from *calapharius* of RUMPH. The synonyms of BURMAN, PLUKBNET and *Piso*, he regards as doubtful. In all which I take him to be right, so that it is a pity perhaps DR. MARTIUS did not adopt *C. Rotang* for his *C. calapharius*.

Leaves pinnate, from eighteen to thirty-six inches long.

Leaflets opposite or alternate, sessile, linear-lanceolate, armed in the margins with minute bristles pointing forward, and a few distinct, long, erect bristles on the upper surface, from six to twelve inches long.

Sheaths cylindric, armed with numerous, strong, straight, compressed thorns.

Petiole sheathing the leaflet-bearing portion compressed, channelled, and armed with both straight and recurved thorns on the under side.

Flagelli, one from the sheath of each leaf near its mouth, they are very long, slender, drooping or waving, and well armed, resembling the slender lash of a whip. Many of Rumphius' figures of these plants have such, terminating the rib or rachis of the leaves.

MALE- *Calyx* universal; *spathe* none; partial many scattered. *Spadix* supra-decompound, drooping, being the above-mentioned flagellus much enlarged, with numerous, partial, truncate spathes, with alternate, decompound, bifarious, recurved spikes therefrom, the ramifications thereof recurved, bearing in two rows on their convex sides] numerous minute greenish flowers. *Perianth* 3-parted, smaller than the corolla, permanent. *Corolla* 1-petalled. *Tube* imperforated. *Border* 3-parted; divisions oval, permanent. *Filaments* six, thick at the base, tapering nearly as long as the corolla and inserted on the mouth of its tube. *Anthers* incumbent. *Germ* none, but there is the rudiment of a 3-cleft stigma.

FEMALE. *Sheaths* as in the male. *Spadix* decompound, *perianth* and *corolla* as in the male. *Filaments* six united at the base round the germ. *Anthers* arrow-shaped abortive. *Germ* round. *Style* short, 3-cleft, divisions or stigmas recurved. *Berries* round, of the size of a small gooseberry, imbricated backward with baky scales, 1-celled, 1-seeded; between the bark and the seed there is a considerable portion of whitish juicy pulp, of a sharp acid taste. *Seed* solitary marked with many irregular depressions and elevations, and on one side there is a large, deep, roundish pit, a little below it near the base is lodged the monocotyledonous embryo. *Roxburgh*.

HAB.—Bengal and the Coromandel Coast: flowers during the rains; fruit ripens during the cold season; *Roxburgh*.

" Sanscrit *Vetro, vetus*. Bengal *Bet*, or *Sanchi-bet*."

OBS.—Major Jenkins of Assam favoured me with fruit specimens, at first mixed with those of *C. Mastersianus* but subsequently separate under the name Jattee, or the common Bet, stating that he fears I had mistaken the fruit of the one for the other.

The branches of the spadix in fruit are 10 or 12 inches long, the intemodes are concealed by tubular truncate spathes.

The spikes inserted a little above the orifices of these, recurved, simple 1 to 3, inches long. A minute bract, and two annular bracteoles under each fruit without any carina or scar of a fallen flower.

Fruit at the base presenting the calyx trifid to the middle, below which it is cylindric, the *corolla* equal to the *calyx*, rendered mammillately apiculate by the base of the style, sub-elliptical, about 5 lines long by 3J broad, covered with large whitish scales, having a dark brown intro-marginal line and denticulate points.

Seed solitary baccate, as in *C. Mastersianus*, but larger, transverse section ^uitc rcmiumr.

This I have little doubt is the fruit of *C. Roxburghii*, (*C. Rotang* of Roxb.) Its most obvious distinctions from the *tiondce bet*, (*C. Mastersianus*) are in the size and colour, of the fruit, which in the latter has broad brownish lines, so as to look checquered with brown. The spikes and the branches too, are different.



Calamus Rotang Reeb.

is CALAMUS TENUIS.

TABS. CXCIIL A.B.C.

C. tenuis Roxb. *Fl. Ind.* 3. p. 780. *Icones. Suppt.* 5. t. 18.—*Mart. Palm.* p. 212.

Vaginarum aculeis solitariis paucis rectiusculis, petioli (pinniferi) anguli superioris rectis faciei inferse uncinatis, pinnis sequidistantibus lineari-lanceolatis (long, pedibus lat. 7-8 linealibus) supra nitentibus tricarinatis (carinis setigeris) subtus secus venam centram setulosis, spadice nutante spathisque primariis parce aculeatis, spicis bifariis recurvato-patentibus saepius simplicibus floribus binatis altero superoquo pedicellato masculo, altero sessili faemineo, calyce urceolato breviter tridentato, stylis sub-ternis filiformibus longis patienti-revolutis.

Roxburgh says, " it is beautiful delicate species ; when divested of the sheaths of the leaves and cleaned, it is **not** thicker than a common quill, and of the colour of the common ratan. Flowering time, the rainy season.

" *Stems* simple, perennial, climbing to a great extent; the extremities inserted in the armed sheaths of the leaves, including these, it is scarcely so thick as a common ratan.

Leaves oblong, equally pinnate, nearly two feet long. *Leaflets* from twenty to thirty on each side, equidistant, alternate, linear, polished, three-nerved; *margins*, *apices*, and *nerves* bristly; six inches long, and scarcely half an inch broad at the broadest part. *Petioles* armed. *Flagelli* from the sheaths, simple, armed, as in the other species.

Spathes numerous, sheathing, sub-cylindric, one for each division of the spadix, even to the pairs of flowers.

Bpadiques occupy the place of the flagelli on a few of the spathes, decomposed; primary branches, four, five, or six, remote, flexuose, with about half a dozen alternate, recurvate branches on each side. *Hermaphrodite* and *female flowers* in alternate pairs, the latter short-pedicelled.

MALE. *Calyx* shorter than the corolla, unequally 2-3-toothed, corolla supported on a fleshy gibbous receptacle, border 2 or 3-cleft. *Filaments* four, five, or six. *Anthers* sagittate.

HERMAPHRODITE. *Calyx* and *corolla* equal, gibbous, with a contracted 3-toothed mouth. *Filaments* six, united in a ring round the lower half of the germ; *anthers* sagittate, large, and seemingly fertile. *Germ* ovate, 1-celled, containing three seeds attached to the bottom of the cell. *Style* scarcely any; *stigma* 3-cleft; *segments* rugose and recurvate." *Roxburgh*.

HAB.—Eastern Bengal as at Sillet; Assam, where it is known as the " Bet" proper. Major Jenkins. Bandharibet of Chittagong. *Roxburgh*.

I here subjoin my own description of the leaves and inflorescence of this species, from specimens communicated by Major Jenkins.

Petiole in the pinniferous part, having the upper angle armed with straight conical subulate prickles, together with the usual row of hooked prickles along the centre of the under face, and similar ones about the margins, often close to the *pinnules* or *leaflets* ; towards the apex it only presents the under central series. *Pinnules* or *leaflets* alternate, equidistant, linear lanceolate, acuminate, ten or twelve inches long, seven or eight lines broad, above with three carinse or ribs bearing long bristles; underneath with shorter bristles along the mid vein; margins setoso-serrulate.

The *spadix* is of considerable length. *Branches* just supra-axillary, very flexuose, and about a span distant; spaces between covered, (except perhaps the lower two inches), by the tubular *spathes*, which are green, and armed toward the upper ends with scattered curved prickles. The upper spathes appear to be the most armed. The naked parts of the

spallix also urraud on one face with Muul hooked prickle*. The spathm (of the spikes), are imlher lasty sheathing, sub-truncate, xpnnkdd with bOWU scurf, margins ciliate- *Sftrktr* aUo *upraaxillary, bifarioua. about two inch** long, recurved spreading,, also scurfy.

*Fhwrr** distichous on the ouUide, on the inside letruticbou*, in pain, the larger conical, sessile, the r*n*i* being the smaller, ovatcly oblong, shortly talkcd; the MALE, alway* on the upper or posterior tide of the i]ike. *Bracts* like the spatbea of the spikes, but *ku* ciliate, *Bttuttoln* two, broad, lbs inner om m the toner *ulc is bicsu-iiiite and eroarpnate, and the male flower correspond! to the centre, being adnate as it wen lo its baie.

Calyx of the female thickened at it* base, whence ita conical shape, in both sexea it u subumotate mlh three short teeth, often divided to the middle.

Corolla slightly longer than the calyx, divided below ihe middle into three erect, oblong, lanceolate segments.

Stam MM as usual adnate to the corolla, then tnonadelphou*; *filamenti* (free) short; *ttntkrtr* sagittate, those of tie female flower are effete. The *Onrittm* is as long as the corolla, oblong, rather attenuate to the bate, where it in S-celled, ovule erect. *Style* composed qf three broadiih immediately recurved HgmenU, which are papillose in »ide, gad in i In- bud, Uix-colate and erect.

Oaa.—AS regards the pinnule* or leaflets, this specie* is duely alliH to *C. RoyUs*** and *Jtojburgk**, eapcialh the former. An obvious difference however, exiats in the small recurved deflVxed spikes of this specie* In the pain of flowers, one hermaphrodite and one male, it appears to far u we knuw si present to und <l« The present* of the male may however, (judfi''^ I''^TM tu e •Unilarity of the inner bracteole to thosn of certa nt her species, which appear dbcoid), be expected to occur in other instances. The minute examination of it brmteotes, in order to ascertain whether there i* thpjwir of it fallen flower, becomes therefore necessary So far Can be judged from Roxburgh's short notice of *C. mtmaunu** it would appear to resemble that sptciw clotelr

* *Calamus monoius, scandent. Leaflets numerous, alternate, linear-lanceolate, polished, and bristly; sheaths flagelliferous; stamens monadelphous.*

Native place uncertain. It p in A* BoUmic fird»o to aloat |k« t_M of ik, common ratan, and differs from it only in being monoius, the JM»Umi of il» ooroli* U[h(1 lanceolate, and in the filaments being very completely united. Its flowering tin* is iLj

It f» DWIIM lo girt • Tuñ ieniripton ot ihii |ilml, whioL 14 turtl? lit* C. *Rohrb.*, except in the above-mentioned circumstances.

Th* i«J# fliwert tr« utmol » nunwoui u thw /«••!• HIM, itm«nt!j DO* ot nek proceeds from each of the annular scales of the branches < the sprit*. Tll# r«iiii«ou rtU, /C fi**,, 1Wj, , A ¥, 11wi|, fMIBd completely dioicous; this must therefore be considered a distinct species. 783. *Mart. Palen. p. 209.*

I subjoin ROXBCHGH'S description of *C. polygamus*, and three of la AInst species, all which appear to me to belong to thia i>art of ibe Section.

C. POLYGAMUS Roxb.

Scandent. Spines sub-verticilled. Sheaths flagelliferous. Inferior leaflets in remote fascicles of three or four, above single and alternate or opposite, all linear, with a few bristles on the margins and nerves underneath. Male and hermaphrodite flowers on the same supra-deux- poud spadix.



Calamagrostis tenuis Poet.



Calamus tenuis Roxb



Calamus tenuis Pers.

Hoodoo Bet of the people of ChHtagong, where it is, indigenous, and a most extensive Rambler; the general thickness when cleaned is that of a stout walking cane. Its growth is exceeding slow, for in ten years it had acquired a stem of only five feet in length, and the leaves from ten to twelve more.

C. Polygamus, *JRoxb. Fl. Ind. 3. p. 780. Mart. Palm. p. 210.*

It appears to differ from *C. monoicus* in the lower pinnules being fasciculate, and in the flowers being male and hermaphrodite, not male and female.

C. NITIDIS Mart.

Caudice; frondibus edrosis glabris nitidis, pinnis approximate cequidistantibus linearilanceolatis marginatis, aculeis rhacheos recurvis sparsis et confluentibus; spadibus foemineis compositis; julis horsum versus fleasis, baccis (ovato-globosis), squamis fuscis.

Pinnae spithamam longae, unguem latae, firmulae, venis statu sicco vix conspicuis, setulis non solum in margine latiusculo sed etiam in nervis utriusque faciei. Calarao tenui Roxb. multis modis affinis, sed diversus videtur praesertim sexus distributione.

Crescit in Tenasserim, prope Tavoy. Martius. Palm. p. 211.

C. CONCINUS Mart.

Fronidium rhachi ferrugineo-tomentosa, subtus aculeis rectis reversis, pinnis sub-cequidistantibus condnnis lineari-lanceolatis; spadicis monoid? compositi spathis aQuleis rectiusculis reversis; baccis magnitudine pisi minor is, squamis flavidis margine inferiore latius fuscidulo.

Pinnae, quas vidi, fere sesquipedalea, ultra pollicem latae. Juli fructiferi bipollicares, non nihil recurvi. In calycum fructiferorum uno eodemque per cujusvis seriei flores latere conspicitur spathella valde contracta, cujus basis cicatricula parva notatur, quam ob causam conjicio, hae flores masculos aut eorum rudimenta in florente spadice excidisse.

HAB.—*Tavoyf. Martius. Palm. p. 208.*

C. MELANOCANTHOS Mart.

Caudice scandente; frondibus ecirrosis, pinnis cequidistantibus condnnis linear i-lanceolatis acuminatis, margine nervisque tribus primariis setis longiusculis tigrisicantibus; aculeis cantice nigris, vaginarum subverticillatis rectis, rhachium spadicum compositorum lororumque recurvis; baccis oblongis octolinearibus, squamis pallide fuscis spadiceo-marginatis.

Crescit in insula Pinang et in ora Tenasserim prope Chappedong; Martius. Palm. p. 211. t. 116. f. 13.

14 CALAMUS LEPTOSRADIX-

T. i. CXCIV. A.B.C.

~~Calamus leptosradix~~ (pinnifer) aouuriit uncioatit?, pfawb sprosismstK ftqoMliiUtibut loearibut (long. 10 unchillbus kt 4-5 linealibut), supn mtinh tribos artigtrif tabtua tetulotb —am rasa m**iUm_f*spadidit aUcMftti acoltati nmii aUifarmibot, spatbit primtriiis aculoitis •eondariit lamiot oaatptaa laoesolala» apiait afapBdhoi abbreviate *corpioi.lfk bra»~~to~~fi inie* ptmnieillatia, floribas obloogia, calyce corolla duplo brevior, fructibua globoso turlinatis i'alli« .

The description of this species is derived from the portions of a leaf, and of male spadix in flower, and a female spadix in fruit.

Petiole (in the pinniferous portion) triangular, $\bar{I}U$ under surface rather convex, with scars of solitary spines or prickles, the two side faces are somewhat channelled, and presenting especially towards the insertion of the leaves, dark filamentous tomentum.

Pinnules or *leaflets* many, crowded, regularly alternating, linear, very narrow, tea inches long, fmr or four-and half lines wide, subulately acuminite, or even perhaps cirrhosely acuminate, the upper face being provided with three bristle-bearing carinae or rilw. a frw mniw l>rUtins on the mid vein underneath: margins rough with very frequent ascending bristles.

MALE. *Spadix* apparently nodding, long, slender, distantly branched, the parts not covered by the spathes frequently armed with short acute stout thorns, solitary, or in clusters of two or three together. *Spathes* very long, narrow, tubular, with rather large lanceolate nearly unarmed limbs. *Branches* of the spadix filiform, a foot long, apparently scund, with frequent alternate, simple, bifarious, short, scorpioid recurved simple spikes, each of which i> suffulted or propped by a spathe with a rather large, lanceolate, acute ewt limit The lowest branch " tl ciinon is inserted about an inch above the mouth of its spathe.

Spikes about an inch long, nearly twice the length of the limbs of the spathes.

Flowers distichous, oblong, with an amplexent bract having a sub-lanceolate rathnr I* . • ^ T , , , . , . , Umb . pcnnicellate at the apex. Inside this bract is a short cup, emarginate behind.

Calyx oblong, divided nearly to the middle in three half-ovate segments.

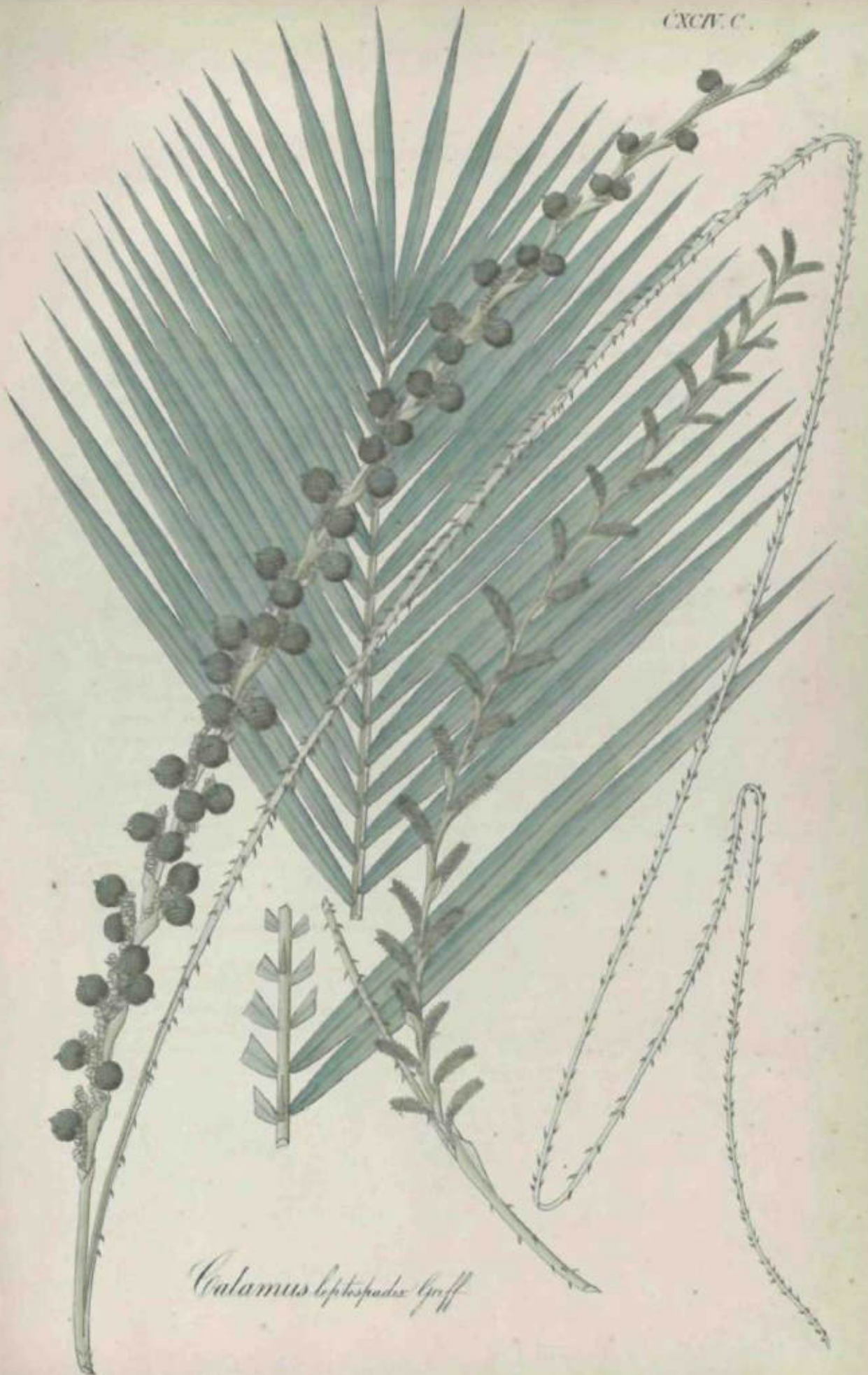
Corolla twice the length of the calyx, divided nearly to the base, into thr*> KI rather obtuse segments. 6 U U

Stamens united to the corolla as far as the base of its segments ; *filaments* (free) shorter than the corolla. *Anthers* attached above the middle, linear sagittate, gli h ^ ^ 8 U bulate> abo ut one half yellow, with one longitudinal furrow. , is l y mu cro nate> versatile. p o llt n

FEMALE. *Spadix* ends in a long flagellus, armed as usual, the spikes annr

Fruit globosely turbinate, apex cuspidate, looking rather downwards seal F pressed to the <:rr UchiNi » i*aies rather l U brown magins and point*. Iu base k mrrounded by the flattened peri ^ (a e "x' »>iti>h, milh conspicu- ,|,e corolla ivith three segments a little longer and narrower), and by two brace,, * " W l h " " « oblong arguments. oa ooe side, and forms a cup, they do not appear to be pennicellate. S w j ^ * « * » ! * ft, inner base a disc

Albumen solid, with a pitted areolar surface and a cavity corresponding to the fo h, with a foreole on one side. is blackish-brown. Embryo basilar. lled with the tegument which



Calamus leptospadix Griff

HAB.—Khasya Hills, between Nunklow and Naogong, in flower and fruit, November, 1835. *Herb. Assam Deputation*. In the same locality *Areca gracilis*, *Harina caryotoides*, and *Caryota urens* were observed.

The male spadix of this, resembles in some respects that of *C. palustris*.

In the leaves it approaches *C. tennis*, Roxburgh. It is distinguished from all the others by the long filiform distant branches of the spadix, the lanceolate rather large limbs of the primary, and especially of the secondary spathes, and the pennicillate bracts; the cellular hairs or processes of these bracts, are not altogether unlike the bodies forming the tufts at the end of the leaves in certain mosses.

Plukenet's figure of *Phaenicoscorpiurus*, *Phytogr. t.* 106. *fig.* 2. resembles this species in many respects.* Hamilton (*Cat. Dried Plants*, p. 90.—No. 877.) quotes the same figure for his *C. Heliotropium*, to which I should have referred this, had the relative lengths of the calyx and corolla agreed with Martius* character of that species.

* " *C. Heliotropium* HAMILTON ; caudice scandente; frondium e cirrosarum pimis aequidistantibus concinnis lineari-lanceolatis acuminatis, acteis rhachium spatulatumque recurvis; spadicebus masculinis decompositis, clypeis urcedatis breviter dentatis, petals sitibeequantibus;—loris?—; bracteis.—

Frondium forma et verosimiliter caudice affinis est *C. Rotang*, sed differt spadicum masculinum julis laxioribus, spathularum apparatu minore, calycibus multo longioribus, ore contracto breviter tridentatis.

In Goijalpara, India Orientalis, Augusto, 1808, legit Hamilton ." MARTIUS. *Palm* p. 211.

is, CALAMUS FASCICULATTJS.

TAB. CXC A.B. and T*«. < XCA. T^ . II.

<- fasciculatus.. fioj*. «<w. />*f. 3. p. 77'!. .U«tr(/'aiw. /, 209.

linfri >m i!««(. 9 in uiioiiliUi* lil %it nciUby). HWirinibM rt n tlu milntl supra spinoso-vestigata subtus vasis tribus setulis et saepe forfuracosa, spadicis aculeato, spatia infimis primariis bicarinatis secus carinas aculeatis superioribus carinatis aculeatioribus, spicis compositis, spiculis brevissimis scorpioides, **trH*of4** 4-t.iHit, **Midi** calycem **Mfo ••pnutt, Mji* tUi»*Ji nJMn** illinrltii. fructibus oblongo-ovatis brevis cuspidatis (albis), albumine aequali **btoe** umbilicata.

Stems mlher ak-jider, and not very long: theHhn »l fir»l covcml with »hite mod, •ftcnrardj itnoolher and green, m w l »it« »prwidiu« rtrong fUt tpin*, ioUUry, or in short lerus.

frtioln (pnoifiTou* purt) convri trigonal, eoTrred *i(li bn>wni*h *^uv mecl, as also are the bases of the ^ ; the under fttt fa« U "itDed with long fi»t spreading very sharp •,iimr*, generally fMdclcd, sometimes solitary.

upper angle *» -««^hla(> or |linw y- -imiUr, but aimlllfr ooe8,

PiMMbi di->«MI i» *•••• or "» ^l"««««« qf lhr«, QCCMioiully four, ill slightly «rch«d, conrex oq the upper face, (hi li»*«> <f ^^ *•••• •*cendIIIIE paten' - ««i owrins ottfqudj over the othm, » th*I they i« nearly tetrastichous. They are linear nine inches lon«- wd about ouc inch brood, lite uP|OT mrftn with o« carina, armed, » * • "• the margins with whitish thorny terth: miii •*• 'indcnjcaih fumiMhed with a few bcirflw.

MALE Spadix several feet long, ending - * long flagellus, ^ularte in th* ^rt notcwtml by Ifal <f>the.

Lower spathe long, compressed, almost two-edged owing to a dorsal and ventral carina, the former armed especially toivanU the apex, with a few short subulate spines; upper spathe without carina, armed with many prickles.

Branches rf the spadix adnate to the peduncle as high as the mouths of the spathe, ««mll» branched, slightly and flexuose, upper half of the internodes ««ml wi.h.p.th. hanng,,», acute ^ Branchlets bearing the sp>U•• four or five inches ''''> generally slightly scorpioid.

Spikes very .hort. not exc«diog hulf»u boh in Length, .corpia. ,uffu|ted by distichous flowers. y. broad short spathe, crowded with

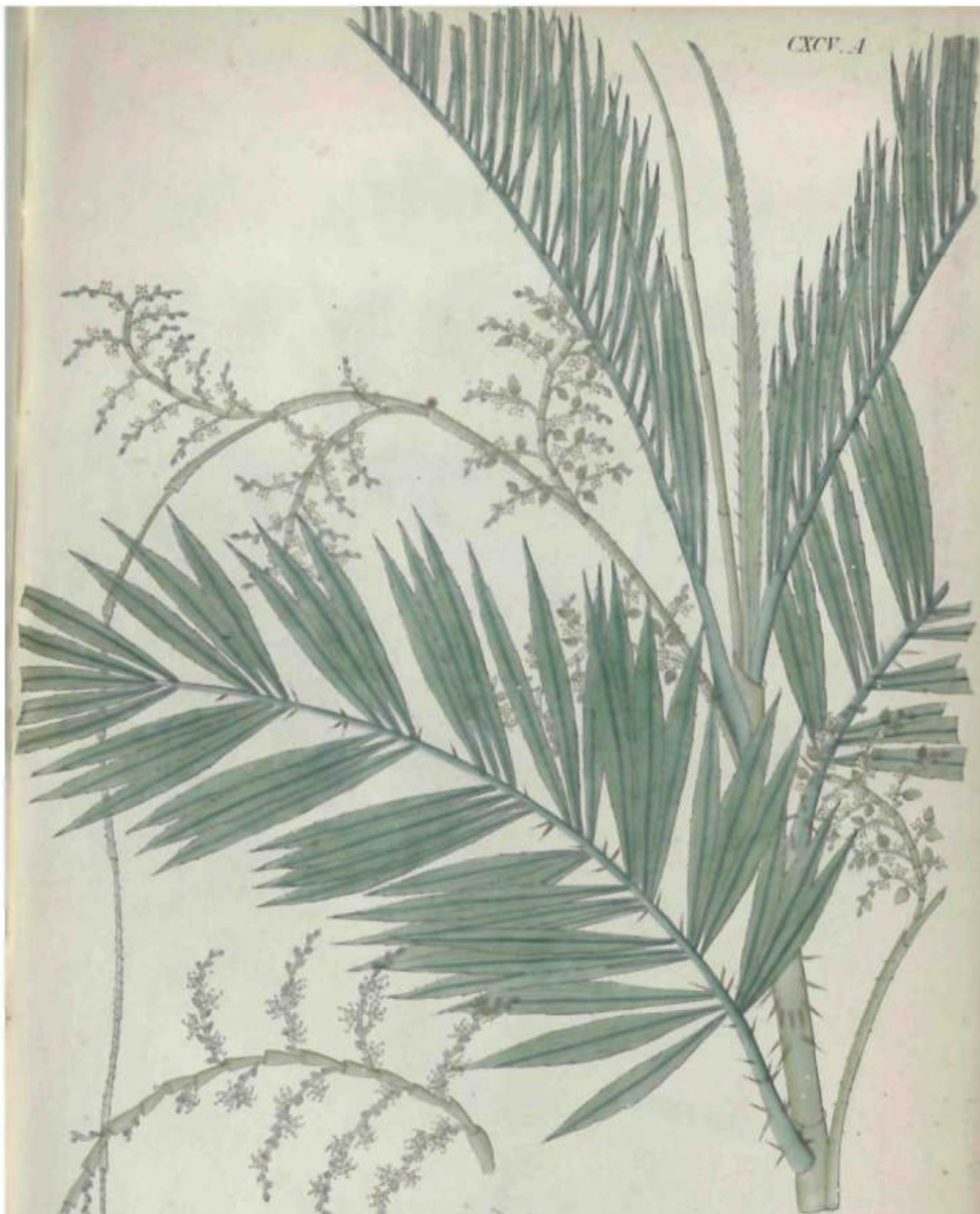
ing oblong ovate limbs. Bracteoles small, especially the inner one, not united into a cup! Calyx broad, angular, divided to the middle, segments half ovate, slightly keeled. Corolla three times the length of the calyx, broad, angular the hu.l, divided nearly to the base, segment, oblong, .preying. 6 t m nu ^ ^

mi\ to the base o corolla. Filaments (free) subulate, moderately long, anthers rather short, sagittate. Rudiment of • tbi Pistillum consists of three small bodies.

FEMALE spadix resembles that of *»In(de,

Branches detached from *« | -Km,l, • « .)i.U(C above th« JMjIUU (or ^) spathe.

Spikes (simple) 2 << 8 inclm long< S|MI,IM^ + ^' + ^' y- ^ become deu-J^ r branch just within the half lancco»«e points



Calamus fasciculatus R. & S.



Calamus fasciculatus R.

Bracts amplexent **somewhat** boat-shaped. The inner bracteole with one side bicarinate and presenting also to **scar** of a fallen flower.

m

Fruits surrounded at the base by the flattened Perianth {*Calyx* of three lanceolate sepals, *Corolla* of three rather shorter and smaller petals) at the apex it presents a stout short style, with three recurved branches. Fruit itself tur-
binate, scales whitish. Seed one, erect, sub-uniform, the sinus being at the base covered with a fleshy tegument of a light reddish colour, with green areolations.

Raphe divided nearly from the base into two white lines, disappearing about the middle of the seed.

Albumen horny, with a cup-shaped depression on the raphal face, the opposite face foveolar. Embryo concealed short, obliquely situated near the base of the seed.

HAB.—Bengal: (common about Calcutta in Bamboo jungles), also at Cuttack, and many other places ; Rox-
burgh says he never saw it to the southward of Ganjam. It is the *Bura-bet* of the Bengalees and grows in small thick bushy tufts.

Flowers during the rains.

OBS.—Of this I have fruit specimens from the eastern parts of Bengal, and from the neighbourhood of the Gardens. These do not correspond with Roxburgh's Drawing either as regards the relative size of the calyx and corolla, or shape of the fruit.

I can see no difference between the specimen from eastern Bengal, and Dr. Martius* figure of *C. extensus*, (*pit. t. 116./.* *iv.*) which it is to be remarked Martius describes (though Roxburgh gives the leaves only as flagelliferous, as having both the petioles and spadices extended into flagelli, a circumstance I believe not yet observed in the genus).

A fine climbing specimen exists in the Serampore Garden, and has the leaves much longer and narrow than I have elsewhere observed.

This species is easily distinguished from all the others by its habit, by the direction of the pinnules (in which respect it approaches to *Zalacca*), and by their spinous margins and keels. The male spikes are shorter and broader than in any other species I am acquainted with, and in the distinctness of the bracteoles it appears to be singular.

16 CALAMUS GRACILIS.

TAB. CXCVI.

C. gracilis. Roxburgh. *Flor. Ind.* 3. p. 781. *Icones Suppt.* 5. t. 16. Mart. *Palm* p. 210. Tsjeru-tsjurel. *Rheed. Hort. Mai.* 12. t. 64.

Aculei* vaginarum. et petiolorum aolitarii. tparsis, pinnU faaculaiis (fwiculis diitantilus terms subopositJs) lauceolatis (long. 3-5 uneialibas]>t. aubuneialibus) cuspidato-acuminBtisaimis utrinque trivenii», veuia setigrcris, spadice subfiliformi tpathiique aculettis, ramis dittantibus spicis paucis .implicibus obsolete scorpioideis, corolla calycem triplo excedente.*

" A native of the forests of Chittagong, where Mr. W. Roxburgh found it climbing over trees and bushes to a great extent, and in flower in the month of May. This species is uncommonly slender, when divested of the sheaths of the leaves and dry, scarcely as thick as a common quill, in texture firm and elastic, covered with a smooth, straw-coloured crust as in the common ratan.

Stems simple, perennial, climbing to a great extent; all the tender or younger part to their extremities invested in the armed sheaths of the leaves, including these about as thick as a man's little finger.

Leaves alternate recurved interruptedly pinnate, if I may be allowed to call a pinnated leaf so, which is destitute of smaller leaflets, between the principal ones/ from one to two feet long.

Leaflets collected in three opposite bundles of from two to four pair each, with much more of the rachis left naked between them than the spaces they occupy, sessile, doubled backwardly at the base, linear-lanceolate brctly pointed, both surfaces lucid, three-nerved; nerves on the upper side as well as the margins bristly, from three to five inches long, and less than one inch broad. *Rib* or *rackis* carinated along the upper side, when yOUNs covered with ferruginous dust, rounded underneath, and armed with recurved prickles.

Flagelli or *tendrils* issue single as in the other species, from near the mouths of the sheaths of the leaves • the are long, jointed, slender as a pack-thread, drooping, sheathed, armed with numerous, very sharp, recurved prickto

MALE *Spadix* from the mouths of the sheaths or opposite sides of the flagelli compound, jointed , , proximate, sheathed; ramifications recurved, bearing two rows of sessile flowers on their convex 'j f ^ ^

Calyx 1-leaved, tridentate, sitting on the joints of the rachis in a three-toothed cup, which ma - b or exterior calyx. *Corolla* 3-parted, with the base fleshy, and partly impervious, *laments* six, \ ^ ^ T''

serted on the mouth of the fleshy impervious tube of the corolla.

Anthers linear, incumbent.

pitillum, a small, three-toothed, abortive, style-like body is all that is all that is to be fou

HAB ^-Chittagong. Mapoori Bet of the Hindoos of that district.

foxbunjh.

* Character ex Icone Roxburghi.



Calamus gracilis Roxb.

12. CALAMUS MISHMEENSIS.

Petiole (pinnifero) spinis solitariis longis uncinatis subtus armato et margine aculeato, pinnis fasciculata (vel superioribus alterais) liaerialanceolatis (long. 15 uncialibus lat. 1[^]uncialibus) apice obtusis peucillatis, supra venis 5 setigeris, subtus¹ central! tantum, spadice aculeato, spatha primaria infima ancipiti secus inarginea aculeata, spicis simplicibus patentibus, fructibus globosis (albis).

This is a climbing species the description of which is derived from portions of a leaf and spadix in fruit, the latter broken.

Petiole (in the pinniferous part) trigonal, lower face concave, armed along to middle with long hooked spines with here and there, particularly about the margins, short aculei, these gradually disappear towards the apex of the leaf.

Pinnules fasciculate, with solitary ones interspersed, towards apex distantly alternate, linear lanceolate, fifteen or sixteen inches long, one and a quarter broad, upper face with three keels, which bear bristles of good size; there are also two lateral veins (one on either side) with small bristles; under surface with the mid vein unequally bristly above the middle, margins with spreading pungent bristles, apex obtuse, with the bristles so much developed and crowded as to be nearly pencilled.

Spadix in the exposed parts plano-convex, with strong short hooked thorns on the convex face.

Spathes tubular, lowest compressed, two-edged, with short teeth along the edges, upper ones not compressed, almost unarmed. *Branches* altogether exserted, being attached considerably above the mouths of the spathes, five inches long. *Spikes* simple, stout, 2 or 3 inches in length, arising from a knob just above the points of the narrow spathes, which cover the internodes of the branches, and which have small acuminate limbs.

Fruit sessile, globose, as usual tribracteolate, surrounded at the base by the flattened *calyx* with oblong-ovate segments, and the *corolla* with ovate-lanceolate segments and 6 sterile *stamens* \ scales large white, with a brown margin and point. *Seed* one, dry, deeply pitted, with a deep umbilicus on one side.

This species in the form of the spadix is allied to *C. tenuis*, Roxburgh, but the flowers seem to be dioicous, judging from the remains, neither have the females the same form. The spikes also are rigid, very spreading, without any tendency to be recurved or deflexed. The leaves are widely different, in situation resembling those of *C. fasciculatus* and *gracilis*, to which last it appears to be allied.

H_{ABB}—At the foot of the Mishmee mountains near Tapan Gam's village: in fruit, November 1837.

is CALAMUS FLORIBUNDUS.*

TAB. CXCVII.

Spini, petioli (.inniferi) aculeatis solitarii laevis uncinato-deflexis, pinni, fasciculati. linea lanceolata, (long, subpedalibus, lat. 11-12 linealitu,) supra carinis 3-5 setigerie, subtus .etis paucis secus venam medianam, apice saepius obtusis vel bifidis, spudice aculeato supra-decomposito, pathis primaria 1-carinati. .ecus oarinarum spinis rectis longiusculis armatis ceterum crebre aculeatis woondarii. flocculo-ciliatis, corolla ca-tycem duplo excedente, styli ramis lanceolatis.



The description of this species is founded upon a specimen of the upper part of an axis, with the lower part of the base of the petioles, many specimens or portions of leaves, and male and female inflorescences the latter before the expansion of the flowers.

The sheaths are armed with brown deflexed long piano-subulate spines, solitary or in short series, otherwise thickly covered with solitary or seriate brown bristles. The base of the *petiole* appears similarly to be armed, the spines being perhaps confined to the edges; it is in the pinniferous part convex-trigonal, the under face armed with unequal curved deflexed very strong spines (the longest an inch in length or more) also with short scattered prickles. *Pinnules* or *leaflets* fasciculate, with or without solitary ones interspersed, linear-lanceolate, 13 or 14 inches long, 11 or 12 lines broad, upper face with three or even five carinae or ribs, all bearing bristles, under face with a few bristles on the mid vein towards the apex; margins with ascending stout bristles; apex obtuse, hispid, often bifid.

The *spadix* is rather long, probably nutant, where exposed plano-convex, armed on the convex face with hooked prickles. *Spathes* generally very long with short limbs, irregularly armed with slender straight spines, and with many aculei. The lowest of the spathes sometimes a foot long, bicarinate, one carina running up the centre of the limb, those next to it are similarly 1-carinate; the carina in the uppermost is obsolete. The longer spines are confined to the carina. *Branches* distant, supra-decompound, the lowermost deflexed, the upper ones ascending, the internodes are concealed by spathes with truncate margins more or less ciliate, and in the young state especially, they are grey from whitish filamentous hairs. *Branches* which bear the spikes recurved or spreading, with short, acute, often mucronate spathes. *Spikes* attached midway between these, short, scarcely more than half an inch long, subscorpioid.

*UMflo*** distichous, ovate = suffluted by .sn.aU bract likewise ciliate and generally pennicillate at the apex, and also by two *hracUoUs* less combined than usual, indeed sometimes nearly distinct, ft* divided to the middle, segments half-ovate. *Corolla* about twice to length of the calyx, divided ahnos, newlv ,, the base, segments lanceolate, spreading. *Stamens* as usual united to base of corolla, J t a seats ^ long, subulate, flexuous in the bud;

* c . pennisulatus, pinnis squulidantibus lanceolatis 7-8 venis marginis integris (vectolis) apice setoso-pennicillatis,

c pennicillatus Roxb. Fl. Ind. 3. p. 781. Mann. Peta.

It is. — Foresta, Pinnang M. W. ROXBORGH.

[Subject to ROXBORGH'S notice of this plant, which in the shape, venation and toiled joints of the pinnis, and especially their entire smooth

to present sufficient peculiarities to enable it to be identified.

...nant. , ^ t t thirty-four p.ir.re«u.,H.,no_rn.t.,o.pt.,e«e_rn,, two, which are united, A pedicel, seven to nine-norvod-

d a nooth . pe«oi> of brUue> from * apex of each. *Stem* is rigid, seven to nine-norvod-

entire an ... is more slender w* the ... and ... q ...



Calamus flabundus Griff

anthers obtusely sagittate, attached above the middle, versatile. Rudiment of a *pistillum* of three rather small distinct bodies.

FEMALE *flowers* on simply spiked more elongated branches. *Spikes* 2 or 3-inches long, alternate, generally recurved, flexuose, pale ferruginous-tormentose. *flowers* rather distant, suffulted by an amplectent bract with a short acuminate limb, and by two *bracteoles*, of which the inner bears an incomplete disc on one side, and between this and the outer bracteole is a space as though there should be an additional flower. *Calyx* (in bud) ovate-conical, a good deal longer than that of the male flower, divided to the middle. *Corolla* (in bud), length of the calyx, otherwise as in the male, but the segments have thin margins. *Stamens* 6, monadelphous; *filaments* (free) short, flat; *anthers* effete. *Ovarium* cylindrical, 3-celled, shorter than the branches of the *style*, which are lanceolate and papillose. *Ovules* 3.

HAB.—Upper Assam, at the mouth of the Nao-Dihing River, and towards Jarhauth. Both Major Jenkins and Mr. Masters have sent specimens to me, so that it appears to be common.

OBS.—This species seems to vary a good deal; among the specimens from the Nao Dihing, is a portion of a leaf, in which the spines are short, solitary, and the pinnules two feet or more in length by thirteen lines broad, with only one keel on the upper face, and this is the only part besides the margins that bears bristles; the apex also is often subulate-acuminate.

There were also specimens found among the dried plants of the Botanic Gardens without name, but which are said to have been prepared from plants growing a long time ago in the Gardens; these, had the petioles been flagelliferous, I should have referred to *C. latifolius*.

The inflorescence varies a good deal as to smoothness; in some of the more advanced specimens, the margins of the bracts even, are nearly smooth.

It approaches especially by its inflorescence to *C. latifolius*, but that plant has flagelliferous petioles.

19. CALAMUS LATIFOLIUS.

TAB. CXCVIII.

C. latifolius. *Roxb. Fl. Ind. 3. p. 775. Icones. Suppt. 5. t. 17. Mart. Palma. p. 208.*

Katu-tsjurel. Hort. Malab. xii. t. 56. fid. Roxb. Mart.

Spinis vaginarum subverticillatis, petiolis aculeatis, pinnis fasciculatis lanceolatis (long. 16-uncialibus lat. 3-uncialibus) 5-7 veuis supra convexis utrinque esetosis, spadice supra-decomposito spathisque aculeatis, corolla calycem triplo excedente,*



" Korak Bet of the natives of Chittagong, where it is indigenous, and runs over trees to an immense length. When freed from the sheaths of the leaves it is about as thick as a slender walking cane. Plants introduced by Mr. W. Roxburgh, in 1801, into the Botanic Garden, flowered for the first time in November and December 1809, when they had attained to the height of about forty feet.

Spines numerous, on the stems sub-verticilled, very large, flat and divaricate. On the flagelli fascicled and recurved.

Leaves alternate, pinnate, from six to twelve feet long including the whip or flagellus, which terminates the common petiole as in many of Rumphius' figures; and the leaf of his *Palmijuncus equestris*, vol. v. t. 56. is tolerably like that of my plant, but their size is very different. *Leaves* in seven or eight remote fascicles, of three or four each, broad-lanceolate, very erect, many-nerved, smooth on both sides; with the margins triflingly spinous-dentate, and the upper surface always convex, from ten to eighteen inches long, and from three to six broad.

MALE. *Spadix* supra-decompound; all the divisions bifarious. *Flowers* small, of a greenish yellow colour, each sitting in a cup composed of two concave sheathing bracts. *Calyx* 3-toothed. *Corolla* 3-parted. *Filaments* six, inserted on the imperforated base of the corolla. *Anthers* incumbent. *Pistillum* none, a small 3-lobed gland occupies its place/ *Roxburgh**

OBS.-I have a personal knowledge of this species: it appears to be allied to the succeeding, from which it differs by its fasciculate lanceolate pinnules.

* Char, ex Icone Roxburghiana citata.



Calamus latifolius Reiche

so CAIAMTJS INSIGNIS.

(N. sp.) aculeia viginarum sparsis conioo-subulatis, petiolorum infra pinnas dorsalibus uncinatis intra pinnas supra medium marginalibus superad ditis, pinnis distanter et irregulariter alternis (senis cum terminali (equilateral! profunde biloba) cuneato-lanceolatis "vel obovatis subtus concavis glaucae apice obtusiusculo tantum setigeris.



The description of this species is derived from specimens: of an entire upper part of a stem, not in flower. The *stem* is slender, not thicker than a common quill, or including the sheaths, about four lines in diameter. Sheaths about a span long, with a few scattered conical subulate prickles.

Leaves nineteen or twenty inches long.

The *petiole* below the pinnules is about five inches long, roundish, nearly triangular, armed throughout along the centre of the under surface with small hooked prickles, and above the middle of the pinniferous part with similar prickles along the margins.

Pinnules irregularly and distantly alternate, five in number, exclusive of the terminal equilateral and deeply bilobed one, cuneately lanceolate, sessile, distinctly concave, underneath with inflexed margins, glaucous-carinate above, with many parallel veins and transverse venules, and a short obtuse point, which is the only part bearing bristles.

Flagellus united to the sheaths high up, very slender (the longest about a foot long) armed with the ordinary prickles.

This appears to me to be a very distinct species, it may be taken perhaps as a passage to *Ceratolobus*. At first sight it is not altogether unlike *C. gracilis* of Roxburgh.

HAB.—Malacca, where it was found by my collector, E. Fernandez, its Malayan name, is *Rotang Bhattoo*.



21 CALAMUS GEMINIFLORIS.

TAB. CXCIX. A.

(N. sp.) vaginarum (striataruro) aculeis sparsis, petiolorum inferne marginalibus superne dorsalibus, palmatis uncinatis cum vel alisque marginalibus, pinnis asquidistantibus linearibus (long. 8 uncial, lat 4-5 lineal) supra carina 1 setas validas gerente marginibus integerrimis, spadicebrevibus nutantibus inermibus spicas 3-4 pendulas gerentibus, floribus geminatis (interdum ternis) fructibus turbinate-rotundatis, squamis frimbriatis (minutis fuscis).

The description of this species is derived from an entire upper part of the plant in fruit.

It is a climber with the apices of the spathe and petiole both prolonged or flagellate. Diameter of the stem with sheaths six or seven lines.

Sheaths striate, and armed with numerous scattered small irregular prickles, mouths as usual oblique, with an occasional elongated spine or two. The uppermost sheaths, at least of the floral leaves are nearly or quite unarmed.

Petiole pinniferous from the base, throughout the lower part for about a foot, armed with a few marginal straight prickles, above along the dorsum with palmate clawed prickles, with or without a few small marginal ones, the former are continued into the flagellus, which is stout and strong.

Pinnules equidistant, but less close than usual, linear, nine or ten inches long, and four or five lines broad, very acuminate, above with a carina bearing a few very stout bristles, the under surface and margins except perhaps towards the apex smooth.

Spadices axillary, nodding, lowermost four or five inches long, bearing four or five pendulous spikes six or eight inches long, the uppermost very short, consisting of two similar pendulous spikes. The leaves suffluting the uppermost are reduced to an unarmed sheath and a flagellus! so that the inflorescence becomes almost terminal.

Spathes short tubular, rather shorter than the internodes of the spadix, with obsolete limbs; altogether similar to the secondary spathes of the generality of the species.

Spikes stout, shortly adnate to the peduncle, flexuose, shortly ferruginously pubescent. An amplexate bract is placed at each flexure, suffluting two, or occasionally three flowers (equally developed) situated on a short stout stalk, whence the flexures appear thickened, each of which has two bracts, the inner being nearly annular, the outer very small.

Fruit, (very immature) roundish turbinate, surrounded at the base by the Calyx divided into three lobes, the Corolla equally divided into three oblong segments, twice as long as the sepals, and scurfy outside, and six broad filaments without anthers, tipped with the remains of three styles.

Scales exceedingly numerous, very small, brown with whitish fimbriate edges, substance of the parietes thick and spongy.

HAB.—Malacca, where it was found by E. Fernandez, Malayan name *Rotang Toongull*.

OBS.—This species in its spikes is allied to *C. ornatus*, but I know no other species in which the spadix is so simple, and in which the upper leaves are reduced to the vagina and flagellus, the former being unarmed.

In this respect it approaches *Eugeissona*. In the character of two, or often three, apparently equally developed flowers it appears to stand alone, and also in the want of predominance of the lowermost spathe over the rest.



Calamus geminiflorus Griff

22 CALAMUS PALUSTRIS.

TAB. CXCIX.

(N. sp.) aculeis petioli (pinniferi) faciei infers uncinatis, pinnis remote fasciculatis lineari-lanceolatis (long, pedalis lat 1½ uncialibus) supra carinis 5 quarum centrali parce setosa, spadice decomposito parce aculeato, ramis attenuates filiformibus, spathis primariis aculeis rectis inequalibus secundariis fere inermibus, epicis scorpioideis distantibus, corolla calycem triplo excedente.

This description is derived from the apex of a leaf and also a male spadix. It is a dioicous, species six or seven feet high.

Petiole trigonal, the under nearly flat face armed with solitary broad claw-shaped aculei, which are ternate towards the apex and in the flagellus. *Pinnules* distantly fasciculate, with or without solitary ones interspersed, linear-lanceolate with a tendency to be spatulate, twelve inches long, one and three-quarters broad, five-keeled above, with two lateral veins also slightly prominent; a few bristles occasionally on the mid-keel; margins rough with appressed bristle-shaped teeth; apex mucronately cuspidate, smooth or somewhat hispid.

Spadix two and a half feet long, nodding or curved, slender and thinly branched, where exposed plano-convex, the convex face armed with short aculei. *Spathes* three or four inches long with short half-ovate limbs, armed with scattered, irregular, straight or hooked prickles. *Branches* attached just opposite the ends of the spathes, about a span long slender, slightly flexuose, their lowermost spathes empty. *Spikes* also inserted opposite the ends of their spathes, (which are lax, clavate, generally armed with a few minute prickles), about an inch long, scorpioid.

Flowers suffulted by an amplexent scale-shaped bract, with a short acute spreading limb, and by a short, obscurely three-toothed, rather large, oblong cup. *Calyx* short, stout, divided below the middle into three oblong, broad segments. *Corolla* three times longer, divided nearly to the attenuate fleshy base, into three oblong, ovate, erect, ascending segments. *Stamina* as usual united to the corolla, above this very shortly monadelphous; *filaments* (free) long, subulate, introflexed in estivation; *anthers* large, linear-oblong, attached above the middle. *Pollen* yellow. *Pistillum* rudimentary.

HAB.—In watery places at Pular in the Province of Mergui, Tenasserim coast. Gathered in October 1834.

OBS.—In the diffuse slender spadix, this species approaches somewhat to *C. leptospadix*, but otherwise it is abundantly distinct. In its leaves, excepting the flagellus, it approaches nearest to *C. floribundus*, *mishmeensis*, and *latifolius*.

I append to the first section, COLEOSPATILE, the two following species of Roxburgh, which may perhaps hereafter be identified by their vernacular names.

C. EXTENSUS R.

Soandent. *Leaves* flagelliferous; *leaflets* alternate, remote, equi-distant, narrow-lanceolar. *Spinet* in belts, slender. *Berries* spherical.

Deu gullar is the veitoacular name in Sylhet, where it is indigenous, and is of great extent, say two or three hundred yards; when cleaned toward the base, it is not thicker than a man's fore finger, but as thick as the wrist towards the apex. The length of the joint is from six to twelve inches. Fl. Ind. 3. p. 777.

C QUINQUENERVIUS R.

Scandent. *Leaves* flagelliferous; *leaflets* few, remote, equi-distant, lanceolate, five-nerved. *Spines* distinct, few, short and strong; *spadix* decomposed.

Hwrnur-yullar is the vernacular name in Sylhet, where this species is found, running over trees, to a great extent; the ratan when cleaned is about as thick as a man's finger throughout, and the joints from six to eight inches long. Fl. Ind. loc. cit.

OBS.—In evidence of the numbers of species of this genus, I may mention that I have just received from Malacca a very distinct species of this Section, under the name *Rotang Jamang*, which is the true name of *C. Draco*.

The species alluded to is distinguishable at once by the very small numerous deciduous prickles of the sheaths, (the old sheaths are merely rough from their scars), the margins of the mouths of which are lacerate-fibrous.

The *petiole* below the pinnules is about a span long, armed with rather distant, stout, somewhat curved prickles, marginal ones being also found here and there: at its junction with the sheath very gibbous and transversely puckered; also among the *pinnules* or *leaflets* short hooked prickles occur along the dorsum, being continued into the slender flagellus.

Pinnules alternate or distantly sub-opposite, linear-lanceolate, caudato-acuminate, ten or eleven inches long, six and a half to seven lines broad, above 1 -carinate, *carina* and a lateral vein on both sides imbricate.

-*Fhr* *£bis* / *Aenaine* & #7/?r & <ra' / z f / \$ < z may be proposed.

Another species of the same section sent from Malacca, without any name, presents green sheaths, with very few slightly curved white prickles. Total length including the flagellus four feet, of the pinniferous parts twenty-one inches.

Petioles pinniferous to the base, armed with a dorsal row of stout clawed prickles, which towards the apex become binate or ternate with scattered ones intermixed.

Pinnules alternating or fasciculate, the lowermost cartilaginous with swollen insertions, and apparently deHexed, linear-lanceolate, five to seven lines broad, without bristles on either side or with a few ^W ^ *u .
** T* y icw on the carina above,
acuminate with bristly points, apparently glaucous underneath.

This appears quite distinct.



Calamus palustris Griff

23 CAIAMUS VERTICILLARIS.

TABS. CC. A.B.C.

(N. sp.) aculeis vaginalum verticillatis, verticillis zonis vel ternatis, superioris spinis validis planis deflexis, inferiorum duarum setiformibus in anulum alte coalitis, petioli (flagelliferi) aculeis subtus fasciculatis uncinatis, supra lineatis dentiformibus irregularibus, pinnis aequidistantibus linearibus (long. 12-13 uncialibus lat. uncialibus) supra carina setigera subtus venulis tribus setigeris, spadice supra-decompositi erecti pedunculo inermi, spathis persiateutioribus binis aculeis subulato-setiformibus annatis, floribus minutis numerosissimis.

The description of this species is based upon specimens of an entire upper part of a male plant in flower: but with very few flowers remaining.

Scandent. *Stem* with the sheaths about one inch and a half in diameter.

Sheaths green, armed generally at short intervals with complete whorls of flat very sharp deflexed brown-pointed spines; the spaces between the strong spines are filled with minute bristles. Under each of the above whorls are two others of very slender bristles united to each other high up, so as to form a ring; these bristles, are firm and thorny, white below where united, above black. These two whorls have an ascending direction and cross the whorl of deflexed stout spines. The spaces between the whorls generally are choked up with foreign bodies, or occupied by ants.

Petioles flagelliferous, the part below the pinnules is one and a half or two feet long, flattened, somewhat triangular, armed below with bands or lines (generally complete) of stout thorns, and above with small bristles. In the pinniferous part, which is about six feet long, the under flattish face presents the usual clawed thorns, and the upper angular face with unequal incomplete bands of short, tooth-shaped bristles, confluent at the base.

Pinnules equidistant, generally regularly alternating, linear, about twelve or thirteen inches long, an inch broad and subulately acuminate; above with a central bristle-bearing carina; below with three veins bearing bristles; margins rough with bristly teeth.

Spadix about two feet long or more, erect, axillary, adhering as usual to the next sheath; about three inches from the axilla presenting two *spathes*, which are somewhat two-keeled, and not very concave, armed on the back by lines of stout bristly prickles, the uppermost spathe is rather the largest, about a span long; the sheaths are of considerable length, and similarly armed. The peduncle itself is unarmed. *Branches* ascending, naked at the base, from four to six inches long, much divided, divisions rather spreading and suffuted by an inconspicuous short brownish spathe, with a rather long lanceolate acute limb.

Spikes very numerous, each scarcely more than an inch long, of chesnut-red colour, and suffuted by ?, similar but smaller spathe. *Flowers* very numerous, about thirty-five to each spike, (of which there are about twelve to the lower divisions of the lower branches), very minute, exactly distichous. *Bracts* amplexent, with a short rather deflexed limb: cup nearly entire, shorter than the bracts. *Calyx* cup-shaped, of the same texture as the cup, three times longer than it, obscurely three-toothed. *Corolla* (in bud) twice as long as the calyx, depressed at the summit, divided to the base into three oblong segments. *Stamens* six. A large oblong rudiment of a *Pistillum*.*

* These parts in the specimen are generally destroyed by insects, and the calyx generally is also more persistent than the corolla.

HAB.—The interior of Malacca, it was brought to me by Emanuel Fernandez, with the name *Rotang Simote*.

OBS.—The marginal spines of the base of the petiole and of the margin of the sheath three or four inches in length.

Spadix of fruit three and a half or four feet long without any remaining spatha, peduncle unarmed, slightly flattened. Branches several, three or four inches distant about ten inches long below the inner side at the insertion cartilaginous, swollen, very flexuose, the middle spikes are four to six inches long flexuose spreading—slightly ferruginous scurfy or pubescent. A male amplexent bract, and two bracteoles the inner of which is almost cup-shaped occur under each fruit.

An amplexent spathe with a rather large linear or linear-lanceolar scarious limb, generally more or less lacerate under each spike.

These are round, about the size of a small marble, covered with rather large reddish-chestnut scales, with whitish edges. At the base is the spread out perianth, the petals are lanceolate oblong, scarcely twice as long as the sepals. At the apex a mammilliform cuspis, which is the remains of the style.

Seed baccate ? whitish, erect: tegument rather thick, whitish. Albumen horny deeply ruminant. *Embryo* trochleariform basilar.

The uppermost verticelli, or those with bristles and spines sometimes occur singly

This very remarkable species is evidently allied to *C. mirabilis*, Reinw.† to which indeed I should have referred it, had not Reinwardt described his plant as having the long peduncle of the pendulous spathe armed with distichous thorns.

The armature of the sheaths is very curious, and is well characterised by Martius.‡ It is almost equally distinct by its exceedingly numerous minute flowers, and the great degree of branching of the spadix.

† Mart. Palu. p. 213.

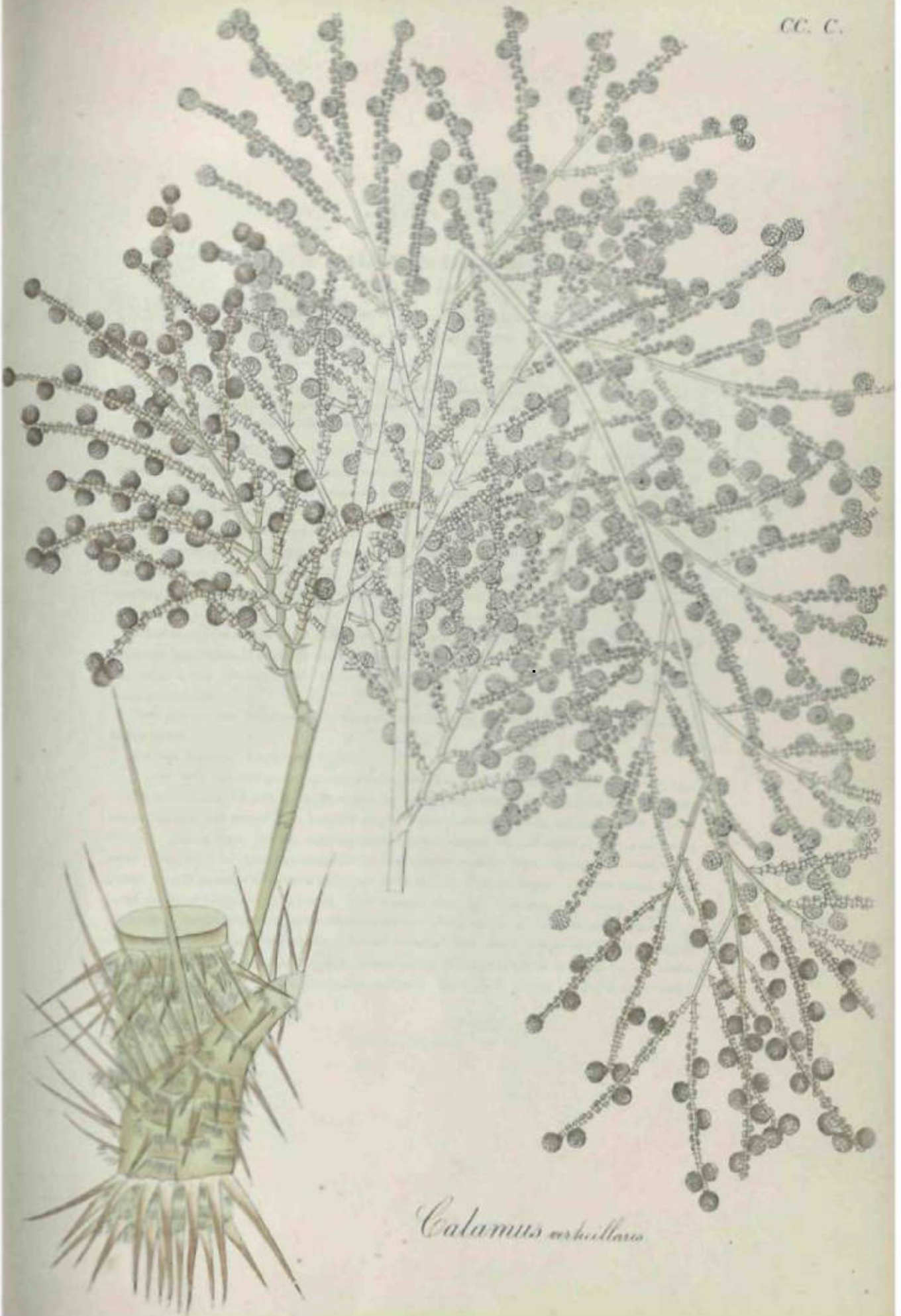
‡ f. l. c. cit.



Calamus verticillaris



Pinus tuff/tJtf/.y ...; Hain.



Calamus arborescens

24 CALAMUS DRACO.*

TABS. CCI. A.B.

C. Draco. Willd. 2. p. 203. *Syst. Veget. ed. Schultes*. 7. pt. 2. p. 1323. *Roxb. Fl. Ind.* 3. p. 774.

Martins Palm. p. 211. *Pahnijuncus Draco*. *Rumph. Hb. Ami.* 5. p. 114. *. 58. / 1.

Aculeis vftginarum rectis seriatis p'tiolorum sparsis, pinnis sequidistantibus lineari-lanceolatis (long. •!£ pedalibus lat. 7-8 linealibus), spadice de-compositi erecti pedunculo aculeis seriatis armato, spathis coriaceis infima dorso seriebus crebris aculeorum intermediis secus centrum paroe aculeatis summis inermibus, fructibus ovato-rotundis materie resinosa incrustatis.

The description of this species is derived from specimens of the young, as well as of the mature fruit bearing spadices. Young spadices imbricated with large coriaceous spathes whose margins towards the apex are recurved, almost woody in texture, outside they are ferruginous red, inside chesnut-red. The lowermost much armed with seriate very strong deflexed spines; those next to this are slightly armed along the middle of their backs, the upper ones almost unarmed. Peduncle much armed with stout seriate or fasciculate thorns.

Fruit bearing *spadix* nodding ? nearly two feet long, without spathes, with two or three annular scars beneath that of the lowest branch; peduncle short, armed : branches several, spreading, upper ones simple, lowermost branched, naked at the base. *Spikes* short, stout, flexuose, a squamiform bract and two annular bracteoles under each *fruit*.

These are ovate-round, and placed on short, stout, stalks, surrounded at the base by the calyx, and the spreading or revolute linear-lanceolate petals, are tipped at the point by the remains of the style. Scales with a narrow deep longitudinal furrow, naturally whitish, but incrustated with a rich blackish-red secretion, which is the best Dragon's Blood of commerce.

Seed generally one, sometimes two, in which case they are nearly hemispherical. *Albumen* much ruminated. *Embryo* basilar.

I subjoin Roxburgh's description of this plant.

" *Trunk* while the plants are young, erect, and then resembling an elegant, slender palm tree, armed with innumerable bark-coloured, flattened, elastic spines, often disposed in oblique rows, with their bases united. By age they become scandent, and overrun trees to a great extent. *Leaves* pinnate, their sheaths and petioles armed as above described. *Leaflets* single, alternate, ensiform, margins remotely armed with stiff, slender bristles, as are also the nerves ; from twelve to eight inches long and about three quarters of an inch broad. *Spadix* of the *female hermaphrodite* inserted by means of a short armed petiole on the mouth of the sheath opposite to the leaf, oblong, dfecom-pound, resembling a common oblong panicle. *Spathes* several, one to each of the four or five primary ramifications of the spadix, lanceolate, leathery ; all smooth except the exterior or lower one which is armed on the outside. *Calyx* of the female or rather *female hermaphrodite*. *Perianth* turbinate, ribbed; *mouth* three-toothed, by the swelling of the germ, it splits into three portions, and in this manner may be seen adhering with the corolla to the ripe berries. *Corolla* three-cleft; *divisions* revolute, glandular on the inside. *Berry* round, pointed, of the size of a cherry." Roxburgh.

Char. part, e Roxburghio.

HAB.—A native of Sumatra and the Malay Islands. Flowering time March and April, according to Mr. Lewis, it is the *Jarnang* of the Malays of Penang.

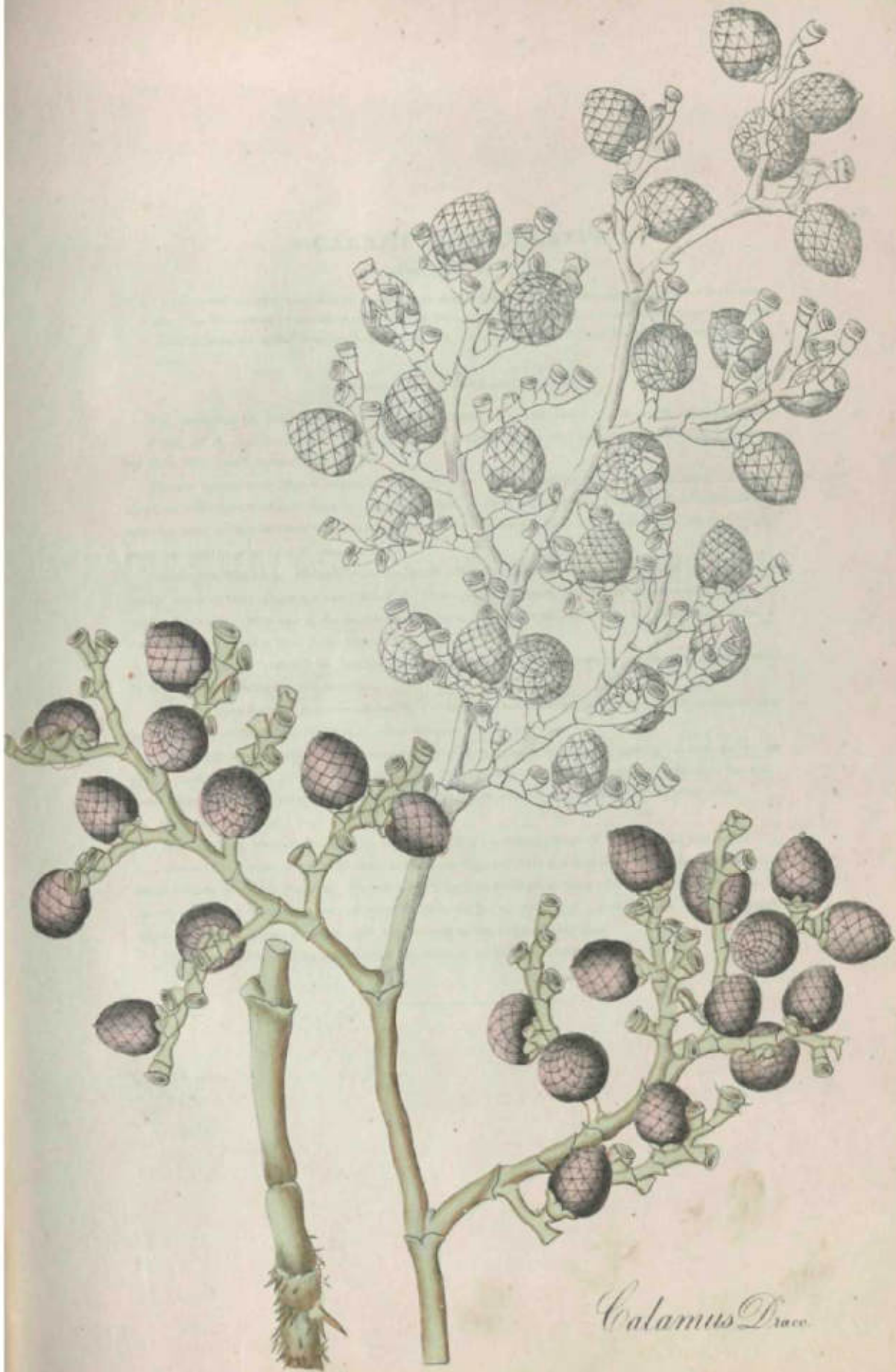
The natural secretion of the fruit constitutes the best *D'jurnang*, or Dragon's Bipod; a second and rather inferior kind is produced from the fruits, from which the natural secretion has been removed by heat and bruising. The third and most inferior, appears to be the refuse of this last process. It is perhaps doubtful, whether this article is procured from the plant by incisions.

The above is taken from Rumphius, who has a copious article on the subject.* Mr. Lewis informs me, that he long ago forwarded a full account of the preparation of this Dragon's Blood to Dr. Wallich; its true source not appearing to him to be generally known.

* Hb. Amb. V. p. 114.



Antennus Traco



Calamus Draco

25 CALAMUS GENICULATUS.

TABS. CCII. A.B.

(N. sp.) acculeis petioli (flagelliferi) pinniferi subtus uncinatis semi-verticillatis supra sparsis dentiformibus, pinnis tequidistantibus lineari-lanceolatis (long. 14-uncialibus lat. uncialibus) supra 1-carinatis (carinft parce setosa) subtus venis 3 setigeris margin e integerrimis, spadicis geniculati pedunculo bipedal! compresso secus margines valide aculeato, spathis omnibus demum deciduis, fructibus rotundis rostratis (albis).

The description of this species is founded on portions of a leaf and 3 spadices with immature fruits. *Petiole* (of the pinniferous portion) obtusely trigonal, underneath armed with hooked claws, the upper angle here and there with small tooth-shaped prickles.

Pinnules approximate, often sub-opposite, linear-lanceolate, fifteen or sixteen inches long, one broad, subulately acuminate, with three prominent veins on the upper surface; of these the central one bears a few bristles towards the apex, the under surface furnished with two lateral veins and which are as well as the central towards the apex bristly, margins except the point without bristles or teeth.

Spadix three feet long. *Peduncle* below the branches one foot and a half long, flattened, not two-edged, with scars of a row of stout marginal spines; above, the branches are unarmed, and at the insertion of each branch, swollen into knots. First scar of the spathes situated immediately under the lowest branch. *Branches* all naked at the base, the lowermost a span long, angular, and stout.

Spikes spreading, suffulted by lanceolate acute scarious bracts, stout, flexuose, two or three inches long: some of them present subulate abortive branches.

Flowers subsessile at the flexures, suffulted by a scale-shaped annular bract, and at the base surrounded by two annular alternating bracteoles, the inner of which is almost cup-shaped.

Fruit subglobose, cuspidate by the base of the style, and surrounded by the calyx, more or less split, and by the corolla much more split and tending to be lacerate; its segments are oblong, twice as long as those of the calyx; scales large, pale, yellowish-white with a narrow central furrow and dark brown margins with whitish edges.

Seed one, (immature).

HAB.—Penang, where it was found by Mr. Lewis. It is the *Rotang Dodoor* of the Malays of that Island.

OBS.—This species comes very close to the succeeding, and there is a similarity in the Malayan name which would indicate their being the same. Nevertheless I have little doubt of its being quite distinct, especially from the smooth margins of the leaves, a very unusual character, the flat, not two-edged peduncle armed strongly along the edges, the swollen nodes, the stout, rigid, very flexuose spikes, and the round fruit.

The spikes call to mind by their flexures, the spikes of some Rottbotliaceous grasses.

26 CALAMUS LOSGIPES.

TABS. CCIII. A.B.

Palmijuncus verus angustifolius. *Rumph. Hb. Amb. 5. p. 105. t. 53. fig. 2. ?*

(N. sp.) aculeia vaginarum planis seriatis vel solitariis setis presertim versus margines interspersis, petioli (flagelliferi) infra pinnas paucis subulatia inequalibus, inter pinnis uncinatis solitariis, pinnis sequidistantibus lineari-lanceoletis (long. 14. uncialibus lat. uncialibus) supra venis tribus setigeris, spadicis decompositi elongati nutantis pedunculo bipedali ancipiti subaerme, spatbis omnibus dimum deciduis, fructibus oblongis styli basi cuspidatis, basi calyce tantum circumcinctis.

This description is taken from the apex of a fruit-bearing plant, fully expanded, leaf wanting.

Sheaths very much armed with stout flat spines, broader than usual, with bristles often intermixed, those along the margins, are very bristly, more slender, but not longer. The marginal ones of the base of the petiole are subulately triangular, and rather longer than any of the others.

Petiole at the base convex below, channelled broadly above, and armed with long irregular spines, (which about a foot from the axil appear reduced to a marginal row of distant short straight teeth, and another similar row along the centre of the lower face), inclusive of flagellus, about twelve feet long; the pinniferous portion is about seven feet long; the first two feet being naked, above the channelled part, the upper surface is rather flat, and convex underneath. Between the pinnules it is obtusely triangular, above unarmed, below armed with solitary distant short aculei or prickles.

Pinnules about fourteen inches long, and about an inch broad, linear-lanceolate, and subulately acuminate, the upper face having the central and two lateral veins sparingly bristly; the under surface smooth; margins and apex bristly.

Spadix adhering to the next sheath as usual, throughout the lower two, or two feet and half feet of its length, naked, unarmed, Or with a very few and not very strong spines along the edges, compressed, distinctly two-edged, marked with the annulus of the first spathe, which suffults the lowest branch of the spadix; surface irregularly sprinkled with brown chaffy matter, Fruit-bearing part a little more than eighteen inches long, rather compressed, but not two-edged. Brandies several, angular, themselves much divided, the lowermost four or five inches apart: without suffulting spathes. *Spikes* varying in length, the lowermost of the lowest branches four or five inches long, spreading, angular.

Fruit on shortish stalks, the uppermost of each spike is nearly sessile, spreading, oblong-ovate, in length six lines in breadth three and a half, attenuated into a short mammilla terminated by the base of the style, and surrounded the base by one envelope! divided below the middle into three oblong segments, between this and the fruit itself, is a short cup variously lacerated, and outside at the apex of the stalk, two bracts, the outer one sub-annuliform. Scedes whitish, cartilaginous, with pale margins, the central furrows deep and consecutive.

Seed (immature), oblong. *Albumen* ruminant.

HAB.—Malacca, where it was obtained by E. Fernandez, and sent to me with the name *Rotang Dodow*.

OBS.—This is probably the plant of Rumphius, quoted by most authors as *C. verus*; it resembles it in the length of the spadices, the want of a spathe when in fruit, the distance of the *annulus* or cicatrix of this from the axilla, and its suffulting the lowest branch of the inflorescence.

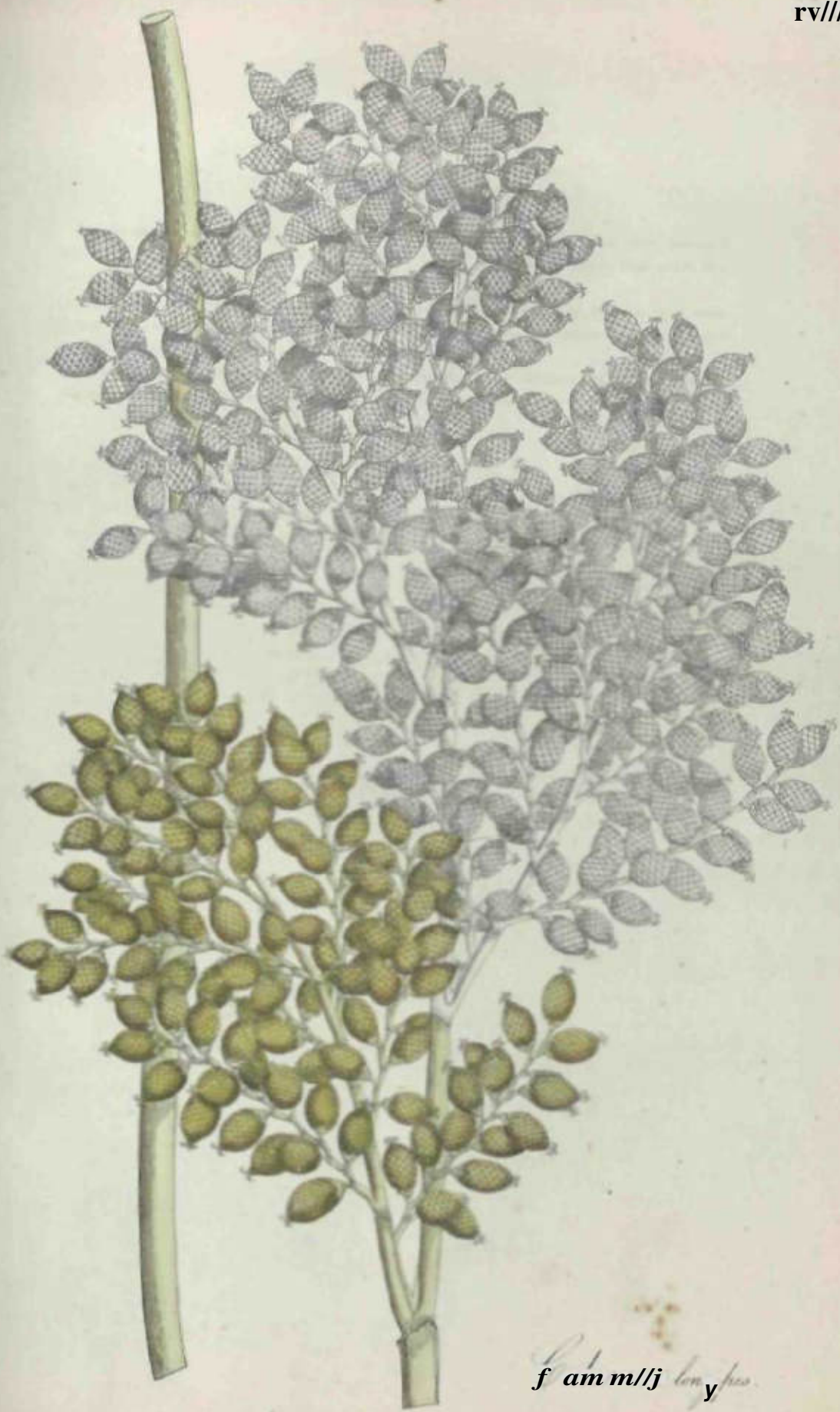


Calamus geniculatus Griff.



Calamus longipes Griff.

rv/// B



Lupinus
f. am m/lj long y

It is as may be supposed, very closely allied to the *C. piatyacanthus* of Martius,* from which however it differs in the,very long two-edged peduncles of the spadix, the want of spathes when in fruit, in which points Martius' plant differs from that of Rumphius.

It is the only one I have yet seen of this Section in which all the spathes appear to be deciduous, or in which the fruit is only surrounded by one envelope, the corolla being apparently for the most part deciduous. In this again it differs from Martius' plant.

From the preceding, to which it is closely allied, it is known at once by the absence of the remarkable very long spines to the margins of the mouths of the sheaths, and by the spadix and fruits.

* MARTIUS' Palm. p. 206.1.160 f, i, ii, iii.

27. CALAMUS HYSTRIX,

TABS. CCIV. A.B.C.

(N. sp.) aculeis vaginalum seriatis vel sparsis marginum longissimis spithamaeis vel pedalibus, petioli (flagelliferi) infra pinnas valde inaequalibus sparsis patentissimis, inter pinnas subtus uncinatis supra minutis dentiformibus, pinnis aequidistantibus confertis linearibus (long. 16-uncialibus lat. 5-6 linealibus) supra carina et carinulis duabus setigeris, subtus venis 5 setosis spadice decomposito erecto, spatha crebre armata spinis marginum apicem versus longissimis, spicis florum faemineorum ascendenti-convergentibus fructum patentibus, dentibus oalycis villosis vel pennicillatis, fructibus oblongis nrbis.

The description of this species is derived from specimens of the entire plant with female flowers and fruit. It is climbing to a great extent, and flagelliferous; the diameter of the stem towards the flowering part, is 1/4 inch. The *sheaths* are swollen at the insertion of the petiole, armed with strong large flat spines, distinct, or in the usual incomplete verticils, those of the margins of the mouth of the sheath are exceedingly long, a span or a foot in length, and proportionally broader at the base.

The *petiole* is 1^ to 1 1/2 feet long in its naked part, where it is rather angular and variously armed. The spines of the margin are one inch long, and subulate, the others aculeiform, while the upper flatter face has small thorny teeth. The pinniferous part is five or six feet long, rather angular, armed above along the centre with short straight teeth, below with solitary hooked thorns. These are as usual continued into the *flagellus*, which is very long.

Pinnules very numerous, generally approximate in pairs, linear, subulately acuminate, 16 inches long, 6 lines wide, the under face with five bristle-bearing veins, the upper has the mid vein carinate, one lateral, one on either side subcarinate, bearing bristles chiefly above the middle; margins bristly, ciliate; apex as usual hispid.

Spadix 2 1/2 feet long, (exserted, 2 feet), the peduncle adhering to the next sheath, and is in the young state so imbricated with spathes as to be subulate; of these spathes the lowermost four are armed, armature gradually diminishing from the base upwards. In flower, it has one *spathe* near the axilla, boat-shaped, four or five inches long, flattish or nearly revolute at the apex, coriaceous, armed on the back with very strong broad spines, of which the uppermost along the margins are a good deal the longest, and awl-shaped from a flat base. *Branches* several, with the same ascending direction as the peduncle, naked at the base. *Spikes* two or three inches long, also ascending, slender, flexuose, ferrugineo-furfuraceous, suffulted at the base by an obscure squamiform bract.

Flowers solitary on short stalks, occupying the flexures, stalk furnished with one minute bracteole!

Calyx short, cup-shaped, obsoletely three-toothed, teeth short, villous at the points.

Corolla with a sub-globose base, twice as long as the calyx, divided to the middle; segments half-lanceolate, spreading.

Stamens adhering to the corolla at the base of its segments; *anthers* linear-sagittate, effete, or obsolete on very short *filaments*. *Ovarium* ovately-roundish, covered with shortly ciliate scales, 3-celled at the base. *Style* divided to the base into three oblong-clavate segments, very lamellar, and papillose on the inner surface and sides.

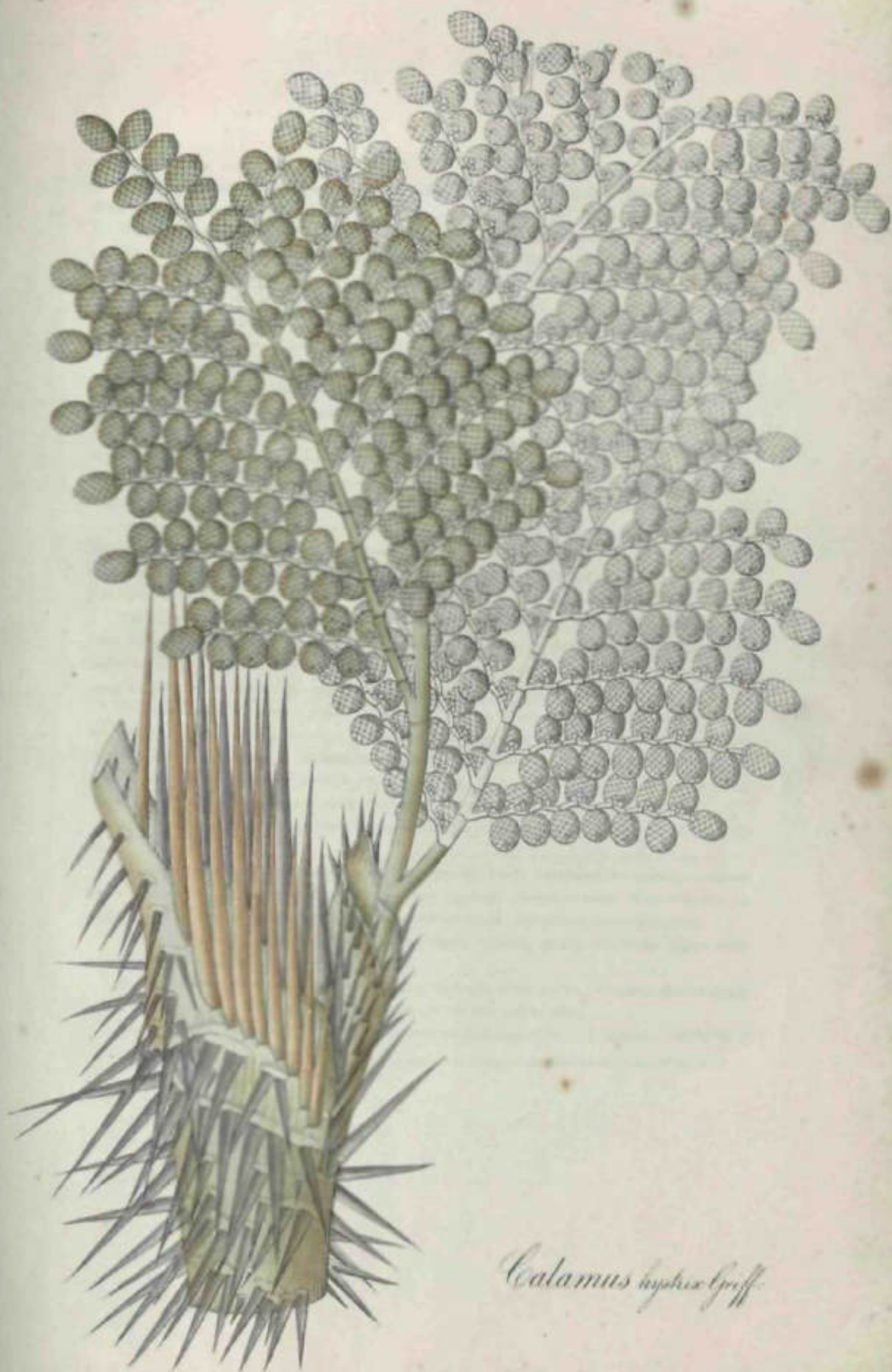
yui-bearing spadix, with or without the spathe. *Spikes* spreading, very flexuose. Stalks of the fruit spreading. *Fruit* surrounded at the base by the persistent envelopes, elliptic, shortly mammillate at the apex. *Seed* large, cartilaginous, appearing to the naked eye to have two lines down the centre, margins cartilaginous. *Seed* 1



%f Il lamus *sp.* Hoff **ff**



Calamus Hystrix Griff



Calamus hystric Griff.

oblong, erect. *Tegument* dark-brown, with the usual resiniferous pits, rather thick in some parts. *Albumen* horny deeply ruminant. *Embryo* basilar.

HAB.—In forests of Ayer Punnus, and Rhim, in the Province of Malacca. Malayan name *Rotang Babote*.

OBS.—This species is closely allied to *C. platyacanthos*, Mart, from which, however, it is at once distinguishable by the enormously long spines of the margins of the mouths of the sheaths. The armature of the lowermost and most persistent spathe also differs in the analogous elongation of the spine of its apex. The teeth of the calyx are moreover, tufted with hairs, and the fruit of the same period of development is oblong, not obovate as in the species alluded to. Prof. Martius also gives the spadices in his species as "pedes nonnullos longi." *

It appears to vary a good deal. I have specimens sent by E. Fernandez from Malacca, under the name *Rotang Pusaisur*, which is of smaller size, the spadix (with young fruit) not a foot in length, and the flowers with two bracteoles. • But otherwise the plants are so much alike, and there appears to be so great a tendency to vary in the length of the spadices, that I have thought it better to unite the two, particularly as so little is yet known of the real value of the characters employed in the distinction of the species.

The female spikes in flower resemble a good deal the same parts of *C. leptopus*; and it is to be remarked that the lowermost spathe though persistent for a long time, presents scarcely any sheath.

In the armature of the petioles it may be considered to approach in some degree to *C. castaneus*, the thorns in both being often, or generally solitary, and very unequal in size.

Rumphius' figure of *Palmijuncus verus angustifolius* gives, with the exception of the want of the long spines, a good idea of this species in fruit.

The following additional particulars} regarding this species may be here stated. It is a stout climber, the young parts are scurfy, the diameter of the stem with the sheaths 1J to 1[^] inches, the sheath with a short oblique mouth, highly armed with unequal, solitary, very spreading or reflexed brownish green flat spines, the largest an inch or rather more in length. In its seeds it comes near to *C. Mastersianus*.

The naked base of the *petiole* is about six inches long, the upper flat face is armed with erect unequal prickles, the under convex face is chiefly armed about the margins with stout spreading shortish prickles, with or without a row of smaller ones along the dorsum. Between the pinnules above, roundish, low down with *similar* erect prickles, above unarmed, dorsum with a few marginal *similar* ones: below, and throughout with a row of hooked ones along the dorsum, these above are clawed, in which state they are continued into the flagellus.

The whole length of the *leaf*, including the flagellus, is eight or ten feet long, the flagellus itself three to five feet.

Pinnules are placed in distant irregular fascicles, conduplicately sessile, linear-lanceolate, fourteen to eighteen inches long, and 2J broad, "sub-spinously acuminate, margins spinulosely toothed or bristly, above with about six carinate veins, of which the centre towards the base, bears a few solitary erect prickles, underneath smooth. •

Spadices green, axillary, from three to five feet long, distantly branched, covered with sheaths without limbs, considerably prickly chiefly above the middle.

Branches spreading, adnate to the peduncle as high as the mouth of the spathes. Secondary spathes slightly armed, spikes from opposite the mouths of these, 3 or 3| inches long, sub-ascending.

Flowers solitary tribracteolate, a scar of a second flower on the dorsum of the third bracteole. *Calyx* trifid to

• Palm. loc. cit. f. Hα. Amb. v. t. 54. f. 2. C. verus of most authors. *C. platyacanthos*. Mart. loc. cit. J. January 1st- 1845.

the middle. *Corolla* of the same length. Young *fruit* of oblong shape, rostrate by the style which is divided to the middle into three revolute segments.

Seed sub-immature berried, greenish. *Raphe* of two distinct white lines, incurved at the points, tegument bacate, viscid, thickened at the centre of the raphal face. *Albumen* in the dorsal part foveolate, in the ventral part with a central pit. *Embryo* not seen.

CAIAMUS HEPTOPTJS.

TABS. CCV. A.B.

(N. sp.) spinis vaglnarum seriatis, petiolorum (flagellifer): partis inferioris nudse seriatis, acnleis partis pinnifera uncinatis, pinnis jequidistantibus lineari-lanceolatis (long. 15-16-undalibus lat. 12-13-linealibus) drrhoso-acuninatis supra 1 oarinatis sub-glabris subtus sspius venis 3 setigeris, spadice nutante vel pendulo decomposite infra spathas spinis subulatis armato, spathis coriaceis iufima spatliifomi secus carinas duas armata reliquis planis inermibus, spicis ascendenti-convergentibus, floribus oblongis.

The description of this species b derived fron, ^ f a , of ^ ^ ,, ^ , , , , , t-bearing ^ rf femate plant.

It is scandent; the diameter of the stem and sheaths about one inch. *Sheath.* »h * fascicles of flat rather deflexed spines, shorter and stouter than usual, at the base of the petiole swollen transverse-ly>

The *petiole* in its lower naked part, is about two feet long, triangular, and ar- lity but smaller spines, those of the-margin subulate and slender. th e pinnif generally so, under convex-face being armed with clawed prickles placed thra ? pinnif Part is convexly trigonal, the smaller pricklee. i «v, cu mree or four together ty, upper is unarmed or with

The *pinnules* or *leaflets* many, alternating, sometimes almost opposit r long, twelve or thirteen lines broad, acuminated into a long cirrhose bristle, an Ceolate, fifteen or sixteen inches smooth; underneath as well as the two lateral veins. with a few bristles. Prominent above and generally

Spadix (young) club-shaped, mature pendulous (?); peduncle about a fo * tT eBpedaUy towards the point. about a span long, much armed chiefly along the edges with short stout, I ^ o * * * * P r t flattened. ^ n d e r , and distantly branched, each branch suffulted by a large leathery *inxuto* ^ J g * * ^ o T three . . alternately form, the margins revolute towards the apex, indistinctly bi-carinate, with J . " * ^ * * o U t e r m o s t » spathi- rest flat, unarmed, about a span in length. *Branches* two or three times ^ T ^ ^ ^ " ^ the keels > * » same direction with the spadix, with distichous sUghtly spreading n u ^ " " ^ their ^ thes, nearly of the half to three inches long, distinctly flexuose: bearing at each fle ^ a J * ^ W - spikes) are one and a

Flowers all pushed to the posticous side, on short stalks or nearly sessile ^ k ^ 1 br * * , and one flower somewhat 3-toothed cup, outside which on the posticous side is. w ! ^ ^ at « * base by a short one. See Tab. CCXVI. Fig. IV. lu ^ bract, and on th * ^ . side a smaller



Calamus leptopus Griff.



Calamus leptopus Griff

Calyx oblong-ovate, rather large, with three short stout acute teeth. *Corolla* in the part corresponding to the calyx ovate-ventricose, 3-partite a little below the middle (or down to the calyx), segments linear, acute, rather spreading. *Stamens* 6; *filaments* united to the corolla as far as the base of its segments: from thence it is free, short broad-subulate and ending in bristles; *anthers* deficient.

Ovary ovately oblong, densely covered with shortly ciliated scales, 3-celled. *Ovules* solitary. *Style* very short, stout, divided nearly to its base into three branches which are subulate, spreading or almost recurved, rather longer than the petals, with an elevated line along the centre of their backs; the inner face stigmatic.

HAB.—Malacca. *Rotang Chinchin* of the Malays.

OBS. —This species differs from *C. platyspathus** abundantly. The petioles (not the spadices) are prolonged into flagelli or thongs, the spines of the sheaths are distinctly seriate, the pinnules neither plicate, nor tomentose underneath.

It comes close to the preceding Section, its young spadices having a strong resemblance to those of *C. Draco*. The mature spadices again resemble to some extent those of *C. Hystrix*, and there is moreover a tendency in the spathes to be deciduous.

To this section belongs the *Katu-tsjurel* RHEEDE. fbrt. *Mai* 12. t 65. Referred by ROXBURGH to his *Calamus latifolius*, which species, may be distinguished as *C. (Platyspatha) RHEEDEI*, petiolis spadicibusque aculeatis, pinnis distanter fasciculatis lineari-lanceolatis.

* *C. platyspathus*; scandens, nucleis vaginarum crebris subulatis rectis petioli rectis et reduncis, pinnis sparsis lineari-lanceolatis long, subpedalibus lat. pollicaribus pluriveniis plicatis subtus ferrugineo-tomentosis, spadicis aculeis rectis abortivis loriformibus, spathis subinermibus spicis abbreviatis confertis. Char. e MARTIO. *C. platyspathus*, MART. *Palm*, p. 210.

HAB.—Tavoy, Tennasserim Provinces. W. GOMEZ.

I subjoin DR. MARTIUS' character and description of this species :—

" *Calamus platyspathus*: caudice scandente tenui; frondibus edrosis; pinnis sparsis, terminalium distinctis lineari-lanceolatis phrinerviis plicatis, subtus ferrugineo-tomentosis, aculeis vaginarum crebris subulatis rectis, petioli rhacheosque rectis et aduncis; spadicis masculi decompositi, julis dibrmatu confertis, aculeis rectis; spathis primum clausis, dein expandis 9) planis, lubriferis; bris aculeatis.

Species distinctissima. Pinnae spithamam ad pedem longae, medio ultra pollicem latae. Spadix sesquidalis, laxis, rhachi inferne ancipiti superne teretiuscula. Rami florigeri masculi quadripollicares et sursum breviores, primum, ultimi videtur, spathis membranaceis omnino involuti, quae tandem explanatae, dorso nervis binis nunc passim aculeatis nunc inermibus sunt percursae. Juli cujusvis rhacheos partialis secundo-convergentes, continent flores 7-11 parvulos, pariter in unum idemque latus conversos, quasi uti in racemo scorpioideo. Calyx catupanulatus sinibus rotundatis in denticulos tres breves excisus pallidus. Corolla viridiflava, petalis lanceolatis."

29 CALAMUS MASTERSIANUS.

TAB. CCVI.

(N.sp.) vaginarumspuiisplano-subu^{^^}b-deflexis aculeis irregularibus interceptois, pediculi partib; nodis dorsalibus etc marg;nalibus aculeis tr-
terspersis, aculeis partis pinniferae dorsalibus cum vel absque marginalibus, pinnis aquidistantibus linearibus (long. 13-uncialibus lat. 7-
linealibus) cirrhoso-acuminatis, supra carina ceatrali et venula laterali utrinque setigera subtus vena centrali setulosa, spadice (flagellifero)
aculeato masculo supra-decomposito, spatthis planis coriaceis eztus glaucis infraa bicarinata secus carinas aculeata, spicis femineis distanti-
bus patentibus, floribus conicis, corolla calyce paullo longiore, fructibus pbiformibus cuspidato-rostratis (albidis), albumine subtequabili.

The description of this species is derived from specimens of the female plant in flower and fruit, and a portion of a male spadix.

The *stem* with the sheaths about half an inch in diameter. The *sheaths* are armed with stout flat spines, somewhat deflexed, concave underneath, arising from a large sub-conical base; among these, except perhaps towards the apex of the sheaths, occur smaller prickles, very irregular in size. *Ligula* very large and coriaceous. *Petiole* a good deal swollen at its insertion : the lower naked part is three and a half or four inches long, plano-convex, armed on the centre of the under face with a row of distant spines like those of the sheaths but smaller, along the margins with still smaller ones, interspersed with small prickles. Pinniferous part (which is three or four feet long) armed with stout clawed prickles along the centre of the under face, a few others being added about the margins.

Pinnules equidistant, linear, about thirteen inches long, seven lines broad, cirrhosely acuminate, 1-carinate above, with a carina and a lateral vein on either side, bristly towards the apex, mid-vein of the under surface with a few smaller bristles : margins rough with minute bristle teeth.

MALE. *Spadix* supra-decompound, more slender than the female; branches a span long. *Spathes* more membranous, especially about the limbs. *Spikes* scarcely more than an inch long, slender, very flexuose, spreading or recurved, sometimes scorpioid, arising from a cartilaginous base opposite the ends of their spathes. *Bracts* with an acute spreading limb. *Cup* very shallow, almost wanting anticouely, poeticouely brudly emarginate and sub-bicarinata.

Flowers oblong-ovate, exactly distichous. *Calyx* with a broad cartilaginous base, divided to the middle into three broad rather acute segments. *Corolla* about twice as long, in the bud, it is ovately conical, and divided almost to the attenuated base into three lanceolate-ovate segments. *Stamens* shortly monadelphous; *filaments* (free) subulate, about half the length of the petals; *anthers* ovately sagittate, yellow. Rudiment of the *Pistillum* large, of three oblong bodies like abortive carpel leaves.

FEMALE. *Spadix* five or six feet long, decompound, nodding. *Peduncle* adnate to the next sheath, plano-convex, armed on the convex face chiefly along the centre, with broad hooked prickles, along the edges with spreading subulate middling sized spines, the armature is continued above this in the shape of hooked prickles which gradually encroach on the surface of the peduncle, so that the apex has the whole surface armed. A linear, coriaceous, entire or split *spathe*, brown inside, whitish outside, is situated at the base of each branch; the lowest about a foot long, bicarinate, carina armed except towards the apex with stoutish prickles, subulate from an oblique bulbous base. The remaining spathes diminishing in size gradually, all unarmed, sometimes split and lacerated, subsequently the tubular parts alone remain. *Branches* of the spadix longer a good deal than the internodes, bearing many filiform spreading,

Cvr.



Calamus maskirovianus Griff.

flexuose spikes, **two** to four inches in length, surrounded at the cartilaginous base by a whitish scale-shaped annular bract.

Flowers distichous, rather distant, one at each flexure, of the shape of a sugar loaf, small, suffulced by a small annular scale-shaped bract, and two minute bracteoles. *Calyx* oblong, conical, of a thick substance at the base, with three short sub-cordate mucronate teeth with whitish membranous margins. *Corolla* oblong-ovate, a little longer than the calyx, divided nearly to the middle; segments erect rather obtuse. *Stamens* six; *filaments* not adnate to the corolla, united into a cup surrounding the lower free part of the ovary, very short; *anthers* ovately sagittate, effete. *Ovary* oblong-obovate, smooth at the base, where it is 3-celled, otherwise covered with scales. *Style* (common) scarcely any, the branches revolute from the base, subulate, and stigmatose inside. *Ovule* solitary.

Fruits very numerous, of the size of a pea, surrounded at the base by the perianth, beaked by the hard persistent base of the style. *Scales* very numerous, minute, whitish with fuscous margins and points, which are incised. *Seed* baccate, erect, roundish-placentiform. *Tegument* thin; pulp gelatinous, thick opposite the *chalaza*, and in a less degree on the opposite face. *Raphe* of two divergent whitish branches, terminating about the middle of the ventral face of the seed. *Albumen* cartilaginous, solid, surface slightly unequal; opposite the *chalaza* is a shallow foveola, and a smaller and shallower one on the opposite face; on a long section it appears pulley-shaped. *Embryo* basilar, conical.

HAB.—Assam, No. 1201, of my Assam collections. *Soondee-bet* of the Assamese. The smallest *bet* of Assam Major Jenkins.

OBS.—This appears to be a very distinct species, especially in its inflorescence. It has considerable affinities with *Calamus tenuis*, especially in the female spikes and flowers. I have dedicated it to my friend Mr. Masters, late Head Gardener of the Hon'ble Company's Botanic Garden Calcutta, who is now investigating the Flora of Assam with great success.

Specimens, of the upper part of a male plant in flower, subsequently received from Major Jenkins are about the same size as the female.

Sheaths greatly armed with seriate very broad, very strong, rather short flat spines, and with many much smaller, so as to be aculei-form. The large ones have a tendency to be decurrent, and above are adnate to the sheath by means of a broad callus, one on either side of the base of the petiole is two or three inches long, and much more slender.

The naked lower part of the petiole about a span long, armed on the centre of the dorsum with stout short rather deflexed spines, along the margin with longer ascending ones otherwise, especially towards the base, armed with small prickles. Young *petiole* sprinkled with brown scurf. The pinniferous part—? feet long, convex, bifacial; the convex lower face armed with irregular scattered, generally solitary, and somewhat hooked spines, which above, pass into hooked aculei.

Ligula very lorig, membranaceous and brown. *Leaves* four or five feet long.

Pinnules equidistant, linear-lanceolate, shortly subulate-acuminate, ten or twelve inches long and one broad, above tricarinate, caring and a lateral vein on either side, bearing strong bristles; the under surface with three veins, bristle-bearing, margins bristly.

Spadix very long, peduncle to the first spathe three or four inches long, compressed, ancipitous, armed along the margins with stoutish rather short spines, and on the dorsum with scattered irregular prickles otherwise on the

dorsum with stout daw-shaped aculei which are continued into the flagellus, each division is suffulted by a small membranous spathe.

Flower-bearing branches of the spadix about the length of the internodes, adnate to the peduncle of the spadix for three or four inches, flexuose, geniculate.

Spathes one to each branch at first completely involute round the branches, and the peduncle linear, a span or a foot long, coriaceous, the lowermost bicarinate, armed along the carinae with ascending rather stout aculei, the rest unarmed or with a few prickles here and there.

Spikes inserted on flexuose short spreading or somewhat recurved branches (or as the uppermost simple) scarcely *i* an inch in length, occupying the swollen flexures at the insertion when suffulted by a small squamiform spathe.

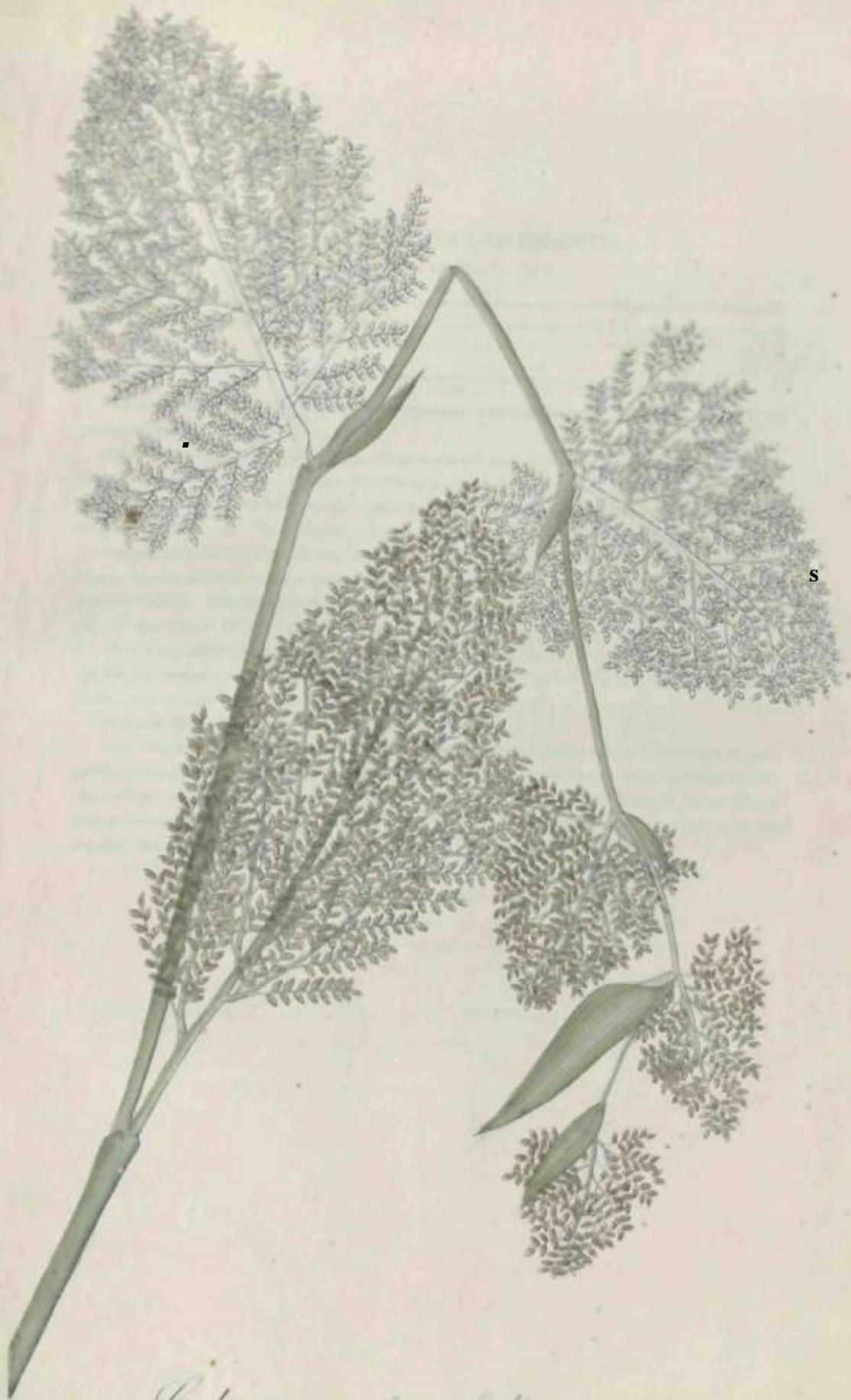
Flowers distichous, close together, the flexures of the spikes being very short, each has a small bract with an acute spreading limb, and a very shallow cup, almost indeed deficient anteriorly, emarginate or bi-lobed behind. Flowers oblong.

Calyx somewhat urceolate, broad and fleshy at the base, three-toothed.

Corolla, divided nearly to the base into three lanceolate-oblong erect cuspidate segments.

Stamens six, filaments subulate, fleshy at the base, united with the base of the corolla and to each other, into a fleshy annulus or narrow cup, in which will be found an oblong triangular rudiment of a Pistillum. *Anthers* oblong emarginate. *Pollen* triplicatum, plicis apicem utroque confluentibus.

rcvn.



Calamus sativa J. H. Burtt. f. n.

30 CALAMUS RAMOSISSIMUS.

TAB. CCVII.

(N. >p.) Spinis——pinuis——spadices supra-decompositi inermis pedunculo infra spathas ancipiti sursum teretiusculo arcolato, spathis (terminalibus) membranaceis scaphiformibus, spicis graecillimis, floribus (masoulis) numerosissimis, corolla oalyce oblongo breviter tridentato duplo fere longiore.



The description of this species is derived from a specimen: a male spadix (entire?) with very few flowers, and one terminal spathe.

Spadix unarmed, about two feet in length; the peduncle is flat and two-edged; the internodes long, compressed, not two-edged, and pitted from pressure of the flowers in the bud, its *branches* are the length of the internodes of the spadix, the lowest about nine inches long, spreading, and extremely divided; the largest *branchlets* of the lowest panicle are about four inches long. The uppermost *spathe* two inches long, membranous, acute, smooth, and boat-shaped.

Spikes about an inch long very slender, very flexuose with a scale-shaped bract at each flexure: rachis triangular. *Flowers* extremely numerous, suffluted by the above bract, and surrounded by a very shallow, oblique, oblong-ovate cup, emarginate behind. *Calyx* oblong, with three very short rounded teeth. *Corolla* not quite twice the length of the calyx, divided nearly to the base; segments oblong, rather obtuse.

Stamens six, united to the corolla as far as the base of its segments; the free part of the *filaments* long, subulate, and flat; *anthers* (included) obtusely sagittate. Rudiments of the *Pistillum* very long, nearly equalling the stamens, and composed of three subulate distinct bodies.

HAB.—Uncertain.

OBS.—This species approaches closely to *C. JenHnsianus*, from which it appears to be distinguished by the comparatively long internodes of the spadix, the lowest being distinctly two edged, by the very slender spikes, the obsolete cup, and rather longer calyx. It is one of those which establishes some degree of affinity, at least in the inflorescence, with certain grasses. The male flowers moreover of this and many others, are not altogether unlike the flowers of such grasses as *Oryza* and *Blepharochba*.

3i CALAMUS NUTANTIFLORUS.

TAB. CCVIH.

(N. ip.)—Pinnis linearibus equidistantibus supra earina centrali et venis lateralibus duabus setigeris, spathis inermibus incurvatissimis secundii pedunculo spadiceo (masculi) supra-decompositi laermi, ramis nutantibus dense ferrugineo-furfuraceis, spatkarum (secundiarum) laminis majusculis, caucis dentibus obtusis villosis penicillatis quam corolla sub-duplo brevioribus.

The description of this species is founded upon specimens : of three male spadices, and a portion of a young leaf

The *petiole* in its pinniferous part is armed with ternate prickles.

The *pinnules* are equidistant, linear, about a foot long, and five lines broad, the upper surface with one central carina, bearing small bristles, and a lateral vein on each side with long bristles; the under surface smooth; margins with many appressed bristles.

Spadices about two feet long. *Peduncle* unarmed, apparently united to the neighbouring sheath, compressed, about three inches long to the first flower-bearing branch, below which it presents one annulate scar.

Spathes all unarmed, pushed as it were to one side, the lowest about eighteen inches long, one-keeled along the centre, all very much acuminate, and considerably longer than the spadix, (the tips about level-topped) coriaceous, striate, chesnut coloured internally, externally glaucescent, and much flatter than in almost any other species of the section. Flower-bearing branches each suffulted by one of the above spathes, very much branched, four or six inches long, towards the time of expansion nodding and secund.

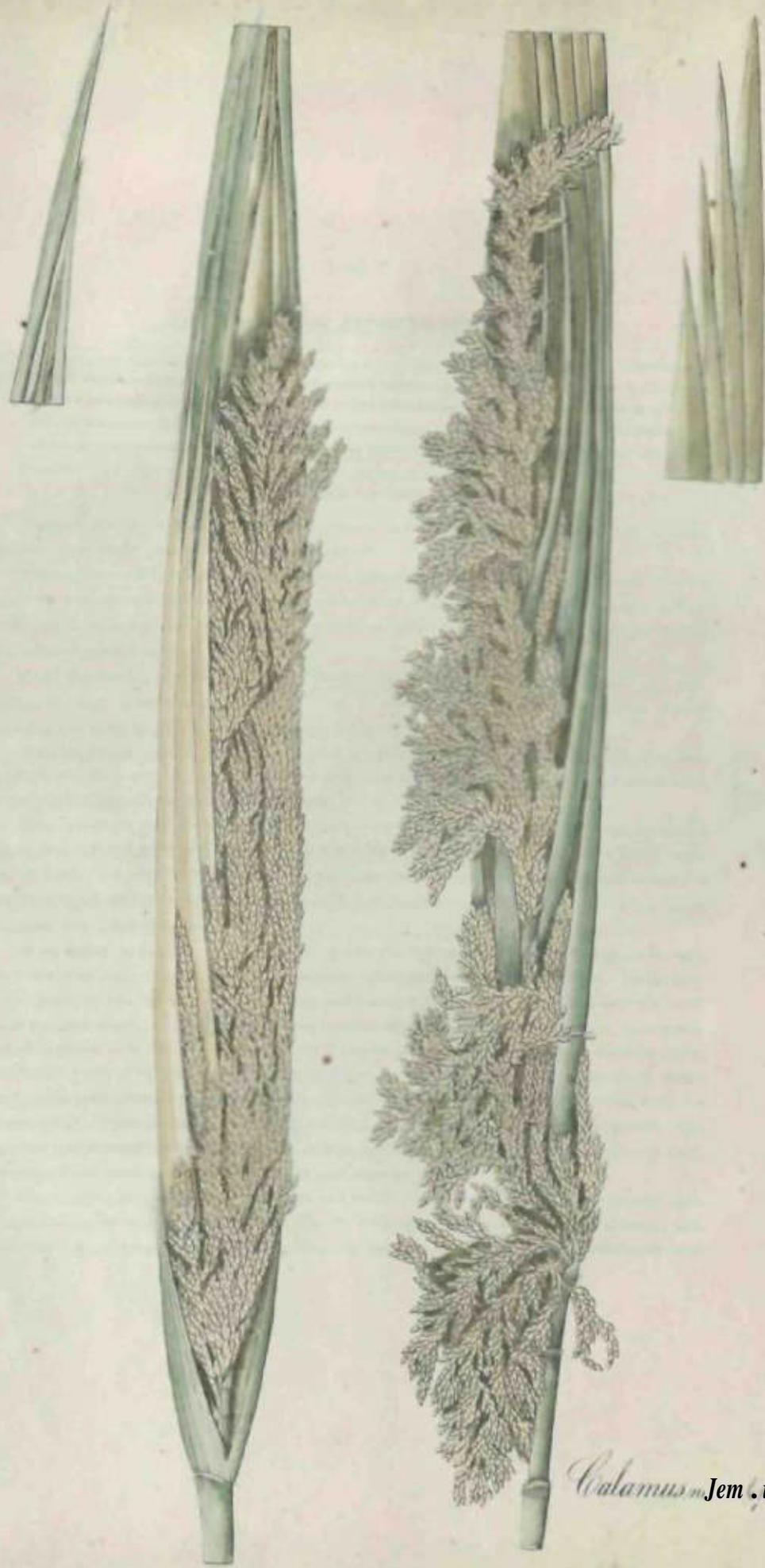
Spikes like the branches sprinkled with dark coloured tomentum, about an inch long, very flexuose with a single flower at each flexure.

Flowers distichous, sprinkled with tomentum. *Bract* amplexent, with a short membranous limb, the margins more or less ciliate, and the apex often tufted. *Cup* bidentate membranous, about three times shorter than the calyx: margins ciliate, and teeth tufted. *Calyx* oblong, very coriaceous and much striate, three-toothed; teeth obtuse, with tufts of brown wool. *Corolla* oblong, one-third longer than the calyx, divided almost to the base into three oblong obtuse segments. *Stamens* six; *filaments* subulate, distinct, reddish; *anthers* obtusely sagittate, about as long as the filament. A small three-lobed rudiment of a *pistillum*.

HAB.—Assam, where it was found by Major Jenkins.

OBS.—This remarkable species, for which I am indebted to Major Jenkins, appears to be an intermediate form between the true CYMBOSPATHS and the PLATVSPATHS; the majority of the characters being those of the former section.

It is closely allied to the succeeding species, from which it is to be distinguished by the unarmed peduncle of the spadix, the unarmed spathes (the second one at least presents no spines), the comparatively large limbs of the secondary spathes, and the nodding very scurfy branches. I take it to be one of the forms exhibiting a representation of Gramineae, to some Andropogoneous forms of which it is at first sight not altogether unlike.



Calamus in Jem. i.

32 CALAMUS JENKINSIANTJS.

(N. sp.) Vagmarum spinis longis pluis deflexis setis multis interspersis, petioli partis nude dorsalibus et marginalibus crebris mediocribus, pinniferis inferioria marginalibus crebris mediocribus, partis pinniferae inferioris marginalibus ventralibusque cum aculeis dorsalibus uncinatis, aculeis partis superioris ventralibus solitariis et dorsalibus palmatis, pinnis equidistantibus linearibus (long, bipedalibus lat. 6-7 linealibus) supra carina centrali et venis lateralibus 2 setigeris, vena media subtus parce setulosa, spadiceis elongati decompositi pedunculo crebre armato, spathis sub-apertis extima subplana bicarinata dorso spinas graciles deflexas interdum fere setiformes gerente, rostro sub-triplo brevior.

The description of this species is derived from specimens of an entire upper **part of** a male plant **in flower**, **and** two or three female spadices in flower, (after fecundation).

Climbing. Stem with the sheaths one inch and three quarters in diameter. *Sheaths* highly armed with long seriate flat brown spines, broader, but less hard than usual, deflexed, except those of the margins which are ascending; rather long thorny bristles occur mixed with these, or in distinct series. The edges of the larger spines are irregular from adhering brownish tissue.

Petiole transversely puckered at the base: the naked part five or six inches long, armed on the back with stout deflexed brownish spines, solitary, or, as in the lowest, in short series; numerous shorter and rather stronger ascending ones, along the margins solitary, placed or a few together.

These are continued into the pinniferous part, which is angular above, convex below, while the back of the same is armed with short strong conical claw-shaped prickles, which upwards appear to be reduced into a central series. *Flagellus* long, armed with the usual claw-shaped aculei.

Pinnules alternate, linear, the largest in the specimens nearly two feet long, eight or nine lines broad, the average size fourteen to sixteen inches long, and six or seven lines broad, cirrhosely acuminate, above with a central carina bearing bristles, and with a lateral one on either side with very long and often stout bristles; the under surface with a bristle here and there on the mid-vein; margins rough with numerous appressed bristles. The young petiole is covered with a brownish tomentum.

MALE. *Spadix* two feet long, adnate to the contiguous sheath. *Peduncle* between the lowest spathe and the axilla about two inches long, very much armed with black spines; above the lowest spathe quite unarmed. *Spathes* open level-topped? not over-lapping, probably spreading, except perhaps the lowest, which is attached about two inches, below the lowest branch. It is two feet long, linear-lanceolate, acuminate into a long beak, concave, scarcely boat-shaped, bicarinate on the back and armed with deflexed irregular rather slender blackish spines. The other spathes (one to each branch of the spadix) gradually diminish in size upwards, they are leathery or chartaceous, of chesnut brown colour inside, glaucescent outside, unarmed except the second, which presents a few weak thorns along two obscure carinae. Flower-bearing *branches* several, ascending, longer than the internodes, decomposed, much shorter than their spathes, except perhaps the uppermost. *Spikes* flexuose, more or less covered with rust coloured scurf; the lowest of each branch three or four* flowered, the upper about two flowered.

Flowers oblong, oblique, situated at the flexures, each suffulted by an amplectent ovate-acute generally ciliate bract, and a cup with two pennicillate teeth next the axis. *Calyx* oblong, very striate, shortly three-toothed; teeth with short tufts of ferruginous hairs. *Corolla* rather more than twice the length of the calyx, divided nearly to the

base; segments oblong, concave. *Stamens* six; *filaments* subulate, fleshy, red, united by their bases to each other and to the petals. *Anthers* not seen, nor the rudiment of the *Pistillum*.

FEMALE. *Spadix* about the same length as the female: the lower part of the peduncle, however, is longer, and the armature as well as that of the outer spathe more slender, bristly and white; the beak is also similarly armed. Flower-bearing *branches* flattened, so that the spikes are nearly bifarious. *Spikes* or more properly speaking racemes, two or three inches long, flexuose, also scurfy.

Flowers solitary at the flexures, the lowest placed on short stout stalks, the upper ones sessile. An amplectent acuminate blackish *bract* (at the base of the stalk), and two *bracteoles* to each flower: between the upper and larger sometimes cup-shaped bracteole, and that situated next to it, a gibbosity occurs as though there should be another flower. Apex of the upper bracteole pennicillate. *Calyx* barrel-shaped with three obsolete teeth. *Corolla* rather more than twice as long, divided nearly to the base into three linear-lanceolate erect segments. *Stamens* six; *filaments* united to the base of the corolla and each other into a cup, (free) short, very broad, without anthers. *Ovarium* roundish-oblong, covered with scales, three celled. *Ovules* solitary. *Style* stout, with three rather long stout sub-recurved branches, lamellar, and papillose inside.

Fruit. Specimens received from Major Jenkins (Tab. CLXXXVI. A. Fig. III.), are roundish whitish fuscous, about the size of a musket bullet, surrounded at the base by the flattened split perianth, mammillately rostrate by the persistent base of the style. Scales of moderate size deeply furrowed with whitish margins and a brown intramarginal line. *Seed* roundish single, sometimes two, when they are sub-hemispherical, containing resinous dots. *Albumen* horny, ruminant. *Embryo* basilar.

HAB.—Assam, Major Jenkins.

OBS.—This species is closely allied to the preceding, and to *C. ramosissimus*; it is also one of the forms shewing that *Dajmonorops* is not to be generally considered a distinct genus from *Calamus*. Indeed this and the preceding species weaken greatly the distinctions between the two last sections, herein proposed,* particularly if, as I suspect, the spathes of this species are spreading. The upper part of the spadix might almost be mistaken for the same part of *C. ramosissimus*, and only differs from the same part of the section PLATYSPA™, in the greater degree of contraction.

* PLATYSPATUJE and *CmumiWE*, or *Dmonoropi*,

33. CALAMUS GRANDIS.

TABS. CCX. A.B.C. TAB. CCXVL Fig. III.

(N. sp.) *Aculeis* petiolorum dorsalibus uncinatis com marginalibus (infra pinnas) inaequalibus interdum spiniformibus, pinnis glaucescentibus linear-lanceolatis (long. 18-20 uncialibus lat. 1½ uncialibus) supra 1-carinatis, vena media utrinque et margine cum vel absque setis, spathic extimée spinis planis latis deflexis, rostro squante, calyce subintegro margine ciliato, fructibus globosis.

The description of this species is derived from specimens of an entire upper part of a male and female plant in flower, and several spadices in fruit. It is a stout Palm, the diameter of the *stem* (including the sheaths) being about two inches.

The *sheaths* are armed with broad, flat, generally very obliquely seriate, dark brown or black spreading, unequal spines.

The *leaves* are fifteen or sixteen feet in length.

Petiole swollen at its insertion, stout; in the lower two feet without pinnules, plano-convex, armed along the centre of the convex face towards the base, with a good many scattered rather deflexed small prickles; these upwards become hooked; along the margins they present a few broad flat short thorns pointing downwards, and within the margins a number of still shorter, generally solitary, ascending thorns; the pinniferous part, which is six to nine feet long, is armed below with strong hooked prickles generally placed in threes, these are continued into the *flagettus*.-

Pinnules alternate, equidistant, of a whitish glaucous aspect linear-lanceolate, eighteen or twenty inches in length, one inch and a quarter in breadth, acuminate, at the apex into a long awl-shaped point, 1-carinate above, without sets on either face or along the margins, or with the mid-vein setigerous on both sides, as well as the margins.

Spadices axillary, erect, fourteen or fifteen inches long, including spathes; peduncles adhering to the next sheath, free, scarcely an inch long, much armed towards the summit with short prickles.

Spathes several, coriaceous, more or less boat-shaped, one to each branch of the spadix. The outermost is the largest, bicarinate, and with the second and third entirely enclosing the others, armed on the back, especially the outermost, with flat ascending brown spines, tapered at the point (especially the outer) into a long flat beak, which is armed towards the base with a few thorns. The inner ones are generally unarmed, all more or less covered with rust-coloured scurf.

MALE. *Spadices* fifteen or sixteen inches long, of which the beak forms one half; branches decomposed. *Spikes* short, scarcely exceeding half an inch in length, flexuose. *Cup* with the margins nearly entire, about three times shorter than the calyx. *Calyx* oblong, shortly three toothed, margins villously ciliate. *Corolla* cylindrical-oblong; three, oblong, erect distinct as far as the base of the rudimentary Pistillum. *Stamens* six; *filaments* blood coloured, lower halves united into a fleshy mass, (free) subulate: *anthers* oblong-sagittate. *Pollen* one or three plicate. Rudiment of a *Pistillum* deeply three-lobed.

FEMALE. *Spadix* very stout with the *internodes* swollen at the centre, and having a corky appearance, all sprinkled with rust-coloured scurf. Branches of the female spadix stout, ascending. *Spikes* short, stout, similarly scurfy,

flexuose. *Flowers* on short stalks, the uppermost about sessile, TMth one bract at the base, and two bracteoles that close to the base of the flower being almost cup-shaped, entire. A niche exists between this and the back of the second, (which is sub-bicarinata) as though there should be another flower.

Calyx barrel-shaped, almost entire, striately veined; the margin fringed with reddish cellular processes. *Corolla* about one third longer than the calyx, ventricose from the middle downwards, divided nearly to the base into three erect, segments. Six rudimentary *stamens* line the lower half of the corolla.

Ovary oblong, three-celled, covered with scales, continued into a stout short cylindrical style, with three, long* revolute, horn-shaped branches, stigmatose on the inner face, which is also longitudinally furrowed. *Ovule* solitary.

Fruits more exposed than the flowers, the spathes being gaping, and at length these falling off, are quite exposed, surrounded at the base by the calyx and corolla, (the latter being generally split) terminated by the persistent base of style about the size and shape of a large marble; scales are of a light tawny colour with white edges, the central furrow narrow on either side of which the scale is more than usually gibbous.

Seed (immature) erect, the covering abounding with resin of a rich blood colour. *Albumen* horny-cartilaginous, very much ruminated. *Embryo* basilar.

HAB.—Malacca. Sent by E. Fernandez under the names *Rotang Sumambo*, and *Rotang Chry* ?

OBS.—This seems to me distinct from *DAEMONOROPS melanchtetes*, BL* by the large leaves, the broad glaucous pinnules, the large spines of the outer spathes, and their beaks equalling, or exceeding them in length.

• *C. Mdanochates*, apinis petioli dorsalibus lancoolato-subulatis allis setiformibus marginalibus supra additis, pinnis aBquidistantibus linearibus (long, subpedalibus lat. 3-4-linealibus) secus venam mediam et margines setoso-aculeolatis, spadicis pedunculo (infra spathas) spinis armato, spathis breviter rostratis eztimis spinis parvis armatis. (Char, e MARTIO.)

" *Palmijuncus niger*. *Rumph. Hb. Amb.* 5. p. 101. t. 52. *Calamus niger*, *WUld. Sp. PL* 2. p. 203. *Lam. Enc.* 6. p. 306. " *Daemonorops melanochiEtes*. *Bl. in Sg*t. Veg. ed. Schultes.* 7. pt. 2. p. 1333. *MART. Palm.* p. 198. t. 117, 125, / . 1.

HAB.—Penang.

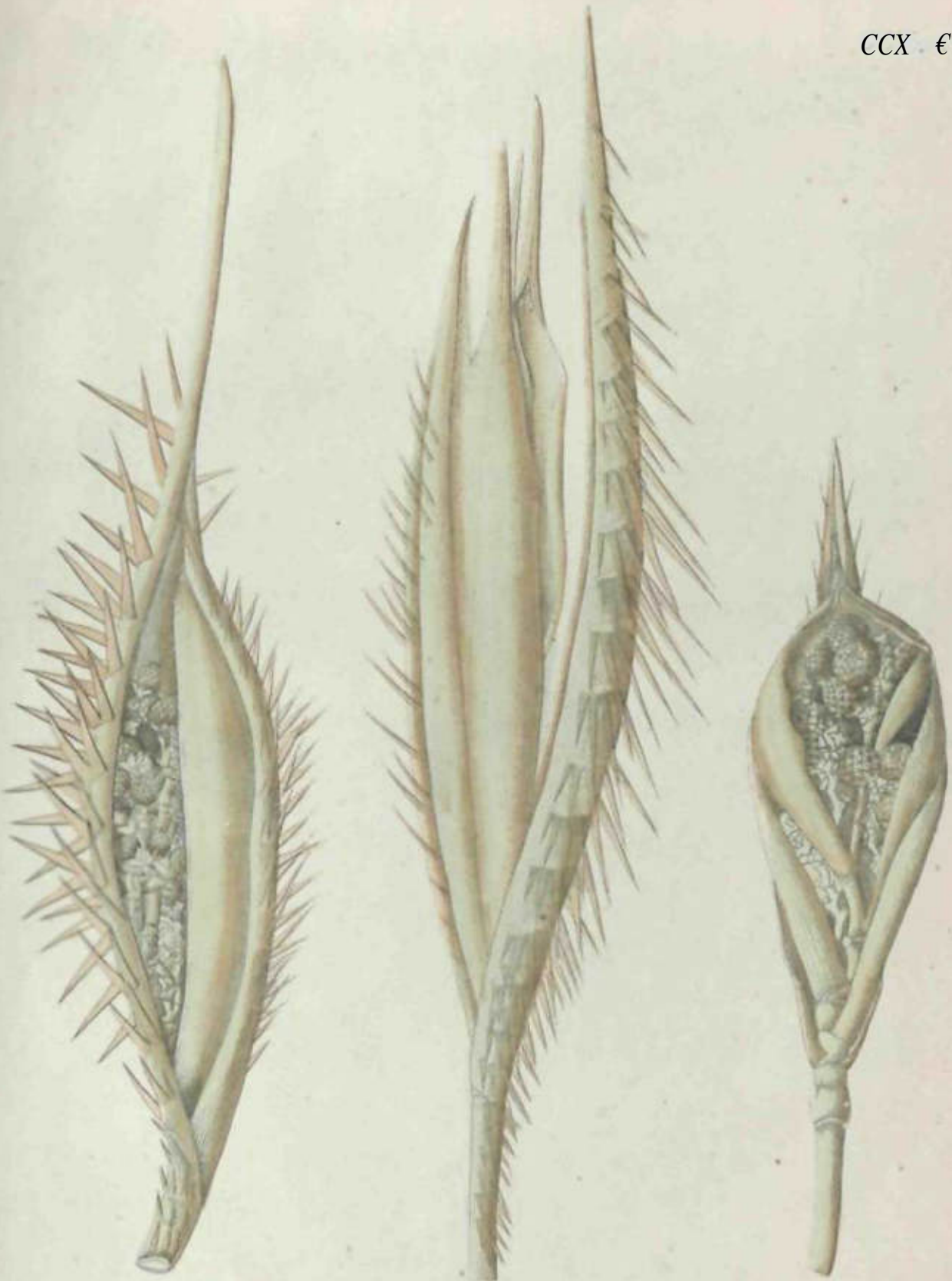
The spathea in plate 125, the only one I have seen, are represented as partially open, in which respect it approaches *C. nutantillorus*, and *Jenkinsianus*. The pinnae are said to be 3-4 feet long.



Calamus (Daemonorops) grandis Griff



f ffUtjm&J (-, fi&metuttfa «,««Mf, #



Calamus L. *It ttfi'ftt u/>.,t,m vndial f.,.*



ft it /nut it. > *V. amonocropha*, *intermedia* (Griff)



CaM/m/J ' Jfimwtuxu, (h.) inha medusa

34 CALAMUS INTERMEDIUS.

TABS. CCXI. A.B.

Aculeis petiolorum dorsalibus uncinatis, spiniset aculeis marginalibus inaequalibus infra pinnas superadditis, pinis linearibus lanceolatis (long. 15. uncialibus, hi uncialibus) supra carina una cum' vel absque setis et venis 2 lateralibus setigeris, subtus vena media setigera spadice pedunculo inermi, spathis externis spinis longis gracilibus deflexis armata, rostro longissimo.

The description of this species is derived from specimens of an entire upper part of a female plant with young fruit. The stature is much the same as that of the preceding species.

The *sheaths* are armed with black seriate flat spines.

Petioles transversely puckered at the base; their naked portion (below the pinnules) about a foot long, plano-convex, armed on the back towards the base with scattered prickles; about a span from the base, it has on the back, solitary, rather long deflexed spines, and along the margins some stout deflexed spines, and more numerous, slender, ascending ones inside these. The pinniferous part is from three-and-a-half to four feet in length, angular, and provided with claw-shaped aculei along the lower convex surface. These are continued into the *flagellus*.

Pinnules rather distant, scattered, often opposite, linear-lanceolate, fifteen inches long, not exceeding one in breadth, and subulately acuminate, glaucescent, above with a central carina, with or without bristles and two lateral veins bearing a few long bristles; mid-vein underneath bristle-bearing as also are the margins.

Spadix with an ovate body and a very long beak, twice as long as the body, the whole length being about eighteen inches. The peduncle is unarmed; about an inch long in its free exerted part. Outer *spathe* bicarinate, covered with very long deflexed, slender, subulate brownish thorns, as is also the very long and stout beak. The second is thickly armed in a similar manner. The branches of the spadix flowers and fruit, scarcely if at all distinguishable from the same parts of *C. grandis*.

HAB.—Malacca. It was sent to me by E. Fernandez, with the name, *Rotang Chrysa* ?

OBS.—This species is distinguishable with difficulty from the preceding. The stature appears to be smaller, and it presents lateral veins with bristles. The chief distinction however is in the armature of the spathes, the thorns of which are very slender, more deflexed, and much more numerous.

35. CALAMUS LEWISIANUS.

TABS. CCXII. A.B.

Aculeis petiolorum dorsalibus uncinatis, marginalibus (infra pinnas) inequalibus conico-subulatis saepius binatis vel ternatis superadditis, pinnis confertis linearibus (long. 13-15 uncialibus lat. 5-6 linealibus) supra nervina una et venis 2 setigeris subtus setis nullis, spatulae extremae spinis planis subulatis gracilibus.

The description of this species is derived from specimens of an entire upper part of a female plant. It is a less stout species than the preceding, the diameter of the stem, including the sheaths, being scarcely more than an inch.

The *sheaths* are armed with solitary or seriate, long flat, black spines; margins revolute.

Petiole much swollen at the base, and there armed with scattered, deflexed shortish thorns; below the pinnules are about a foot long, plano-convex, armed along the back with a few solitary hooked prickles, along the margins with short, conical-subulate, solitary, binate or ternate thorns. In the pinniferous parts it is obtusely triangular, armed along the convex lower face with hooked and solitary prickles which, upwards gradually become palmate towards the extremity.

Pinnules equidistant, approximated, linear, thirteen or fifteen inches long, five or six lines broad, bristle-pointed upper surface with one carina and a lateral vein on either surface setigerous; under surface smooth; margins rough, with appressed bristles.

Spadices oblong, including the beak of the outer spathe six or nine inches long; peduncle below the spathes armed with flat spines. Outer *spathe* bicarinate, armed with rather weak, deflexed, long black spines, often so slender as to become bristly. Second spathe with about two rows of slender thorns; the rest unarmed.

HAB.—Penang. Sent to me by Mr. Lewis, with the name *Kichum*.

OBS.—The spadix is scarcely distinguishable from that of the preceding, but in the specimen the branches are more slender, and less scurfy.

This is extremely akin to the preceding species, the thorns however of the lower naked part of the petioles are different, those of the margins much shorter and fewer. The pinnules also differ.



Calamus Limosinus Griff

36 CALAMITS ANGUSTIFOLITJS.

TABS. CXCIII. A.B.

Spinis vaginalum paucis aculeis plurimis interspersis, aculeis petiolorum solitariis crebria sparsis, inter pinnas inferiores dorsalibus uncinatis ventralibus dentiformibus, pinnis confertis linearibus (long. 8-10 uncialibus lat. 3-4 linealibus) carina et venis 2 lateralibus utrinque setigeris, spathee extima aculeis istis vaginalum similibus, rostro inermi dimidio brevior.

The following description is derived from specimens of a complete upper part of a male plant in flower.

It is a rather more slender species than the preceding.

The *sheaths* are thickly armed with unequal, short, flat, scattered, solitary thorns.

Leaves five, or five and half feet in length.

Petiole puckered transversely at the base; below the pinnules three or four inches long, piano or concavo-convex, armed on both faces, especially the under, with scattered, unequal, short, straight or curved thorns; in the pinniferous part angular-convex, lower face with hooked palmate prickles, the upper part with scattered small straight prickles.

Pinnules equidistant, very numerous, very narrow, eight or ten inches long, and three or four lines broad, tapered into a long bristle, upper face with one central carina, and two lateral carinulae setigerous, the under face with the same, or with the central carina or rib only bearing a few bristles; margins bristly.

Spadix (with the spathes) narrow oblong; peduncle rather slender, somewhat armed. Outer *spathe* with its beak, which is about half the length, about fourteen inches long, bicarinate, armed (except the beak) with thorns like those of the sheaths, the upper ones are rather the longest. Beak quite flat with a tendency to become a cirrus. Second *spathe* obsoletely bi-carinate, with a very few small thorns about the middle of its back.* Branches of the spadix pressed into a thick oblong mass; lower divisions decompound.

Spikes slender, an inch long, very flexuose, with a single flower at each flexure, sprinkled with rust-coloured scurf. A small amplexent *bract* and a *cup* to each flower. *Flowers* eight or ten to each spike, small, oblique. *Calyx* oblong-cylindric, three times longer than the cup, with three small teeth. *Corolla* three times as long as the calyx, divided nearly to the base into three erect segments. *Stamens* six; *filaments* united into a cup; *anthers* linear-sagittate. *Pollen* yellow. A rudiment of a *Pistillum* hidden in the cup of the filaments.

HAB.—Malacca Province. Malayan name, *Rotang Ghittah*.

OBS.—This is in all respects a very distinct species, especially so from the armature of the sheaths and petioles and outer spathe, as well as the narrow short pinnules.

I am inclined to place near this a very distinct species of Calamus, lately received from my collector E. Fernandez, with the name *Rotang Pajare*, and which by its excessive armature and degree of fasciculation of the pinnae, differs from all the others I have yet met with. The following is a description of it:—

Stem with the sheaths about an inch in diameter. *Sheaths* with very oblique mouths, excessively armed with the usual seriate thorns, of which some series are very large, others much smaller, some almost bristle-shaped. The larger ones deflexed: general colour of the older ones blackish from a whitish base. *Petiole* below the pinnae about two feet long, much channelled towards the base, much armed with stout, straight, unequal thorns, of these the lowermost are like those of the sheaths, and exist on the ventral surface; above, they are stout, subulate, but much shorter,

and are confined to the dorsum and margins. In the pinniferous part they are hooked, and confined to the dorsum and margins. In the pinniferous part they are hooked, and confined to the same part, towards the *flagellu** they become palmate. *Pinna* very numerous in large sub-opposite distant fascicles, linear-lanceolate, 1 foot long, eight or nine lines broad, acuminate, with five bristle-bearing carinae above, underneath smooth, apex generally, bristle-tufted. Length of leaf exclusive of the *flagellus* about ten or eleven feet.

37 CALAMUS HYGROPHILUS.

TAB. CCXIII. C.

Aculeis petiolorum infra pinna dorsalibus sparsis, cum marginalibus longioribus infra pinnas dorsalibus aculeatis, pinnis cequidistantibus linearibus (long, pedalibus lat. semunoialibus) supra carina et verus duabus longe setosis, subtus setis paucis ad venam mediam spadiceo attenuati bipedali spatha extima spinis armatis rostro subsequante.

This species is described from a specimen of the upper part of a male plant in flower. It is a stout palm: the diameter of the stem and sheaths 1½ inch. *Sheaths* armed with broad flat spines, spreading or sub-deflexed, solitary-yet disposed in the usual oblique lines. The *petiole* where it unites with the sheath, is so puckered as to form half a complete thick ring round the sheath; armed about this part along the centre with a few short prickles: it is about six inches long before it become armed on the convex dorsum with scattered prickles, on the margins with stoutish but short spines, with its flat ventral face unarmed in the pinniferous part, it is armed along the centre of the dorsum with hooked aculei, which become palmate towards the upper extremity, and are continued into the *flagellus*, a few marginal ones being found below. The young petiole is ferruginously woolly.

Pinnules equidistant linear, about a foot long, five lines broad, cirrhoso-acuminate, above with a central carina, and two lateral veins bearing long bristles, underneath with small bristles along the mid-vein, margins and acumen bristly.

The *peduncle* of the spathes is adnate to the next for a short distance above the mouth of its own sheath, almost unarmed compressed.

Spadix nearly two feet long.

Outer *spathe* arising just above the *exsertion* of the peduncle, armed on the back where it is bicarinate with spines similar to those of the sheaths but narrower, rostrum about half of its length armed with longer and narrower spines, second *spathe* leathery, unarmed as are the rest.

Flowers entirely enclosed in the spathes, very numerous. *Spikes* short flexuose few-flowered, sprinkled with scurf, an amplexent scale-shaped bract under each *flower*. *Cup* rust-coloured shallow, almost entire. *Calyx* oblong short, with three short teeth. *Corolla* rather more than twice as long, divided nearly to the base into three oblong erect segments. *Stamens* six, united among eachtrther and to the base of the corolla, *filaments* (free) subulate from a stout base, *anthers* linear sagittate. *Pollen* yellow. Rudiment of the *Pistillum* a deeply three lobed body.

HAB.—Sent from Malacca by E. Fernandez, with the name *Rotany Ayer*, Ayer is water in Malay

OBS.—This species has to a considerable degree, the armature of *C. grandis*.

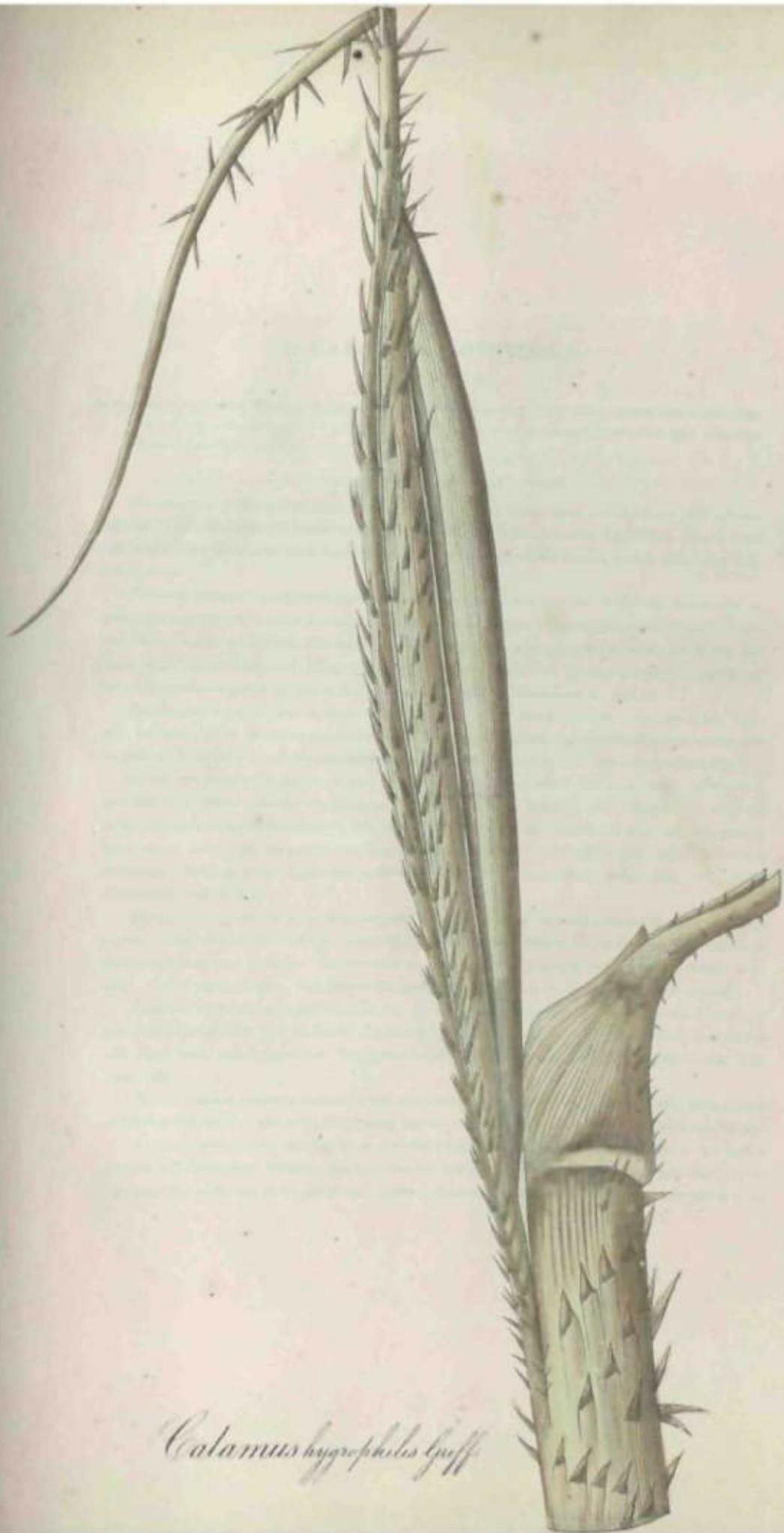
The pinnules however are quite different, being furnished with stout long bristles on the upper surface. This and the lengthened narrow oblong, or fusiform spadix will at once distinguish it from all, except perhaps *Rotan Kirtong*.



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Calamus hygrophilus Luff.

38 CALAMUS MONTICOLA.

TABS. CCXIV. A.B.C. .

Spinis vaginarum longis subulatis deflexis, petiolorura (superiorum) marginibus inaequalibus et aculeis dorsalibus uncinatis, pinnis sequidistantibus linearibus (long. 10-18 uncialibus lat. 6-8 linealibus) supra carina et venis 2 lateralibus setigeris subtus glabris, spatha extima secus carinas duas spinis gracilibus deflexis armata.

The description of this species is derived from specimens of the complete upper part of a female plant in flower and fruit. It is erect, about eight feet in height. The petioles of the upper leaves only, flagelliferous. *Sheaths* armed with long deflexed flat subulate black thorns, disposed in lines, but individually distinct; surface dark brown from adhering scurf.

Petioles of the upper leaves gibbous at the base, the lower naked part is about ten inches long, concavo-convex, armed with a dorsal row of stout hooked prickles, and along the margins, with long, generally deflexed spines, and within these towards the base, with short ascending ones; these are extended into the flagellus; pinniferous part convex below, armed with hooked palmate prickles, these are continued into the flagellus, which is about 1[^] foot long; the pinniferous part of the petiole above, is convexly trigonal, or roundly angular, unarmed.

Pinnules alternate, or often sub-opposite, equidistant, linear, ten or eleven inches long, six lines broad, subulately acuminate, above with the central carina and two lateral veins bristle-bearing, underneath smooth, except that the mid-vein below bears towards the apex numerous small bristles, margins bristly. *Lower leaves* without flagelli.

Spadix with its peduncle adhering to the next sheath, unarmed, covered with dark brown scurf. *Spathes* more open than in the others; the outer one sixteen or seventeen inches long, bicarinate, armed between and along the carinse with weak, long, subulate, deflexed, flat, black spines; the beak is nine or ten inches long, erect, flat, sparingly armed except towards the apex, with long deflexed subulate bristles; its surface when young is also covered with black scurf. Branches of the spadix two or three inches long, included, ascending; ferruginously scurfy. *Spikes* few-flowered, stout, flexuose.

Flowers on short stalks or sessile, bracteate, inner bracteole cup-shaped, and between it and the outer bracteole is a niche. *Calyx* subcylindrical, minutely three-toothed. *Corolla* scarcely twice as long as the calyx, divided nearly to the base into three erect segments. *Sterile stamens* six. *Ovarium* oblong, covered with denticulate scales: three-celled. *Ovules* erect, solitary. *Style* three-partite nearly to the base; branches revolute, stigmatose internally.

Spathes of the fruit-bearing spadix opened out, or none. *Fruit* surrounded at the base by the flattened-out, more or less split perianth, globose, shortly cuspidate by the style, of the size of an ordinary marble; scales tawny with a dark brown intro-marginal line; longitudinal furrows, as it were continuous. *Seed* (immature) erect; tegument fleshy.

HAB.—Somewhat gregarious in thick Forests on Gonoong Miring, an off-set of Mount Ophir, at an altitude of 1500 or 2000 feet. It is also found at Penang, where a specimen subsequently met with is described as follows.

A slender palm, in the specimen six or eight feet high, stem weak, probably climbing, four or five lines in diameter with the sheaths. *Sheaths* armed with obliquely seriate weak brown black spines the longest nearly 1[^] inches long. The naked base of the petiole ten or eleven inches long, puckered at the very base where also it is un-

nned margins with a row of shortish weak spines, along the dorsum with a row of aculei commencing a little above

o^ceohite-ovate. Finns equidistant, linear, eight or ten inches long, four lines wide above, one centra^ keel
ovate, w 1 setigerous, margins setigerously ciHate, underneath the mid-vein is shorUw seUgerous, pomts subulat,
and t o r i i d a row of aculei very short along petiole continued into flageUus towards winch they become clawed.
acumina f l ^ r i t e to shIratherhighup,sUgntfly armed. Outer spathe a^ut a s,m or foot long' arma
with It seriate weak deflexed spines. Bostrum equal to or longer than the body of the s^the, unarmed, mner

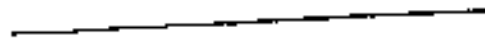
spathe unarmed.

Fruit partly con cealed by the now spreading or belUed-out spathes, the si* of a marble, small, (five line, in dia-
meter) scales green with wL margins andabrown into-marginal line, three reflexed stigmata at the apex, at the

base the perianth.

Seed immature , pellucid punctate here and there, without a raphe. tegument thick albumen ruminant not acid.

Penang Hill: 4th January > 1845 > a b m t Mf mvup,





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(TJ3YB)



Calamus menticola Griff



Calamus (Dioscorea) Monticola Griff.

39 CALAMUS CALICARPUS.

TABS. CCXV. A.B.C.D.

Scandens? petiolis infra pinnas pedalis, spais marginalibus longia et aculeis dorsalibus armatis, iatra pinnas aculeis dorsalibus palmatis, pinnis requidistantibus linearibus (long. 12-13 uncialibus lat. 4-5 linearibus) supra carina 1 et venis 2 setigeris subtus vena centrali tantum setigera, calyce (fl: fsem:) oblongo-ovato breviter tridentato.

The description of this species is taken from the following specimens: viz. the entire upper parts of male and female plants both in flower and fruit. Scandent? Diameter of the *stem* (with the sheaths) about one inch.

Sheaths covered with rust-coloured scurf, and highly armed with very numerous, long, ascending, rather slender very unequal spines, generally disposed in series.

Petiole below the pinnae about a foot long, channelled, convex, armed towards the base, where it is not gibbous or puckered, with spines like those of the sheaths; towards the pinnae they become much fewer and are chiefly confined to the margin, those of the dorsum more or less aculeiform, In the pinniferous part which is 5J to 6 feet long, the prickles are confined to the lower convex surface, are hooked and generally ternate or palmate; these are continued into the *flagellus*.

Pinna equidistant, approximate, very numerous, linear, twelve or thirteen inches long, four or five lines broad, distinctly acuminate into a long bristle: the upper surface with the central carina and two lateral veins setigerous; under surface with more numerous smaller bristles along the mid-vein, the lateral veins with or without bristles; margins with bristles. The leaves towards the apex of the stem small, with comparatively very long flagelli.

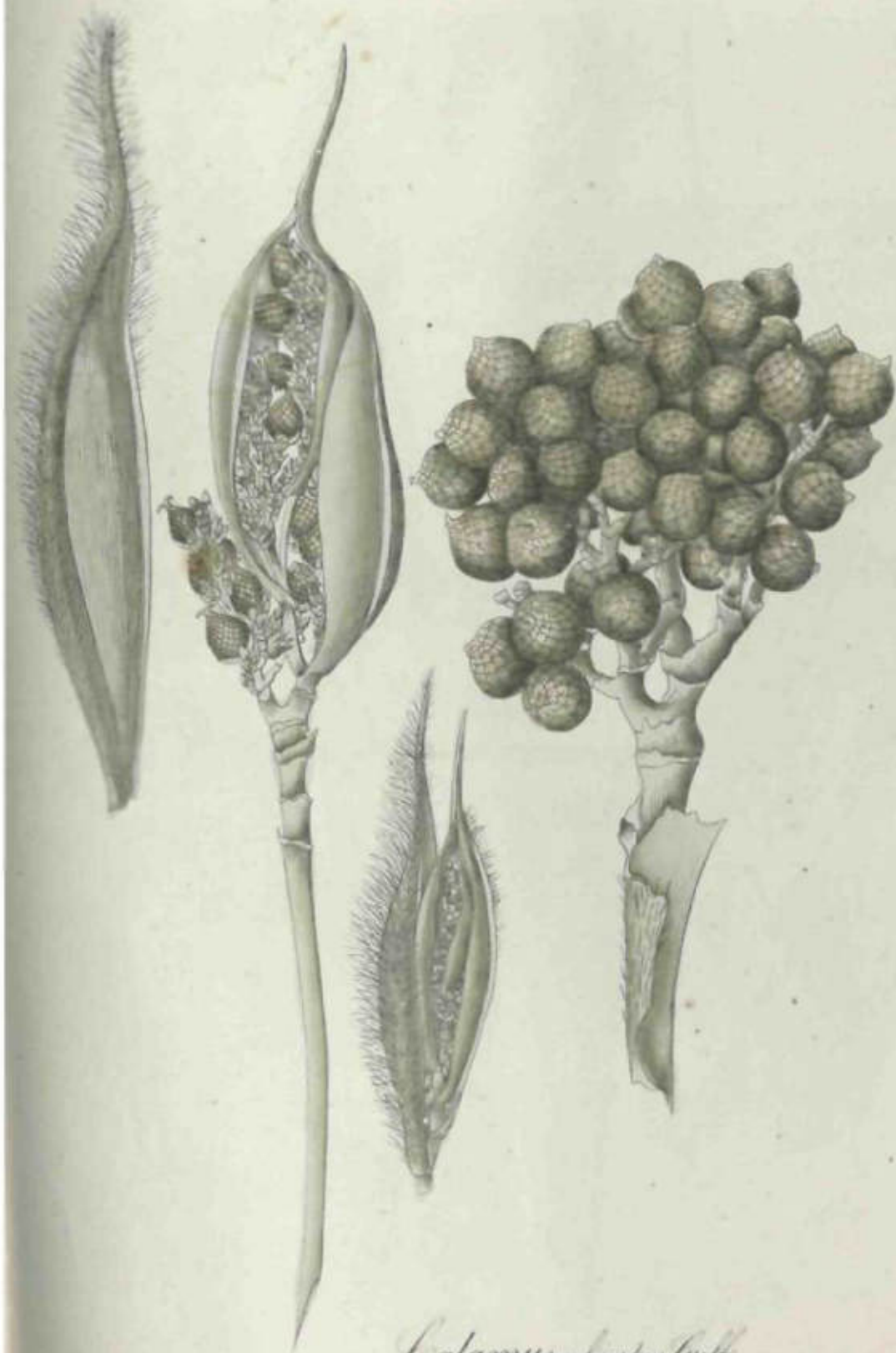
Spadices with compressed, shortly exerted peduncles, bearded along the edges.

MALE. *Spadices* much branched, varying in length, being in some fifteen or sixteen inches long, in others also including the spathes scarcely six, and then much more ovate. Outer *spathe* in the exposed part densely covered with grey-brown bristly hairs, an inch or one and half inches long, these are continued up above the middle of the beak, the moderate apex of which is smooth. Second *spathe* bearded chiefly along the middle, as is also the third. *Spikes* flexuose, with some rust-coloured scurf, a single flower at each flexure, suffulced by a bract and a cup. *Flowers* (Tab. CCXVI. Fig. VI.), as usual oblique. *Calyx* nearly cylindrical, three times longer than the cup, with three short teeth. *Corolla* divided almost to the base, not quite twice as long as the calyx. *Stamens* six, united among each other and to the base of the corolla; *filaments* subulate from a stout base; *anthers* linear-sagittate. Rudiment of *Pistillum* minute, tripartite.

FEMALE. *Spadices* shorter, the upper ones not more than four or six inches long, branches generally simple. *Flowers* (Tab. CCXVI. Fig. V.) with one bract and two bracteoles, a callous lookjpng space on one side between the lower and the uppermost almost cup-shaped bracteole. *Calyx* ovate, the teeth somewhat tufted at the points. *Corolla* three-partite below the middle: ovate from the middle downwards, segments erect. Sterile *stamens* six. *Ovarium* oblong-ovate, covered with scales, three-celled; *ovula* solitary; *style* stout, short, with three long revolute inwardly

stigmatic branches. Fruit exposed, globular, about the size of a large marble, mammillately cuspidate, surrounded at the base by the persistent perianth; scales tawny with a rather broad dark brown intro-marginal line. Seed erect. Albumen deeply ruminant. Embryo basilar.

HAB.-Malacca, where the male appears to be known under the name *Rotang Chockoor Mivio*, the female under that of *Rotary Chochm*.



Calamus calcaratus Guss



Calamus Calicarpus



Coccothrinax reticulata Hoff



Calamita *Panicum* *calicarpus* Griff.



i Calamus aquatilis ii Calamus *||* <** iii Calamus grandis
 iv Calamus leptophyllus v vi Calamus *at/ii* vii Calamus *at/ii*

40. CALAMUS PETIOLORIS.

FIG. VII. TAB. CCXVI*

Erectus, petiolorum parte nuda sub-7-pedali teretiuscula inferne spinis oblique seriatis armata superne aculeis dorsalibus uncinatis et marginalibus (paucis) dentiformibus vel omnino inermi, inter pinnas cum vel absque aculeis dorsalibus, pinnis oonfertis aquidistantibus linearibus (long. 15-17 uncialibus lat. 6-7 linealibus) supra carina et venis 2 setigeris subtus vena centrali setulosa, cupula et calyce ovato-oblongo obsolete tridentato.



I have two forms of this, which may hereafter be found to be distinct, particularly as the characters of this section of Calamus would seem to depend in a considerable degree on the armature of the petioles. I subjoin descriptions of both.

VAR. «. The description of which is taken from a leaf and male inflorescence.

Erect, armature of the *sheaths* the same as that of the preceding species.

Petioles below the pinnules very long, those of the apex of the stem alone produced into flagelli, the pinniferous part about seven feet long, armed below the middle on the convex under face, with rather small palmate hooked prickles.

Pinnules very numerous, approximate, linear, fifteen or seventeen inches long, six or seven lines broad, acuminate into long bristles, upper surface with one carina bearing bristles towards the apex, and two lateral veins more bristly, under surface with many smaller bristles along the mid-vein; margins bristly. The upper flagelliferous leaves and inflorescence are exactly like those of small specimens of the preceding.

Spikes very flexuose, ferruginously pubescent, one bract and a cup to each flower. *Calyx* oblong with three minute teeth, sometimes ciliate. *Corolla* rather more than twice the length of the calyx, divided below the middle into three oblong segments. *Stamens* six; *filaments* united to each other half way up, during flowering reflexed; *anthers* linear-oblong. A three-lobed rudiment of a *Pistillum*.

VAR. p. The description of which is derived from specimens an entire leaf and upper part of a male plant in flower. The armature of the *sheaths* is like that of *C. calicarpus*. *Petiole* seven feet in length to the *lamina*, which is about four and a half feet long: the upper ones only are extended into flagelli; below, the pinnules are subcylindrical, armed in the lower two feet, here and there, with oblique nearly complete series of ascending short flat subulate thorns, becoming gradually fewer upwards; four feet from the base quite unarmed as also among the pinnules, where it is convex below, angular or bifacial above. *Pinnules* as in the preceding.

Inflorescence the same as in the preceding, but the *spadices* and the *spikes* are more tomentose, much longer, and the lowest spathe reaches to the axilla. *Flowers* much the same, but the *calyx* is cylindric-oblong with three acute teeth, the *cup* also has three acute teeth. *Corolla* divided nearly to the base, twice the length of the calyx.

HAB.—Malacca.

* Male flower.

4i. CALAMUS (DIIMONOROPS KIRTONG) ACANTHOPIS.

TAB. CCXVI. B.

Under the name of Rotang Kirtong, I have two specimens of a male spadix of what appears an additional species of this section of Calamus. In this the spadix with the spathes are oblong, nineteen or twenty inches long, the outer spathe obscurely bi-carinate with two rows of ascending flat spines about the carinae, tapering into a long straight stout beak, armed along the margins with very slender spines. The flowers resemble those of *C. petiolaris*.

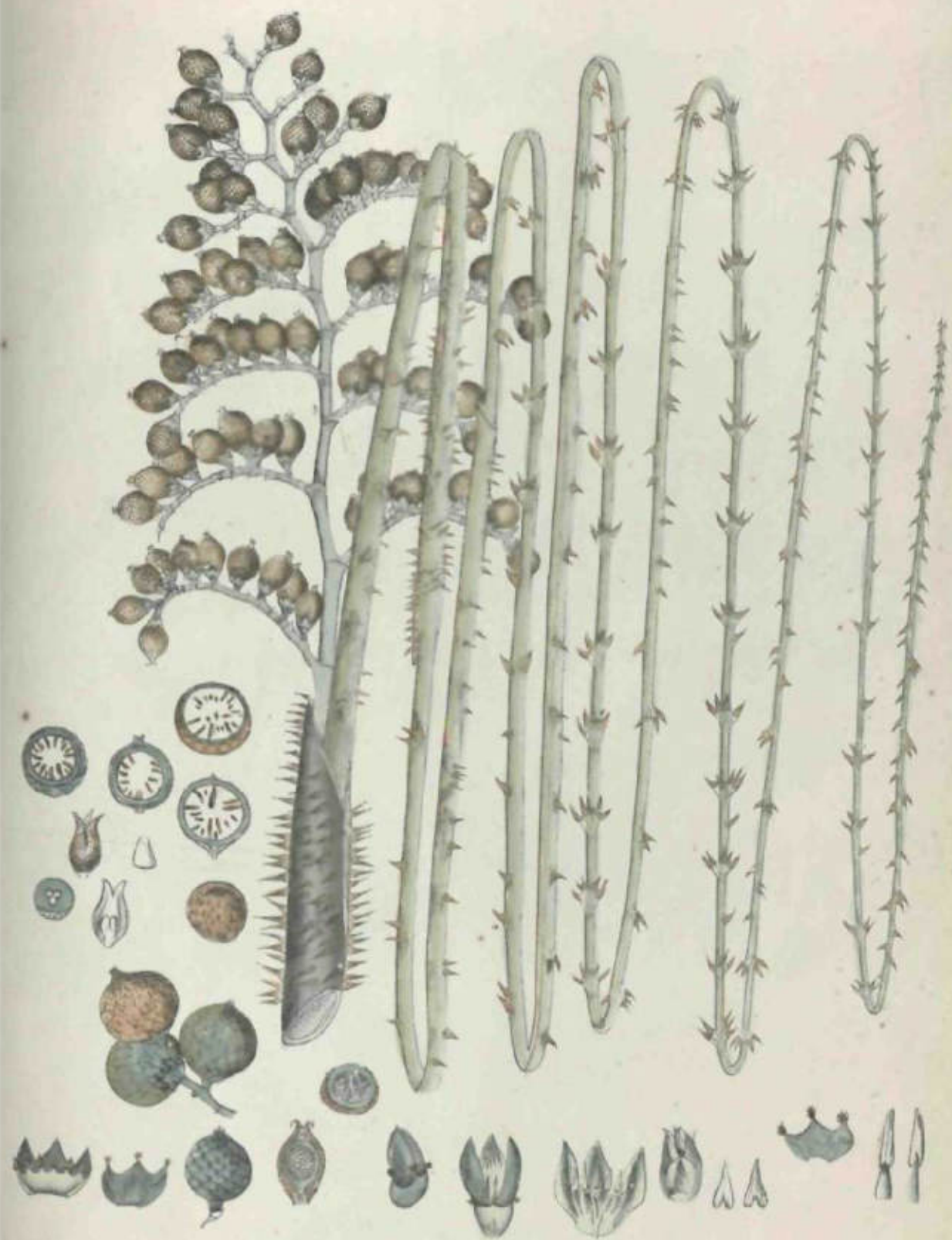
42 CALAMUS WIGHTII.

TAB. CCXVI. C.

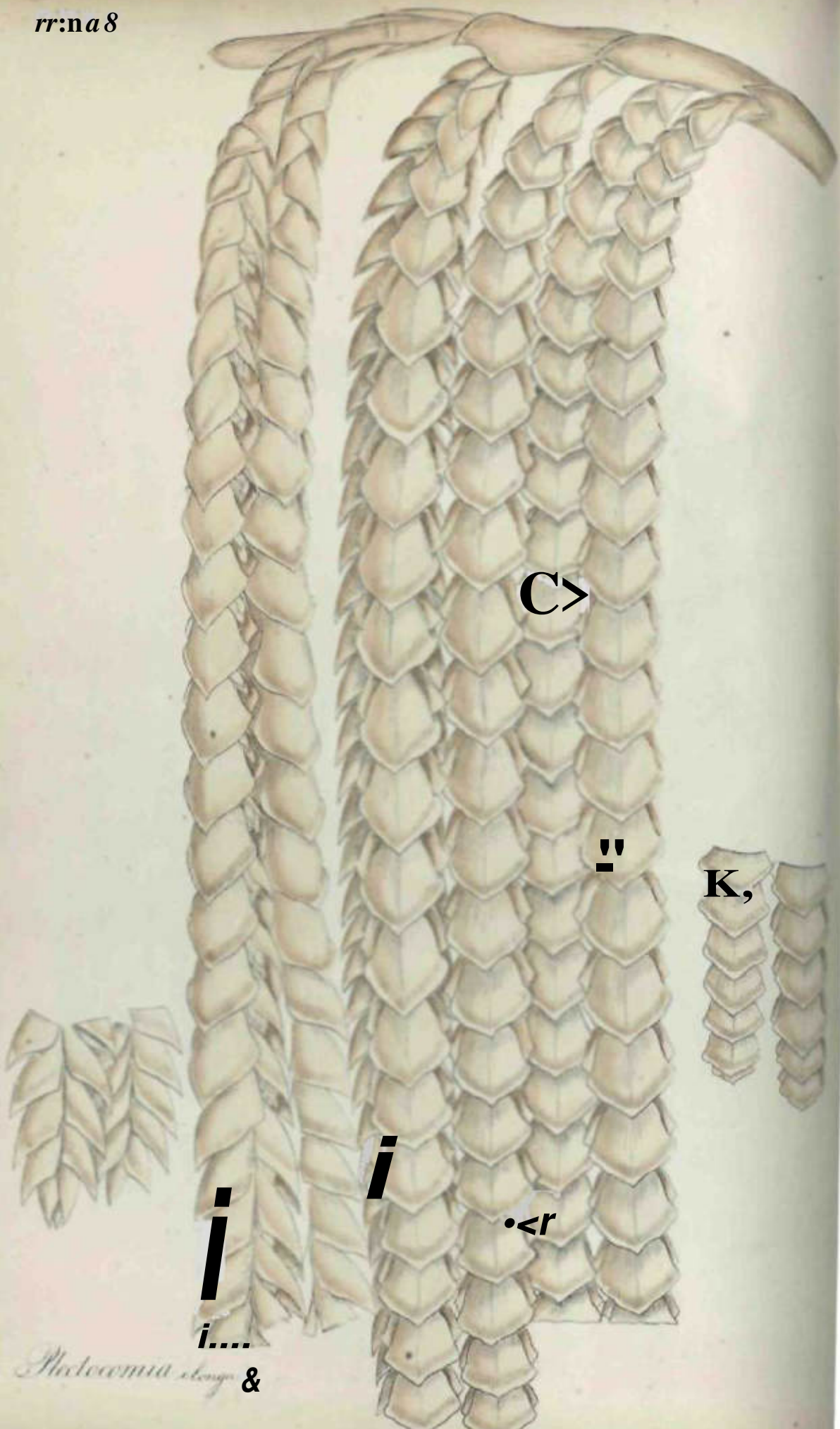
This species which was received from Dr. Wight, is distinguished from all the foregoing by the second arrangement of the fruit.



Lemniscopus hastatus Griff



Calamus, Wrightia, Griff.



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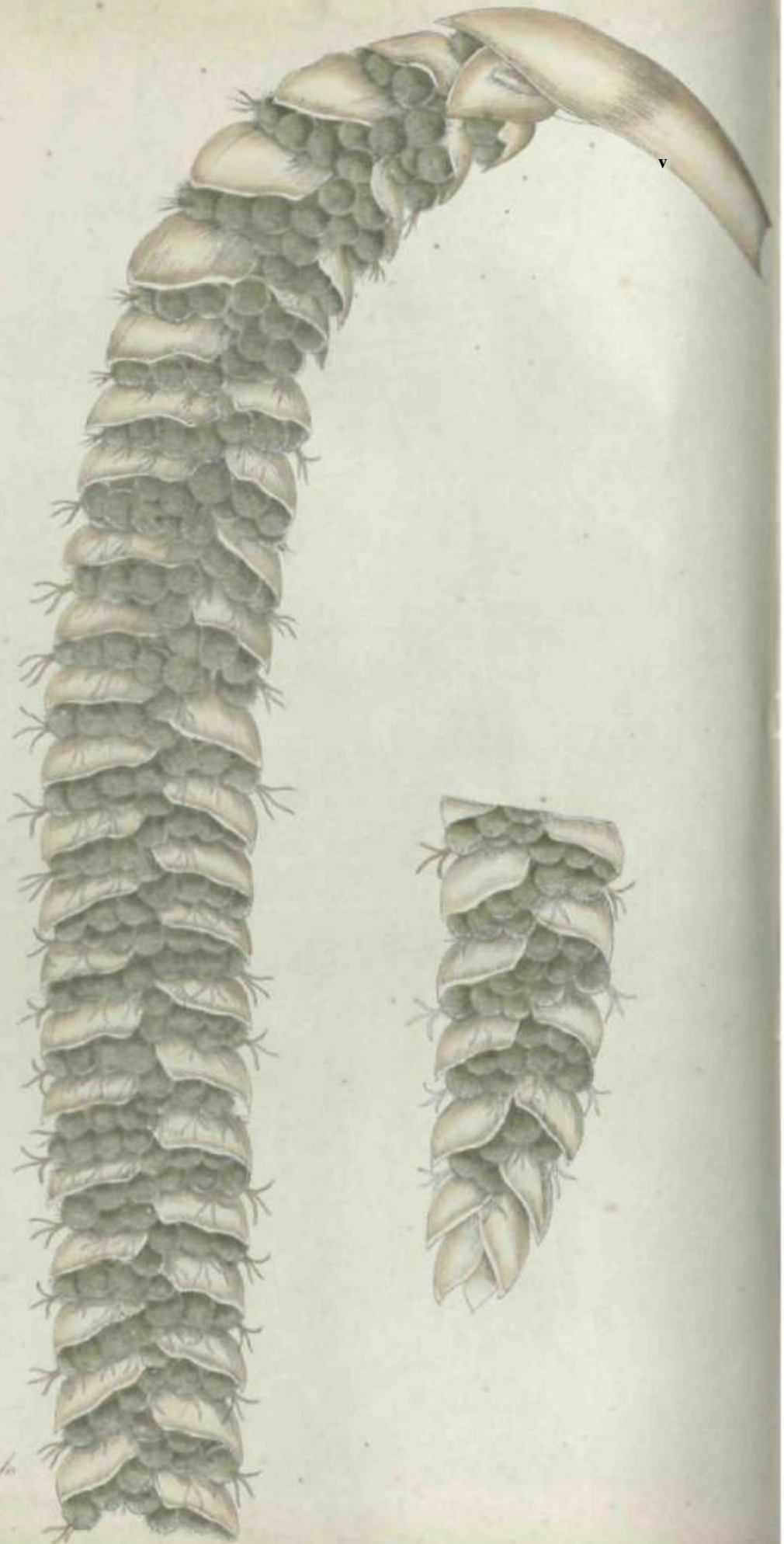
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Phacocoma elonga &



Plectrocomia elongata

V. PLECTOCOMIA.

Mart, et Blume in Syst. Veget. ed. Sohultes. 7. pt. 2. p. 1333. Mart. Palm*, p. 199. t. 114. 116. f. 1. Endl. Gen. Pl. p. 249. No. 1738.

GENERIC CHARACTER.

SPIKES or racemes filiform (paniculate). **FLOWERS** dioecious, **MASCULINE** flowers supported, by two bracts sometimes obsolete* setiform. **STAMENS** 6. **OVARY** covered with scales. **FRUIT** dry, one to threaded, scales reversely placed. **ALBUMEN** even. **EMBRYO** situated at the base.

HABIT.-Perennial palms, climbing, with the appearance of Calami or Rotangs. **PETIOLES** extended into flagellate or whip-like thongs. **PEDUNCLE** and **SPADIX** covered with imbricated spathe, branches long, pendulous, and tail shaped **SPATHES** distichous or in two rows, persistent, closely imbricated. **SPIKES** concealed in fissures between the spathes. **OVARIUM** covered with ciliated scales with fimbriated apices. **STIPULE** three-parted, with subulate branches. **FRUIT** globose.'

OBS - The genus is distinguished from Calamus by the inflorescence, the setaceous bracts, and the scales of the fruit being prolonged into a fimbriated apex as remarked in *Zalaoca*, and in the albumen being even.

i PLECTOCOMIA ELONGATA.

TABS. CCXVII. A.B.C.

P. elongata, Mart, et Blume in Römer et Schultes Syst. Veget. 7. pt. 2. p. 1333, obs. 2. Martins. Palm. p. 19 t. 9.

114. 116. Calamus maximus. Reinw. auct. Martii.

Pinnis lineari-lanceolatis (long. 2-3 pedibus lat. 2-3 uncialibus), spathis (ramorum florig:) ambitu rotundatis, oalycis cupuliformis dentibus brevibus mucronatis villosis-dliatis, petalis oblongo-lanceolatis acutis, squamis (fructus) margine fimbriato-denticulatis.

This is a gigantic climbing species, very striking when in fruit, from the massive pendulous rich brown spadices.

Stem in the lower part almost as thick as the leg.

Sheaths of the leaves much armed, (especially along the margins of the mouth), with stout spines of the usual character.

Leaves with the *flagelli* about twenty feet long.

Petiole armed on the under face with fascicled subulate deflexed spines, varying in number from two to four; in the flagellus these become more numerous, stronger and hooked.

Pinnules distant, arched downwards, linear-lanceolate, tapering to both ends, very acuminate, the longest three feet in length; in breadth two or three inches, coriaceous, of pale-green colour above, glaucous below.

Spadix axillary. *Peduncle* covered with imbricate sheathing spathes, the limbs short, slightly spreading. From the axilla of each of these, a pendulous tail-like branch rises, and is imbricated with similar but smaller spathes, two and a half feet long. The branches are all secund. *Spathes* distichous, amplexicaul, nearly round, 1/2 inches broad, acute, coriaceous, brown, very concave: from the middle to the apex the outline is more angular.*

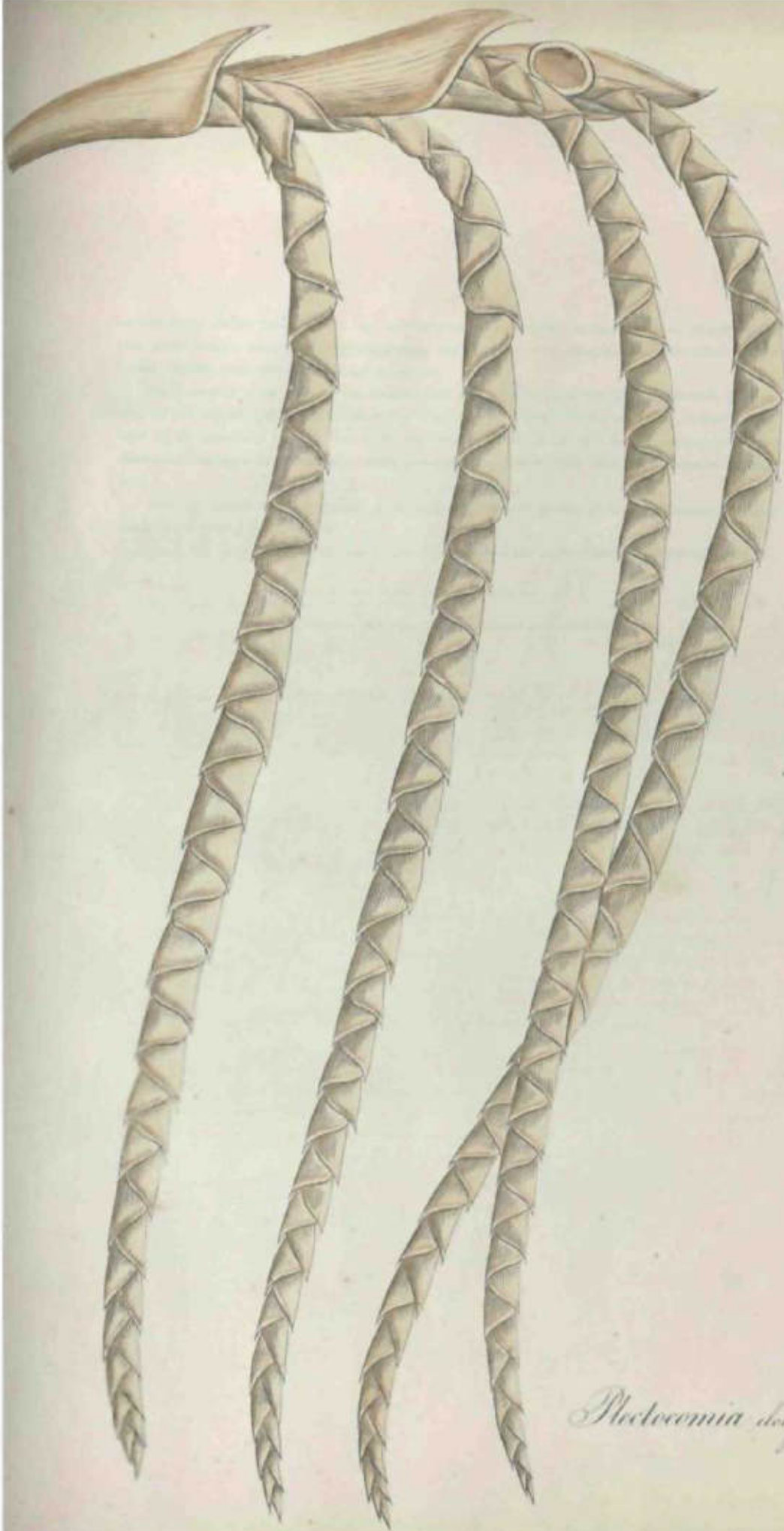
Spikes (or panicles) rather shorter than the spathes, slender, slightly furfuraceous, many flowered. Lower divisions two or three flowered, upper one-flowered. *Flowers* of middling size, oblique, all pressed to one side if viewed anticoffly, if posticously distichous, suffulted by a short stout subulate bracteole.

MALE. *Calyx* striate, angular, cup-shaped, divided to the middle into three short oblong teeth, each ending in a stout point or mucro. *Corolla* three times longer than the calyx, three-partite to the base, petals narrow-lanceolate, rather, obtuse. *Stamens* six, almost entirely distinct from the corolla, the longest one third shorter than the corolla. *Filaments* long, towards the base triangular and red, above filiform and white. *Anthems* twice the length of the filaments, linear, attached a little below the middle. A rudiment of the *Pistillum*.

FEMALE *Spikes* stouter, more ferruginous. *Flowers* fewer, larger, distichous, the lower ones on short stalks, the upper sessile.

Calyx nearly round, with three teeth triangular in outline, mucronate as in the male, coriaceous, scarcely striate, margins of teeth villous. *Corolla* ventricose at the base, tripartite below the middle; segments oblong-lanceolate, acute. *Stamens* six, united to the corolla as far as the base of its segments; *filaments* subulate, flattened; *anthems* effete, much smaller than in the male flowers. *Ovary* roundish-ovate covered with imbricate spathes, the lobes are

* Dr. Martius' figures represent the spathes of the male and female alike; in the female specimens before me though the lobes are open, the spathes are so closely imbricated and so concave that the branches are strictly subulate in form.



Plectocomia elongata (form)

reflexed scales ciliate-fimbriate, with long multifid points. *Ovules* three, erect, anatropous, so close as to leave some doubt whether septa exist. *Style* short, stout, divided nearly to the base, branches rather longer than the corolla, subulate, inner faces stigmatose and canaliculate.

Fruits crowded in the axillae of the spathes, which are now more spread out and more indurated, generally three or five together, globular, about the size of a small bullet, surrounded at the base by the perianth; terminated by the remains of the very short style; very hispid, or ramentaceous (each scale terminating in a fimbriate ramentum)j incompletely three-celled. *Seeds* (immature) one or three, when three, convex-trigonal. *Albumen* solid.

HAB.—In forests near the sea-shore at Koondoor, Malacca, and generally perhaps in the interior. Malayan name *Rotang Oonar*,* *Rotang Dahown*.

OBS.—This species is of inferior value to most others, and is chiefly used for baskets and other wicker-work.

* *Oonar*, Mr. Weaterhout informs me, is the Malay appellation for the flagelli of these Palms.

2 PLECTOCOMIA KHASIYANA.

TAB. CCXVIII,

Pinnis—spathis obovate apicem versus obuneatis, sepalis (fl. turn.) sub-distinctis planis glabris, petalis e basi lanceolata acuminatis, fructibus rostrato-cuspidatis, squamarum fimbriatarum apicibus deciduis.



The description of this species is derived from specimens of a female spadix in flower, and part of a spadix in fruit.

Spathes of the peduncle with erect oblong-lanceolate limbs. Flower-bearing branches one or two feet long, secund, pendulous. *Spathes* at the base half amplexant, rather distant, distichous, and laxly imbricated; outline obovate, towards the apex broadly obtuse, margins below this part incurved, (so that they are very concave) two or three times longer than the spaces between them. *Spikes* concealed by the spathes, are two or three times shorter than the latter, and as usual furfuraceous, three or seven flowered.

Flowers distichous, large. *Calyx* flat, small, divided almost to the base into three triangular mucronate smooth teeth. *Corolla* divided almost to the base into three ascending, lanceolate, acuminate segments, four, to four and a half lines long. *Stamens* six, with very broad, flattened, short filaments, and small effete anthers. *Ovarium* broadly globose, covered with exceedingly numerous, shortish, very fimbriate scales with multifid points, three celled. *Style* very short, stout, with three stout, subulate, spreading branches as long as the petals, channelled and stigmatic on their inner faces.

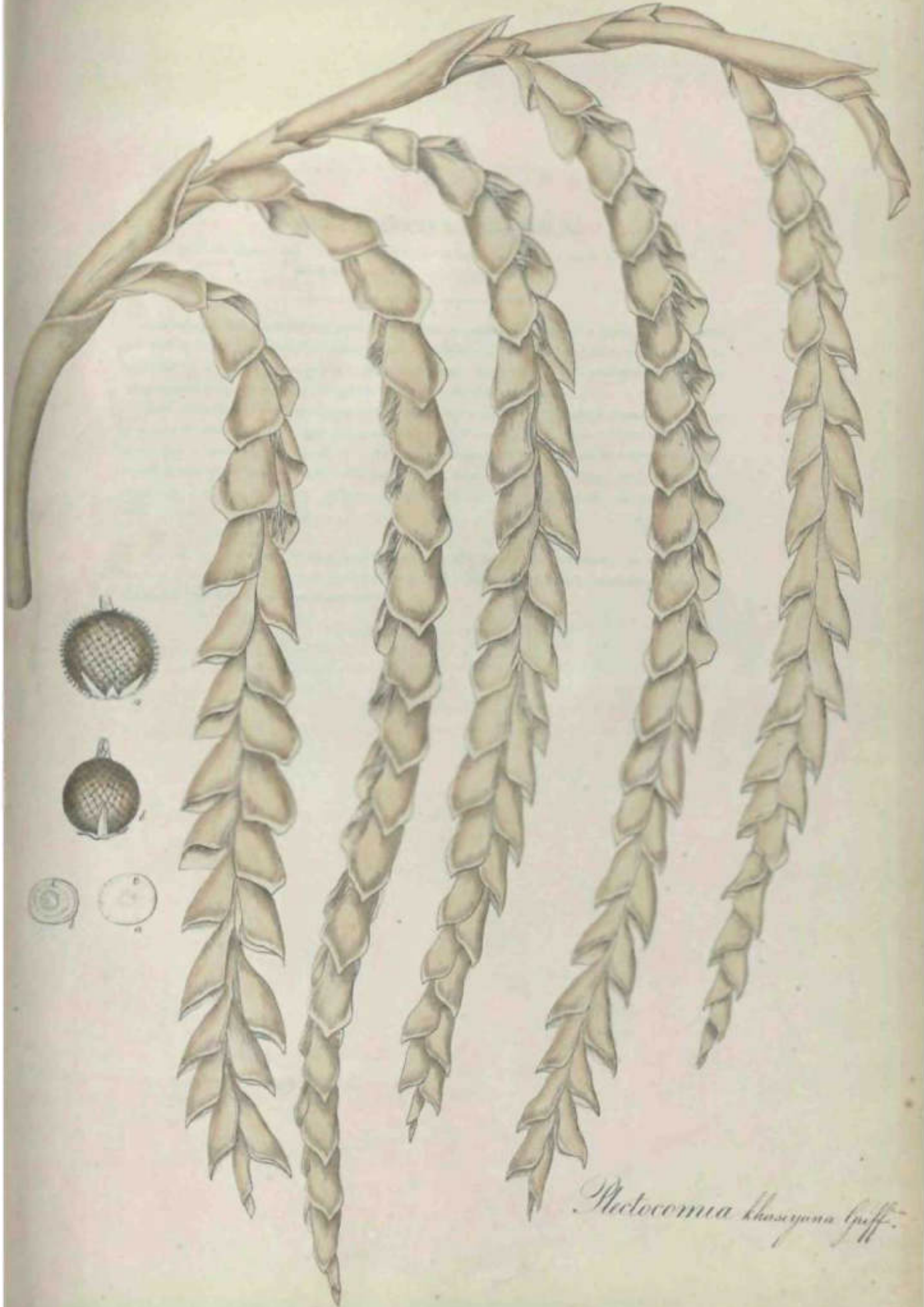
Spathes of the fruit-bearing spadices spreading, rarely perfect, generally much lacerated or deficient.

Fruit surrounded at the base by the calyx, and corolla now flattened out, apex attenuated into the style rostrato-apiculate, otherwise round, about one inch in diameter, dark brown; scales very numerous, rather small, either nearly smooth, or with ciliate margins and recurved split fimbriate points; when not much rubbed it has a woolly appearance.

Seed covered with a rather thick, brown, cellular spongy substance. *Albumen* solid, homy, of cells radiating from the centre. *Embryo* of the ordinary shape, basilar.

HAB.—Khasiya Hills.

OBS.—This would appear nearly allied to the succeeding form from which it differs in the smaller spathes, the very small calyx with minute triangular teeth, the broader petals, the brown, not rust-coloured fruit, which is smaller, and not by any means so villous, the points of the scales being less fimbriate and often deciduous.



Plectocomia khasyuna Griff.

3. PLECTOCOMIA ASSAMICA.

Pinnis——spathis——calyce (fl. faem.) ad medium triparito laciniis cuneato-rotundatis, petalis e basi lineari, acuminatissimis fructibus globosis, squamarum apicibus longis persistentibus fimbriatissimis.

The materials from which this brief description is drawn up consist of specimens of a spadix in fruit received in 1840 from Upper Assam, and which I find marked in the Botanic Garden "Zalacca." The *spadix* is large, the branches very ferruginous, two, or three and half feet long. *Spathes* two and half, to three inches long, shape not ascertained from their being much lacerated and split, and partly deficient.

Fruit (when dry), of a rich ferruginous brown colour, eleven or twelve lines in diameter, surrounded at the base by a calyx of three ovate-oblong sepals, and a corolla consisting of as many petals, which are very long and acuminate from a linear base, terminated by a style tripartite almost to the base with subulate connivent branches; one-celled, very villous from the highly ciliate, fimbriate, split, recurved points of the scales. *Seed* similar to that of the succeeding, but a little larger. *Albumen* cartilaginous, solid, its tissue radiating from the centre. *Embryo* basilar. (Figs, *a a*. Tab. CCXVHI).

HAB.—Upper Assam.

OBS.—I have under the preceding species, noted the differences by which this appears to be distinguishable. The fruit is a good deal like that of *P. elongata*, judging from Martius' figure, (palmre. loc. cit.) but the scales are so fimbriate, that it has quite a woolly appearance.

4 PLECTOCOMIA HIMALAYANA.

TAB. CCXIX.

Pinnis lineari-lanceolatis (long. 1 £ pedalibus lat. 1f **uucialibus**) 5 veniis, upaibis cuneato oblongis apicem versus late obtusatis, floribus masculis **setia** tribus luffuhis, calycis ultra medium (riparliti cupuliformis laciniis glabris in **tetam** desineutibus.

This species is described from specimens consisting of a portion of a leaf and male spadix.

The pinniferous part of the *petiole* is armed below with stout hooked prickles, confluent at the base, these are continued in increased number into the flagellus.

Pinnules alternate, linear-lanceolate, very acuminate, eighteen inches long, one and three quarters broad, with five prominent veins on the upper surface, margins with short sub-appressed spinescent teeth; from the great degree of conduplication of the base, the pinnules may almost be said to be petioled.

Branches of the *spadix* about two feet long, covered with rust-coloured tomentum. *Spathes* almost stem-clasping, conduplicate, coriaceous-scarious, apex decidedly obtusate in outline; they exceed in length by } the inter-spathal spaces. *Spikes* solitary, about half as long as the spathes, angular, flexuose, densely rusty-tomentose.

Flowers suffulted by three narrow bristle-pointed scarious bracts, sub-distichous. *Calyx* cup-shaped with three short rounded teeth ending in bristles. *Corolla* oblong and oblique, four or five times longer than the calyx: petals hard. *Stamens* six, united at the base into a short cup; *filaments* stoutish, subulate; *anthers* large, linear-oblong, obtusely sagittate. No rudiment of a female ?

HAB.—Sub-Himalayan ranges about Dargeling.

OBS.—This may be the male of the preceding, but the appearance of the spathes, which are generally much the same in both sexes, and their shape, which is cuneate-oblong with straight edges in the oblong parts, and concave edges in the obtusate part, has induced me to attempt to characterise it as distinct. I may also remark that the plants of the Khasya Hills are generally distinct from those of the Himalayas.

From *P. elongata* it differs essentially in the shape of the spathes, in that of the calyx, as well as in the smoothness of its margins, and perhaps in the flowers being tribracteolate.



Plectocomia h...
Griff

1

VI. EUGEISSONA.

GENERIC CHARACTER.

INFLORESCENCE terminal, paniculate. FLOWERS dioecious terminal and solitary. STAMENS indefinite. OVARY covered with scales. FRUIT dry, 1-seeded. ALBUMEN cartilaginous or horny, with six furrows. EMBRYO basilar.

HABIT.—Almost stemless spreading palms.

LEAVES pinnate, the sheath and the petiole below the pinnules, both armed with flat awl-shaped spines.

PINNULES linear, central vein on each surface setigerous.

PANICLES four to six feet, erect, aspect sad, of brownish colour, every where covered with imbricated spathes.

SPATHES, the primary ones armed on the back, and prolonged into a beak-like attenuated apex; the secondary ones pointed, and towards the dorsal keel slightly spinose,- the tertiary ones unarmed.

FLOWERS large, half immersed in closely imbricated bracts.

CALYX trifold (membranously chartaceous) *Corolla* three petalled, petals rather long and spinosely cuspidate, those of female flowers have a pennicillate tuft of abortive stamens, which, uniting form a keel.

ANTHERS linear adnate.

STYLES three stigmatose internally. OVULE solitary anatropous. FRUIT ovate rostrately mammillate, the size of a hen's egg, brown. ENDOCARP bony. SEED erect, dry.

(no)

EUGEISSONA TMSTE.

TABS. CCXX. A.B.C.

This is a stemless palm, growing in thick tufts, which are surrounded by the debris of the old leaver *Leaves* numerous, the outer ones spreading, fifteen to twenty feet in length.

Petiole throughout the lower seven or ten feet, roundish, armed with brown, ascending, flat spines, between the pinnules unarmed, triangular. *Lamina* in outline oblong-linear. *Pinnules* two, or two and a half feet long, narrow, scarcely an inch wide, subulately acuminate, margins when dry much involuted, the central vein prominent above, and furnished with distant setae; the old ones generally irregularly split at the point.

Inflorescence terminal, paniculate. *Panicles* four or six feet long, in the lower part furnished with a few small leaves, the sheaths of which are much armed, gradually passing into the *spathes*, which are similarly armed and very acuminate, indeed often flagelliferous.

Branches of the panicle flexuose, much imbricated with coriaceous amplexicaul brown bracts or spathes, the lower of which slightly armed along the dorsal carina, the uppermost unarmed. The lower branches two or three-flowered, the upper one-flowered.

Flowers dioecious, terminal, subsessile, very large, surrounded at the base by similar, but smaller, highly imbricate bracts.

MALE. *Calyx* sub-cylindrical, altogether concealed by the bracts, membrano-chartaceous, trifid, teeth narrow, acute, with broad sinuses, venation the same as that of the innermost bracts. *Corolla* 3-petalled, exceedingly long, (about one and a half inch in length). *Petals* oblong-linear, somewhat constricted opposite the throat of the calyx, indurated, striated, obliquely ascending, point oblique ending in a very sharp thorny acumen. *Stamens* indefinite; *filaments* short; *anthers* long, linear, adnate, of a lilac colour. No rudiment of a female observed.

FEMALE *flowers* rather longer than the male, otherwise similar. The petals opposite the mouths or opening of the calyx, bear a tuft or pencil of abortive stamens which run down in the shape of a keel.

Ovary oblong, densely covered with scales, of about the same length as the calyx, sub-trigonal at the apex three-celled. *Ovule* solitary, oblong, erect, anatropous. *Styles* three, oblong, flattish, sub-connivent and stigmatose on their inner faces.

Fruit densely scaly, generally rough from the recurved points of the scales, dark brown, ovate with a stout rostrum or point, terminated by the remains of the styles, surrounded at the base by the now divergent petals often thrown to one side, one-celled, one-seeded. Substance very thick at the base, consisting of rust-coloured spongy tissues interspersed with fibres; above thin, consisting of fibres alone. *Scales* rough to the touch, lanceolate, with irregular margins; dark brown with paler edges.

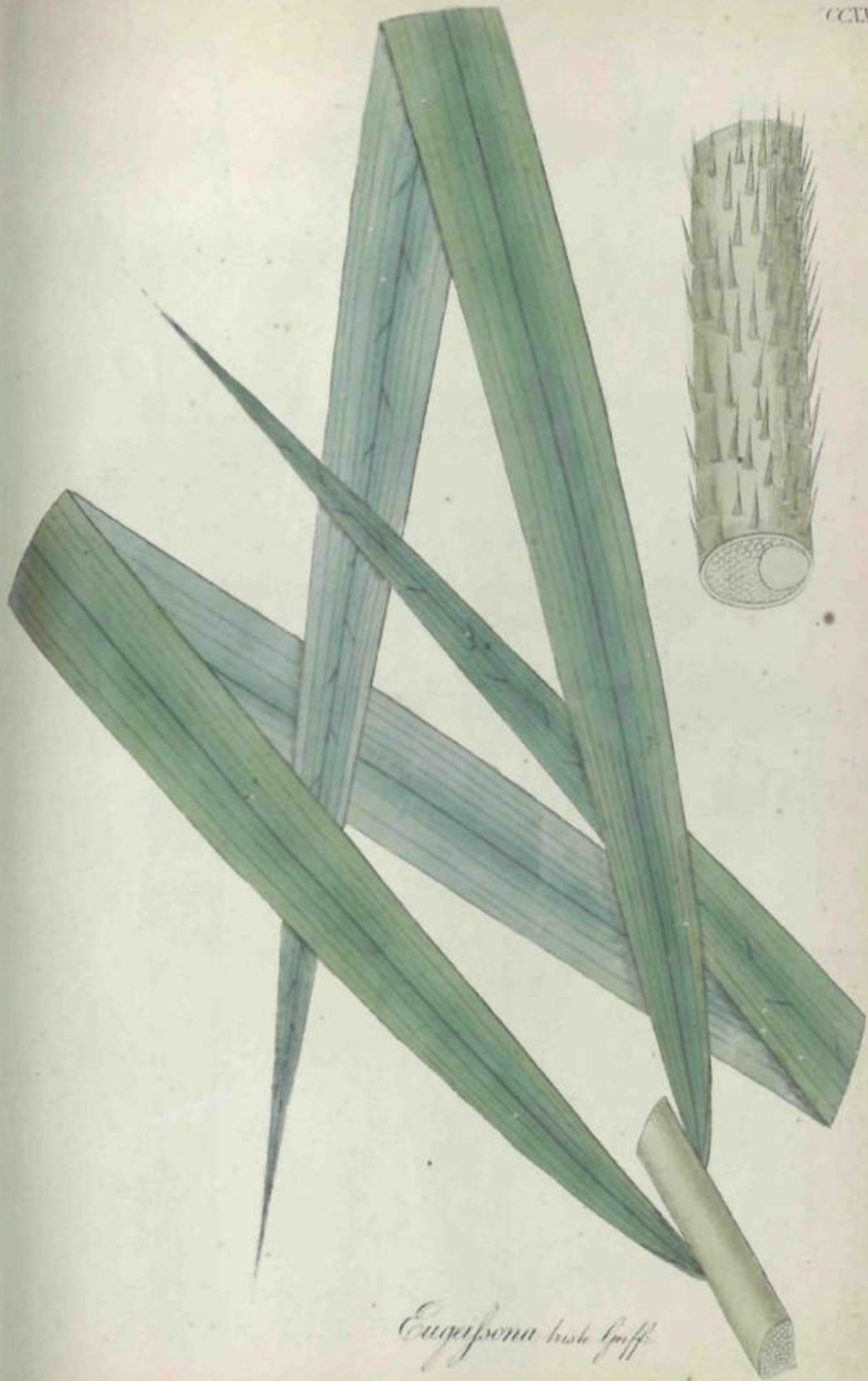
Seed large, covered with a brown membrano-cellular covering, surface with six furrows, of which the alternate ones are the largest and most complete, running into each other at both ends. These furrows are filled with the tissue surrounding the seed. *Albumen* equal, horny, cartilaginous, presenting on a transverse section the furrow, above mentioned. *Embryo* basilar.

HAD.—In forests on the hills about Ching, Malacca, very common. It is also common in Penang where

Sm



Eugenia hirsuta Sm



Euzoisma hirta Griff



Euglossena lutea Griff



Eugenia hystrix Griff.

according to Mr. Lewis it is much used in making mats for sides of houses, for thatch, and the same purposes as those of *Nipa fruticans*. Malayan name, *Bertam*.

OBS.—It appears to constitute a distinct genus by its inflorescence, (which is scarcely c[^]trly explainable by the use of the terms ordinarily used in descriptions of palms), by its indefinite stamens and the structure of the pedicel. No other Indian genus of this sub-family, so far as I know, has more than six stamens: and the only approach to the present genus in this respect takes place in *Ruffia*, which genus also has linear oblong cuspidate petals.

VII. CORYPHA.

*Urn. fMus. Cliff. \J. Gen. PI. ed. 6ta.p. 572. No. 1221. ed. Schrebre.p. 774. No. 1690. Syst. PL ed. SMt. 7. p. lxxviii. No. 1493. Juss. Gen. p. 39. (partim). Geertn. *Fruct. et. Sem. 1. p. 18, t. 7. (semine inverso). Lam. Enc. Meth. t. 899. (e Rheede et Gaertner). R. Br. Pr. Fl. Nov. Holl. ed. 2da. p. 123. Roxb. Fl. Ind. 2. p. 174. Icones. 7. t 37. Suppt. 3. t. 80. Mart. Progr. p. 10. (partim). Palme. 231. Endl. Gen. p. 252. No, 1753. Codd-Pana. Rheed. Hort. Mai 3. p. 1.1 1-12. Talliera. Mart. Progr. p. 10. Syst. PI. ed. Schult. 7. p. lxxviii. No. 1492. Gembanga. Blum, in Bot. Zeit. (1825). 2. p. 580. et 678. (e Martio).*

GENERIC CHARACTER.

FLOWERS hermaphrodite. CALYX three-toothed. COROLLA three-petalled. STAMENS 6, hypogynous. FILAMENTS distinct at the base. OVARIES three, cohering. STYLES connate. FRUIT (generally one only matured) a berry, one-seeded. ALBUMEN horny, hollow in the centre. EMBRYO placed near the apex of the albumen.

HABIT.—Lofty arboreous Asiatic Palms, flowering but once. TRUNK ringed or spirally channelled. CROWN large and broad. PETIOLES without any reticulated fibres at their bases, the margins armed with prickles. LEAVES palmate much divided, each division bilobed at the apex. INFLORESCENCE terminal and very large. SPATHES both primary and secondary numerous. FLOWERS glomerated, short-pedicelled, yellow. Fruit olivaceous yellow.

OBS.—In their affinities they approach near to *Livistona*, from which they are distinguished by their flowering only once, by their terminal inflorescence and secondary spathes.

i. CORYPHA ELATA.

TAB. CCXX. D.

C. elata, Roxb. *Fl. Ind.* 2, p. 176. *Icones Suppt.* 3. t. 80. *Mart. Palm.* p. 233.

Trunco spiraliter sulcato, petiolo spiraliter dispositis exauriculatis, lamina (petiole brevior) plana, laciniis 85-90. profundis lineariterisiformibus obtuse bilobis poaticis cum petiolo angulum scutum efformantibus, glomerulis florum distantibus, petalis lunceolatis, hincibus globuli magnitudine, embryo versus apicem albuminis toli.

"Trunk straight, but often varying in thickness. I have two trees, which were pretty well ascertained to be about thirty years old when in flower; one was seventy feet to the base of the inflorescence, the other about sixty; circumference near the root eight feet, and about *the middle of the trees* six and a half or six: *their whole length strongly marked with rough, dark coloured, spiral ridges, and furrows, which plainly point out the spiral arrangement of the* leaves. The ligneous fibres as in the order are on the outside, forming a tube for the soft spongy substance within, of dark chocolate colour, tough and hard, but by no means equal, in either quantity or quality, to the very serviceable wood of *Borassus fiabelliformis*.

Leaves round the top of the trunk, immediately under the base of the inflorescence, numerous, palmate pinnatifid, plaited, from eight to ten feet each way; *segments* generally from forty to fifty pair, united about half their length, ensiform, apices rather obtuse and bifid, texture hard, smooth on both sides. When the tree begins to blossom, the leaves wither and fall off, leaving the fructiferous part naked.

Petioles from six to twelve feet long, concave above, with the thin, hard, black margins thereof cut into numerous, very short, curved spines.

Spathes numerous, there being one at each joint of the various ramifications of the spadix, all smooth and when recent, of a pale yellowish green.

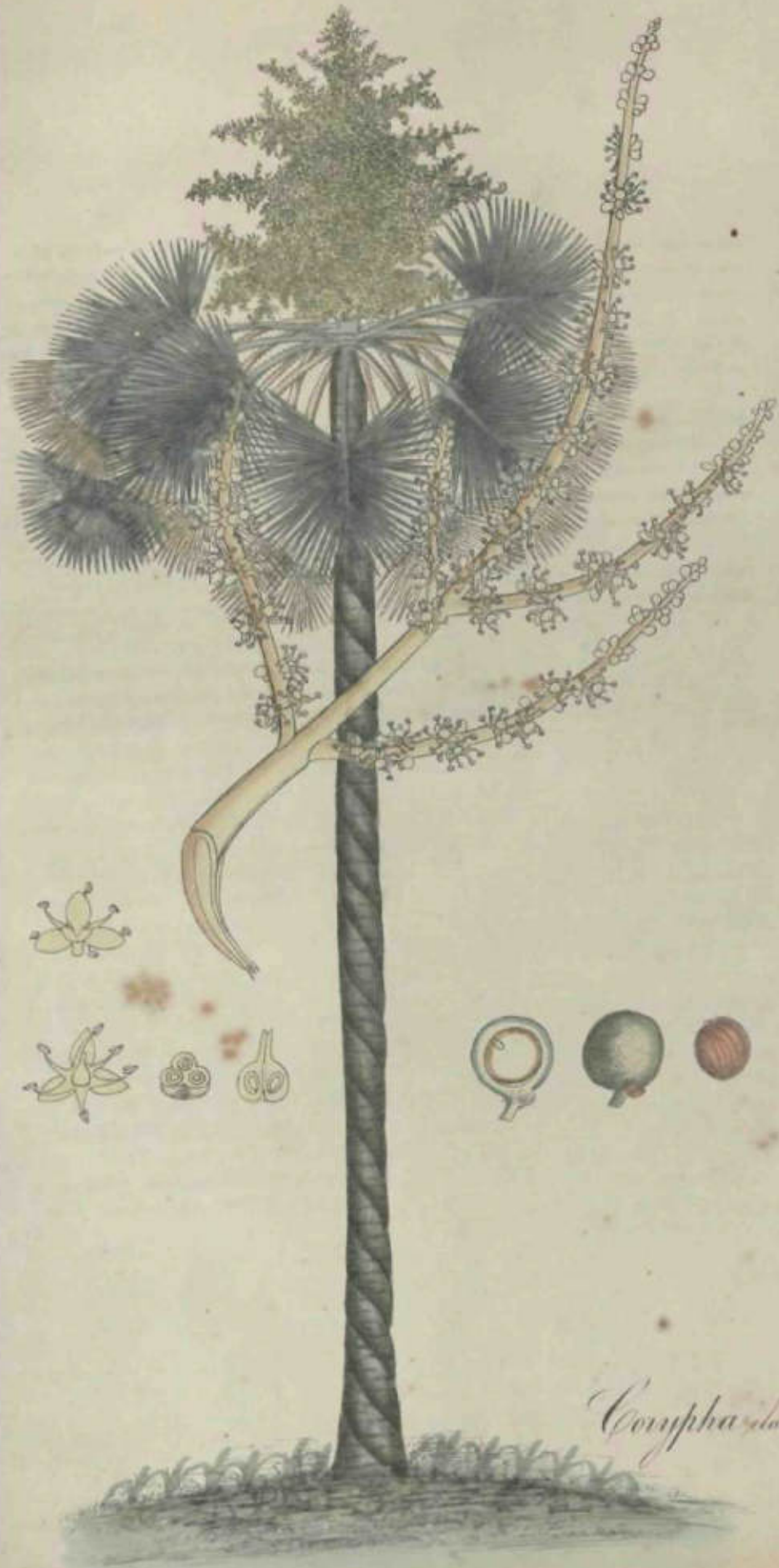
Inflorescence, (spadix) terminal; it may be called an immense, more than supra-decompound round panicle; in this species it is of a much smaller span than the leaves, and only about one-fourth, or one-fifth, part of the whole height of the tree; the various and innumerable ramifications are always alternate, smooth, and of a pale yellow colour.

Flowers small, sessile, collected in little bundles over the ultimate divisions of the panicle, pale yellow, small rather offensive. *Calyx* small, three toothed. *Petals* three, oblong, reflexed, shorter than the stamens. *Filaments*, six, broad at the base, and there united, toward the apex slender and incurved. *Anthers* ovate.

Germ superior, round-ovate, three-lobed, three-celled with one *ovulum* in each, attached to the bottom of its cell. *Style* short, three-grooved. *Stigma* three-lobed. *Berry* globular, the size of a musket ball, olive-coloured, smooth when fresh, but it soon becomes dry and wrinkled, one-celled; the two abortive lobes of the germ are always to be found at the base.

Seed solitary, subglobular. *Integuments* apparently two, but they are firmly united, and of a friable texture; the *exterior* one, pale yellowish brown, and veined; the *interior* one brown, and adhering firmly to the perisperm.

Perisperm conforms to the seed, is of a hard, horny texture, and a pale gray colour. *Embryo* simple, short, cylindrical lodged near the apex of the perisperm." *fRoxb. o. c. 1. c.J*



Corypha elata

To this I have to add that the petioles are much more slender than in the other species, their sides marked with oblique furrows, corresponding with the teeth, which are very large. They separate a little above the base: this afterwards becomes longitudinally split, and long afterwards falls off. The *lamina* describes nearly a complete circle; length five or six feet, breadth fifteen feet; the posterior pinnules do not meet, much less overlap. *Ladnia* or divisions, about eighty-five in number, linear-ensiform, much narrower than in the others: the central ones are about three feet long, the lateral and intermediate about 3 \ feet; the posterior ones towards the base present denticulate margins.

HAB.—Bengal flowering in March and April: the seeds require about twelve months to ripen *Bujoor* or *Bujur-batool*, is the Bengal name. Cultivated in the Botanic and some other Gardens about Calcutta. I have not seen it in flower or fruit.

OBS.—This Palm will be at once recognised by its black spirally marked trunk. From the other species of *Corypha* it is abundantly distinct by its long, obviously spirally placed ex auriculate petioles, and by the smaller-dark green flat lamina, with narrow linear-ensiform segments. The fruit is also smaller.

According to Roxburgh's drawing here annexed, the inflorescence of this species is so dense that no part of the spadix or spathes is visible, and the outline is irregularly pyramidal, some of the branches being much larger than others.

2 CORYPHA TALLIERA.

TABS. CCXX. E.F.

C. Talliera, *Roxb. Cor. Pl. 3. p. 58. t. 255-256.* (auct. Mart.) *Icones 7. t. 37. Fl. Ind. 2. p. 174. Mart. Palm**.
 p. 231. *Talliera benghalensis. Spreng. Syst. 2. p. 18. Talliera Talli. Mart. Syst. veg. ed. Schult. 7.*
 p. 1306.

Trunco obsolete annulate, petioles biuriculatis, lamiua (petiolum excedente) glaucescente a medio supra eonduplicata laciniis 80-90 ensiformibui bilobis postiois inoubentibus, glomerulis florum approximatis, petalis oblongis mstivatione imbricatis, fructibus pomi minoris magitudine rugosis, embryo in apice albuminis centro cavi.

¹¹ *Trunk* perfectly straight, about thirty feet high, and as near as the eye can judge equally thick throughout, of a dark brown colour, and somewhat rough with the marks left by the impression of the fallen leaves.

Leaves palmate-pinnatifid, plaited sub-rotund.

Leaflets or divisions of the frond, united rather more than half way, numerous, generally about eighty, (or forty pairs), linear-lanceolate, pointed until broken by the wind or other causes, polished on both sides, with a strong somewhat four-sided rib, running their whole length; generally about six feet long, greatest breadth about four inches. The thread which forms part of the *Linnean specific character* of *Corypha umbraculifera*, is sometimes present, sometimes wanting, at best such perishable marks deserve no notice.

Petioles from five to ten feet long, remarkably strong, upper side deeply channelled, the sharp margins armed with numerous, short, strong, dark-coloured polished, compressed spines.

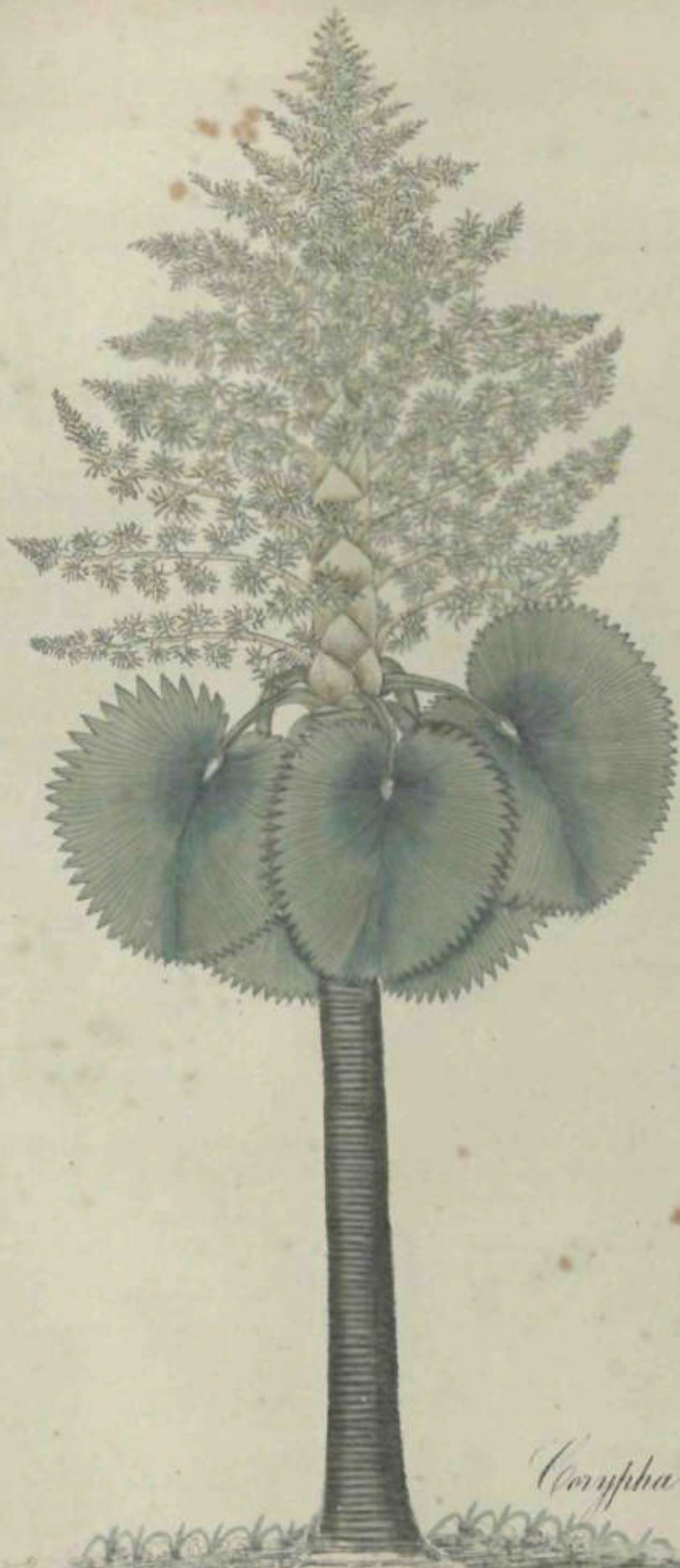
Spathes just as numerous as the primary and secondary ramifications in the spadix, all smooth, and obtuse. *Spadix* supra-decompound, issuing in the month of February from the apex of the tree, and centre of the leaves, forming an immense, diffuse, ovate panicle, of about twenty or more feet in height, so that the height of the whole tree, from the ground to the top of the spadix is now about fifty feet. Primary branches alternate, round, spreading nearly horizontally with their apices ascending. Secondary ramifications alternate, bifarious, compressed, drooping, recurved, soon dividing into numerous, variously curved, smaller, subcylindric branchlets, covered with innumerable, small white, odorous, sessile flowers.

Calyx; perianth inferior, minute, obscurely three toothed. *Petals* three, oblong, concave, fleshy, smooth, expanding, many times larger than the perianth. No nectary. *Filaments* sk, nearly of the length of the petals, at the base broad, and in some measure united. *Anthers* ovate.

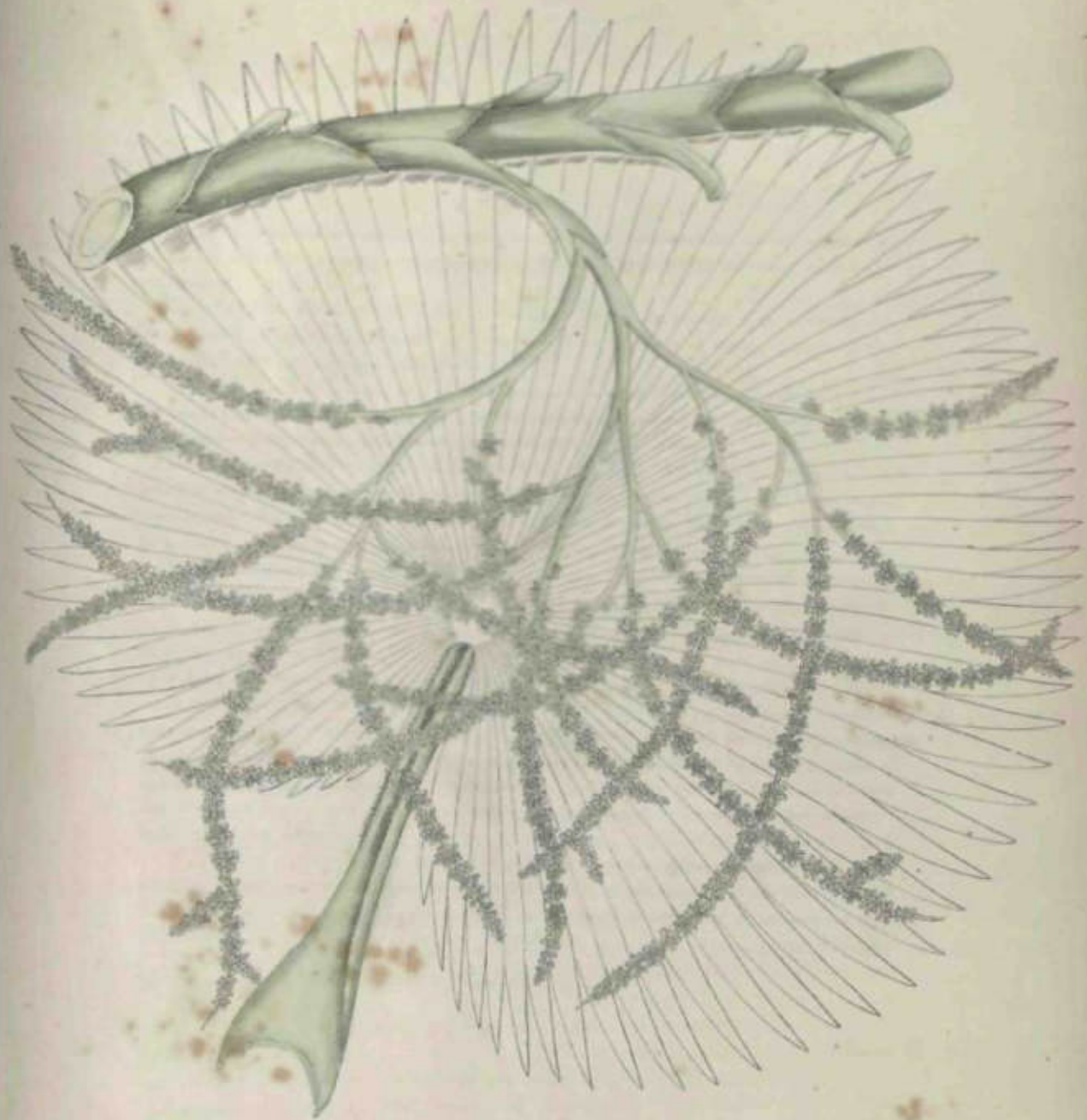
Germ three-lobed, three-celled with the embryo of a distinct 'seed in each, attached to the bottom of its cell. *Style* shorter than the stamens. *Stigma* simple.

Berries from one to three conjoined, though one is the most common, and then the rudiments of the other two are present, they are singly quite round, about the size of a crab-apple, when ripe, wrinkled, and of a dark olive, or Veenish yellow colour. The pulp is but in small proportion, and yellow when the fruit is ripe.

Seed solitary, round, attached to the base of the berry, of a white colour, and horny substance, with a small vacuum in the centre. *Embryo* lodged in the apex, which circumstance alone, is sufficient to distinguish it from *Gainer's Corypha umbraculifera*.



Corypha talura Kerl



Corypha talina

The leaves of this tree are employed by the natives to write on with their pointed steel bodkins, and also to tie the rafters of their houses, for they are said to be strong and durable. I do not find that the wood is applied to any useful purpose." (*Roxb. o. c. I cj*)

IHAB.—Bengal, but it is scarce in the vicinity of Calcutta. It flowers at the beginning of the hot season, the seeds ripen nine or ten months afterwards. It is the *Tore*, *Tallier* or *Tareet*, of Bengal. Cultivated in the Botanic Gardens. I have not seen the flowers or fruit.

OBS.—This species is so closely allied to *C. umbraculifera*, as to be difficult to distinguish when out of flower. The Botanic Garden specimens are distinguishable by the lamina of the leaf being conduplicate from the middle upwards, and by their posticous segments overlapping, so that the whole becomes peltate.

The leaves are very like those of *Borassus fiabelliformis*, but much larger. The petioles are bi-auriculate and without an obvious spiral arrangement, they separate at the top of the dilated part, and subsequently fall off, leaving a smooth trunk. The *lamina* is five or six feet long, fifteen feet broad, glaucescent; the segments ninety, or ninety-five in number, deeper and broader than in *C. umbraculifera*, the central ones being 3 to 3J feet long.

Roxburgh's drawing here annexed, represents the inflorescence as conico-pyramidal, longer than the crown of leaves and open, so that the spathes and branches are seen distinctly, and these last as regularly diminishing upwards.

P. S. I subjoin descriptions of flowers and fruit from Garden specimens with the name *C. umbraculifera*, but which I suspect to be *C. talliera*.

Flower-bearing branches often dichotomous above the mouths of their spathes, about two inches long. *Flowers* several together, placed on short stout sub-annulate stalks, among the bases of which, small scales, may be found. *Calyx* short, cup-shaped, with three very rounded teeth. *Corolla* three times longer than the calyx, petals oblong, concave, very spreading, in bud imbricate! *Stamina* six; *filaments* stout subulate, about as long as the petals, those opposite the petals being twice as broad; *anthers* oblong-ovate. *Ovarium* globose turbinate, three-lobed, each lobe with three depressed areolae on its vertex. *Style* about as long, stout, subulate, three-furrowed. *Stigma* sub-simple. *Ovula* solitary, erect, anatropous.

Fruit globose, substance excepting the cutis rather thick, homogeneous, fleshy, cellular. *Seed* erect, oblong roundish; tegument externally cellular, coriaceous internally blackish, sub-osseous, adhering firmly to the very dense, hollow in the centre. *Albumen* horny. *Embryo* situated rather obliquely in the apex of the albumen, the cavity containing it communicating with the central cavity of the albumen.

3 CORYPHA UMBRACULIFERA.

C. umbraculifera, Linn. *Spec. PL ed. 2da. p. 1657. Fl. Zeyl. p. 187.* (excl. syn. Rumphii). *Oartn. Fruct. et. Bern. I. p. 18. t. 7. sem. inverso. Willd. Sp. PL 2. p. 201. Spreng. Syst. Veg. 2. p. 138. Lam. Enc. Meth. 899.* (e Rheede et Gaertner). *Syst. Veg. ed. Schultes. 7. p. 1308. Roxb. Fl. Ind. 2. p. 177. Mart. Palm. p. 232. Codda Pana. Rheede. Hort. MaL 3. t. 1-12.*

Tronoo annulato, petioles exauriculatis, lamina (petiolum subaequante) a medio supra conduplicata, laciniis 90—100 parom profundis ensiformibus bilobis posticis cum petiole angulum acutum exhibentibus, glomerulis florum approximatis, fructibus pomi minoris magnitudine et forma, embryo in apice albuminis centro cavi.

In appearance, this species is very much like *C. talliera*.

The *leaves* are however larger than those of the species alluded to; and in its native places they attain an immense size.

Petioles stout, seven feet long, channelled, margins with horny, irregular teeth, often placed in pairs.

The *lamina* describes nearly a complete oval, six feet long and thirteen feet broad, from the middle upwards conduplicate, but not so much so as in *C. talliera*; *leaflets* ninety-five or a hundred in number, ensiform, obtusely bifid, the central ones 1j, the intermediate ones, 1f fiet long, the posticous ones not meeting or overlapping, but forming acute angles with the petiole.

Inflorescence much the same as in *C. talliera*.

The following is a description of specimens of part of the inflorescence, from trees growing around some of the pagodas at Mergui, most probably belonging to this species.

Flower-bearing branches eighteen or twenty inches long, the lower divisions bi-trichotomous, the rest simple; these are about a foot long, subulate, covered with warty protuberances marking the situations of the flowers.

The *flowers* are placed several together on short sub-annular stalks, at the base of which small scales exist. *Calyx* cup-shaped, small, with three very short teeth. *Petals* broader, spreading, three or four times longer than the calyx: sub-valvate in aestivation, upper edges quite so. *Stamens* six; *filaments* rather shorter than the petals, about equal, stout, subulate; *anthers* oblong, ovate in bud, much larger than those of *C. talliera*. *Ovarium* conical from a round base, three-lobed, attenuated into a stout subulate three-furrowed *style*, which is rather longer than the ovarium. *Stigma* simple. *Ovula* solitary, erect.

HAB.—Ceylon, the Malabar and Malay Coasts. *Tala* or *Talagas*, Cinghalese. *Condapari*. Tamul. (*C. Roxb.*) *Codda-Pana*. Malabar. (*Rheede. J. Tallipot Palm.*)

OBS.—I have no means of ascertaining that the foregoing specimens of inflorescence really belong* to this species, not having access to a complete copy of Martius' Palms, where the necessary minute particulars can only be expected; but the probability is in favour of their belonging to *C. umbraculifera*. If this is the case, the aestivation of the corolla, and the shape of the ovarium will assist the specific distinction.

VIII. LICUALA.

Rumph. Hb. Amb. 1. p. 44. t. 9. *Thunb. Nov. gen.* p. 70. *IAnn. Gen. PL ed. Schreb.* 2 p. 774. ed *Spreng.* p. 149. No. 1300. *Jussieu. Gen. PL* p. 39. *Gartner. Sent. et. Fruct.* 2. p. 268. t. 139. *Syst. Veg. ed. Sch.* 7, p. 77. No. 1490. *Roxb. FL Ind.* 2. p. 179. *Icones. Suppt.* 3. t. 79. *Mar*. Pro^r.* p. 9. 2Vb. IV. *Pafona?.* 234. t. 134, 125, 162. *EndL Gen. PL* p. 252. No. 1755.

GENERIC CHARACTER.

FLOWERS hermaphrodite. **CALYX** and **COROLLA** each three-parted. **STAMENS** six, filaments often united into a ring, distinct from the corolla. **DRUPE** (only one matured), one seeded, **ALBUMEN** excavated in front. **EMBRYO** placed behind.

HABIT.—They are shrubby, sometimes stemless palms of the East Indies as well as the Island of the Eastern Archipelago.

The **STEM** in many is marked with rings, and sometimes rough with the persistent indurated bases of the petioles of failed leaves.

LEAVES pinnately fan-shaped, with the **PETIOLES** armed towards the margins with horny conical or often hooked prickles; **PINNULES** wedge-shaped, with their apex more or less truncate or lobed, and the lobes bifid. **SPADIX** spicately or paniculately branching.

SPATHES tubulose, their mouths obliquely bi-lobed. **FLOWERS** solitary binate or ternate.

OVARY vertically sculptured, carpels cohering at the apex.

DRUPES red.

i. LICUALA PALUDOSA.

TABS. CCXXI. A.B.C.

Tranco sublcvi 8-12-pedali, petioles apice inermibus; lamina flabelliformi, pinnis 7-9, lateralibus apice obliquis*profunde et acute 3-4 lobis, lobis bipartitis, reliquis truncatis lobis 4-5, (vel terminali 7*8) latis brevibus bifidis, spadice foliorum circiter longitudine, ramis tpicaa plures nutantes secundas gerentibus, floribus glabris lolitariis turbinatis, catyce cyathiformi integriusculo corolla sub-duplo brevior, ovario depresso-turbinato.

The *trunk* is eight feet, or from that to twelve feet high, about 1J inch in diameter, unarmed, and almost without marks of annuli, except towards the apex where they are incomplete. *Crown* of moderate size. *Rete*, or woody fibres rather stout, of rich brown colour.

Ligula linear, one inch long, gradually attenuated towards the apex.

Petiole one and a quarter, to one and a half foot long, sub-trigonal, armed along the margins, except towards the apex, with small, black, horny, conical, curved teeth.

Lamina flabelliform, rather smaller than that of *L. spinosa*.

Pinna or *leaflets* eight or ten in number, cuneate, lateral ones oblique at the apex, deeply and acutely three or four-lobed, lobes bilobed (except the side ones), the others are more or less truncate, with four (or as in the terminal, five or eight), broad, short, bifid lobes.

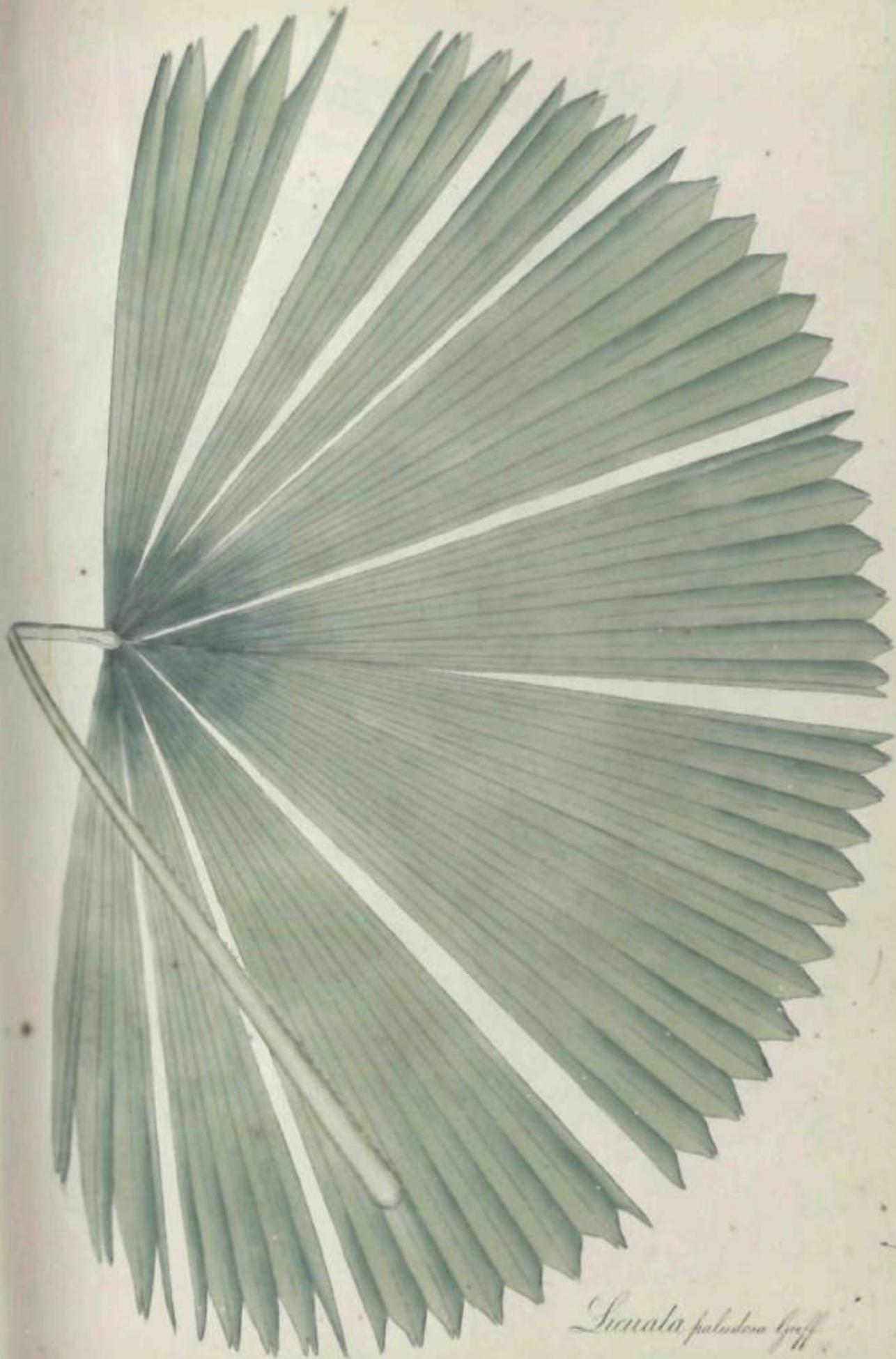
Spadix about the same length as the leaves, rather curved. *Spathes* tubular, green, with membranous or scari-ous lacerated mouths. *Branches* of the spadix bearing five, or seven spikes, which are four, or six inches long, curved, secund, generally nodding, slightly puberulous, often appearing as if they arose separately from within the mouth of the spathe.

Flowers solitary, sessile, of a turbinate form, smaller than usual. *Calyx* cup-shaped, half the length of the corolla, nearly entire, irregularly split at the expansion of the flower. *Corolla* (in bud) urceolate, about one-third longer than the calyx, divided to the middle into three, cordate-ovate segments. *Annulus* of the *stamina* white, nearly entire, projecting considerably above the throat of the corolla. *Filaments* (free) short, setiform. *Anthers* versatile, oblong, pale brown. *Ovarium* depressed, turbinate, with a horny sculptured vertex; carpels adhering by the style. *Ovula* solitary, erect anatropous. *Style* subulate, rather shorter than the ovarium. *Stigma* simple. *Fruit* not seen.

HAB.—Malacca. Low sandy wet places along the sea-coast, about Tanjong Cling, Roondoor, and Pulo Bissar, associated with *Pandanus*, *Eugenia*, *Diospyros*, *Helospora*, etc. It flowers in February.

OBS.—This species approaches to *L. spinosa*, but is abundantly distinct by its smooth stem, (which does not look much like the stem of a palm), and by the short smooth turbinate flowers.

The tracts of country in which it is found, form one of the peculiar marks of the Straits' Flora, and are highly contrasted with the muddy littoral tracts, which are covered as usual with Mangrove jungle.



Siccata paludosa Hoff.



Scaevola paludosa Griff



Succata paludosa Hoff

2 LICUAXA SPINOSA.

Licuaxa spinosa, Willd. 2. p. 201. (excl. syn. Rumph.) Roxb. *Fl. Ind.* 2. p. 181 ? (excl. syn. Rumph. et Lam.) *Syst. Veg. ed. Sch.* 2. p. 1301. *Mart. Palm.* p. 235. t. 135.1. II.

Trunco 8-12-pedali annulato vel aspero, petioles per totam longitudinem armatis, lamina orbiculari-reniformi, pinnis sub 18, lateralibus oblique prtemorsis 3-4-lobis obtuse bipartitis, terminali 10-11-lobo, intermediis 3-5-lobis obtuse bifidis, spadice foliorum circiter longitudine, ramis 3-7 spioigeris, spicis subulatis pubescentibus, floribus bi-ternatis extus pubescentibus, calyce ovato ad medium rotundate tripartite, bacca obovato-oblonga,

This is a stout palm, ten or twelve feet high, forming dense bushy tufts.

Trunk two to four inches in diameter, eight or ten feet high, marked with the scars of the fallen petioles.

Leaves six or seven feet long.

Petiole about four, to four and a half feet long, obtusely trigonal, margins armed throughout with stout conical somewhat curved aculei.

Lamina in outline orbicularly reniform, about four feet across the broad diameter.

Pinnules about eighteen in number, narrow cuneate; the central ones about two feet long; the terminal one is ten or eleven plicate, truncate, with as many lobes as plaits, the lateral ones are the deepest, all are obtusely bifid, the intermediate ones are more or less truncate, three to five-lobed, lobes larger and deeper, but otherwise similar to those of the terminal one, the lateral ones with oblique three lobed ends.

Ligula very narrow, one to one and a half inch long, scarious.

Spadix a little longer than the leaves, branches seven to ten, adnate to the axis as high as the points of the spathes. *Spathes* green, sprinkled with brownish scurf, with scarious lacerated ends, occasionally obliquely lacerated. *Spikes* of the lower branches several, stout, subulate, downy, spreading, generally secund.

Flowers sessile, placed in two's or three's, small, nearly ovate. *Calyx* sub-ovate, divided to the middle into three rounded teeth. *Corolla* a little longer than the calyx, divided below the middle into three broad lanceolate, acuminate segments. *Annulus* rather high, nearly entire. *Filaments* (free), short, setaceous. *Anthers* oblong-ovate. *Ovarium* depressed, turbinate, sculptured at the apex. *Style* filiform, rather longer than the ovary.

Fruit as though stalked by the cylindrical tube of the calyx, surrounded at the base by the perianth, oblong, red, one-seeded. *Seed* ovate, with an intrant process curved towards the middle of the dorsum. *Albumen* horny, on a transverse section horse-shoe-shaped. *Embryo* about central.

HAB.—Malacca. Common in wet places, particularly in hedges, Malayan name, *Plass*. It is cultivated in the H. C. Botanic Garden, where in flowers in the cold, and ripens its fruit in the hot season.

OBS.—This species appears to vary a good deal; it is not improbable that two species lurk under this name. Some of my Malacca specimens have the trunk armed with the hardened bases of the petioles, with more slender spadixes, and considerably smaller fruit.

It approaches in the leaves to *L. peltata*, especially in the division of the ends of the pinnules, but it is otherwise obviously distinct; it is the only species I know that grows in bushy tufts. Its nearest affinity is with *L. paludosa*.

Rumph's figure * (Hb. Amb. 1. t. 9.) quoted for this, appears to me to refer to a distinct species, particularly as regards the spathes, and the erect simple spikes.

* See Mart. Palm. p. 236. adnot. where the name *L. Rumphii* is proposed for this species.

3 LICUALA PELTATA.

TAB. CCXXII

Licuala peltata. Roxb. *Fl. Ind.* 2. p. 179. *Icones. Suppt.* 3. t. 79. *Hamilton Comm. Herb. Arab, in Mem. Wern. Soc.* 5. p. 313. *Mart. Palm.* p. 234. t. 162.

Trunco robusto 3-4 pedali, petiolis per totam longitudine armatis, lamina orbiculari-peltata, pinnis 18-20, lateralibus spice obliquis profunde et acute 3-5 lobis, lobis bipartitis, reliquis truncatis plurilobatis, lobis obtuse bifidis, spadice foliorum circiter longitudine, spicis simplicibus pendulis secundis pubescentibus, floribus solitariis (maximis) extus pubescentibus, annulo staminum nullo, ovario depresso turbinato stylo triplo brevior, bacca obovata, processu intrante sursum latissima obliqua, embryo infra medium seminis.

The description of this species is here drawn up from plants in the Botanic Gardens.* It is a low Palm, with a stout stem three or four feet high, marked below with the scars of the fallen leaves, above rough from the persistent bases of the petioles.

Leaves eight or ten feet long, with copious. *Rete* at the bases of the petioles. *Petiole* six or seven feet long, triangular, armed throughout along the margins, especially towards the base, with stout, horny, black, very sharp, conical, and rather curved thorns. *Ligula* cordate, when young the margin is very elevated and tomentose. *Lamina* peltate; *Pinna* about eighteen or twenty in number, describing nearly a circle of about six feet in diameter, about three feet three inches long, outermost ones cuneate-oblong, three or five-plaited, three or five-lobed, lobes acutely bilobed, with oblique ends; the intermediate and terminal ones much broader, seven or eight inches across truncate with several plaits and as many less deep, broader, rather obtuse, bifid lobes.

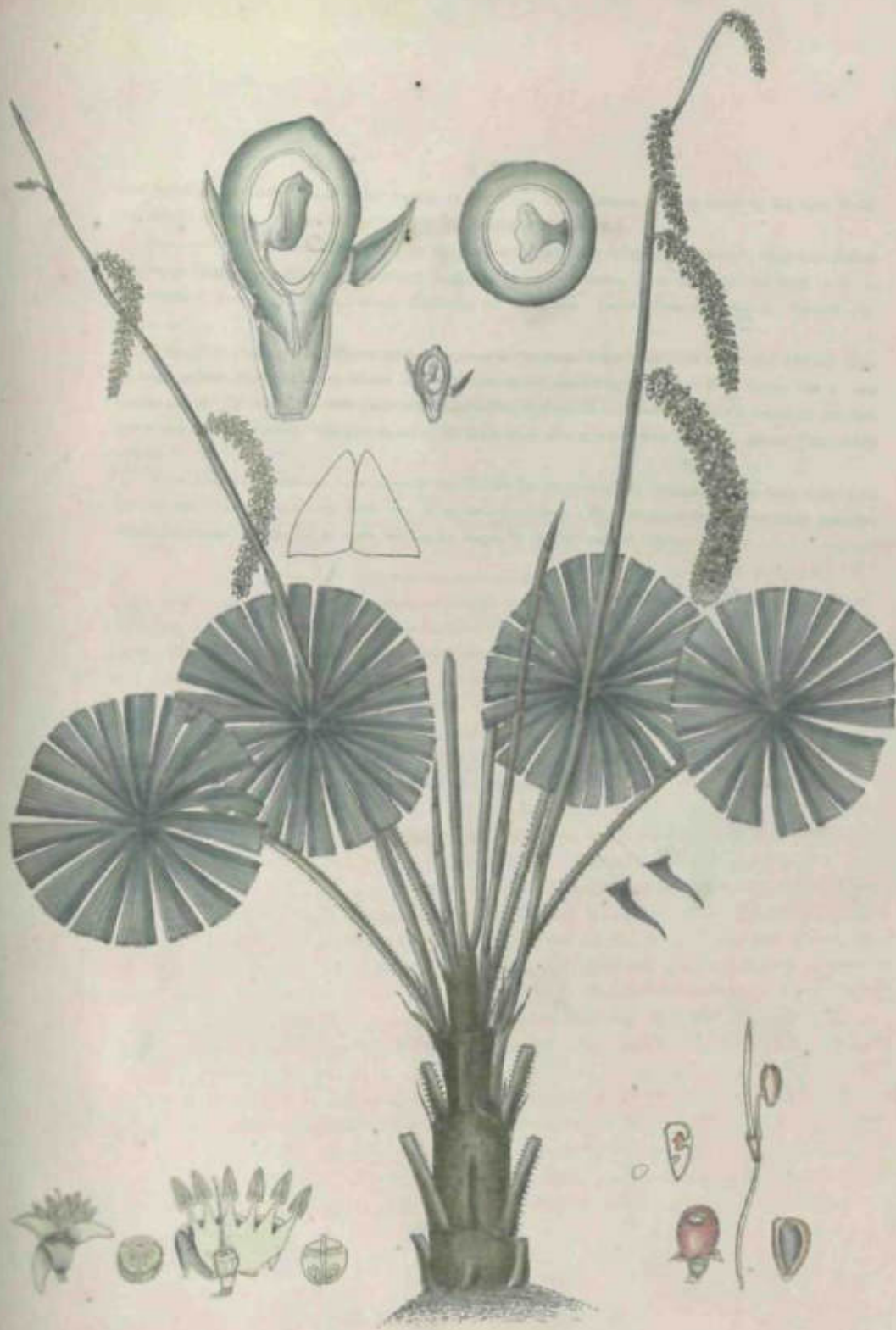
Spadix erect, rather longer than the leaves, stout, simply branched, sprinkled in the upper parts with brown scurf. *Spathes* tubular, green, lower ones a foot, or nearly two feet long, bilobed at the apex, at length variously split, and similarly scurfy. *Spikes* three to five, solitary, nodding-pendulous, secund, centrifugally developed, a foot or more in length, pubescent, and adnate to the axis to about the middle of the spathe.

Flowers numerous, on short stalks, solitary, very large, seven lines long, of a greenish white-colour, covered externally with the same pubescence as the spike, opening centrifugally. *Calyx* with a funnel-shaped or obconical tube, shortly 3-toothed. *Corolla* twice as long as the calyx, divided to the calyx into three broadly lanceolate coriaceous, reflexed segments. *Filaments* united among each other, and to the corolla as far as the base of its segment, thence free, long, stout, piano-subulate, keeled along the back. *Anthers* linear, sagittate, exerted, attached near the middle; otherwise the cells are nearly distinct.

Ovarium turbinate, short, with a sculptured depressed apex; carpels cohering by their apices. *Ovula* solitary erect, anatropous. *Style* filiform, slender, three times longer than the ovarium. *Stigma* obsolete 3-toothed level with the anthers.

Fruit obovate, oblong, attenuate to the base, red, one-seeded, apiculate by the persistent base of the style, and crowned with the two abortive carpels, surrounded at the base by the perianth, the tube of the calyx resembling a

* Entire specimens since received from Major Jenkins have the stem 3½-4 feet high, rough from the persistent, distant bases of the petioles; the leaves 12-14 feet in length; the petioles 8-9 feet and armed throughout. The spadices equal the leaves.



Silvestris I. Phalaena

short pedicel. *Seed* oblong; excavation passing in above the hilum, oblique, reaching nearly to the apex of the seed, dilated upwards. *Albumen* horny. *Embryo* situated below the middle.

HAB.—Woody mountainous country to the eastward of and near Chitlagong, *Roxburgh*; Mountains beyond the Ganges Himalayan range, below Darjeling, Rungpore, *Buchanan*; Assam, Major *Jenkins*; Cultivated in H. C. Bot. Gardens, flowering in the cold season, fruiting in the hot season. *Kurud*, *Kurkuti*. Bengally. *Chattah Pat*. Assamese.

OBS.—This, which is the largest and finest species of the genus, is not likely to be confounded with any other. Its large peltate orbicular leaves, simple large pendulous spikes, and comparatively very large flowers, will at once distinguish it. In the leaves it is allied to *L. longipes*, but that species is almost stemless, the leaves are also dark green, and differently lobed. Martius' figure of the entire plant gives a much better idea of *L. spinosa* than of this species.

Major Jenkins informs me, " the leaves of the Chattah Fat are used for the same purposes as those of the Toko but are much coarser, and only made use of by the lower orders. The demand for them is very great, scarcely a single ploughman, cow-keeper or cooly, but has his Jhapee or Chattah made of Chattah Pat."

4. LICUALA ACUTIFIDA-

TABS. CCXXII. A.B.

L. acutifida, *Mart. Palm. p. 237. t. 135, iii. iv. (excl. syn. Roxb.)*

Trunco gracili, foliis flabelliformibus, pinnis 50-20 subsequilatis anguate cuneatis tricarinatis, latearlibus apice obliquis inaequaliter 3-4-lobis, terminali 4-5-lobo, intennediis trilobū lobulit (lateralibus exceptis) bipartiti* sinibus acutis, spadice folia subequante oum spicis floribusque fusco-pubescenti-hirto, ramis simplicibus vel bipartitis, spatibus bilobis sericeo argenteove paleaceis, floribus inferioribus binatis superioribus solitariis, petalis calyce obconico ad medium tri parti to longioribus, semiais piaiformis procesau intrante cylindraceo rectiusculo.

The description of this species is founded upon specimens, of three entire small plants, several specimens of inflorescence, and a few ripe seeds. It is a small miniature Palm. The *trunk* being only from three to five feet high, (but according Mr. Lewis), sometimes it attains fifteen or twenty feet, ten or eleven lines in diameter above, and about twenty-two lines in diameter at the base, marked with incomplete rings, to which portions of the base of the petioles adhere.

Petioles in some of the specimens 3£ to 4 four feet long, in others (and this seems the natural state) scarcely eighteen inches long, plano-convex, armed towards the base along the margins with tooth-shaped, straight or sub-deflexed short prickles. *Rete* brown, copious;¹ produced upwards into a long brown membranous ligula. *Pinna* fifteen or twenty, disposed in a subpeltate manner, generally linear-cuneate, ten or eleven inches long, eight lines broad; the intermediate ones are the narrowest, and unequally three or four-lobed; the others are three-lobed, the central lobe deeply bipartite; the central pinnules four or five lobed, (the inner lobes deeply bipartite, the lateral ones entire). Between the lobes threads are often to be found.

Spadices twelve or eighteen inches long, nodding, covered below with greyish, above with ferruginous pubescence rather stouter towards the apex. *Spathes* tubular with oblique mouths, covered with grey silvery adpressed hairs or rather palere; limbs more or less lanceolar, bilobed, lobes ending in acuminate scarious points; the second spathe nearly six inches long. *Spikes* generally simple, rarely dichotomous, adnate to the peduncle very high up, subulate, densely covered with a tawny pubescence; the lowest five inches long.

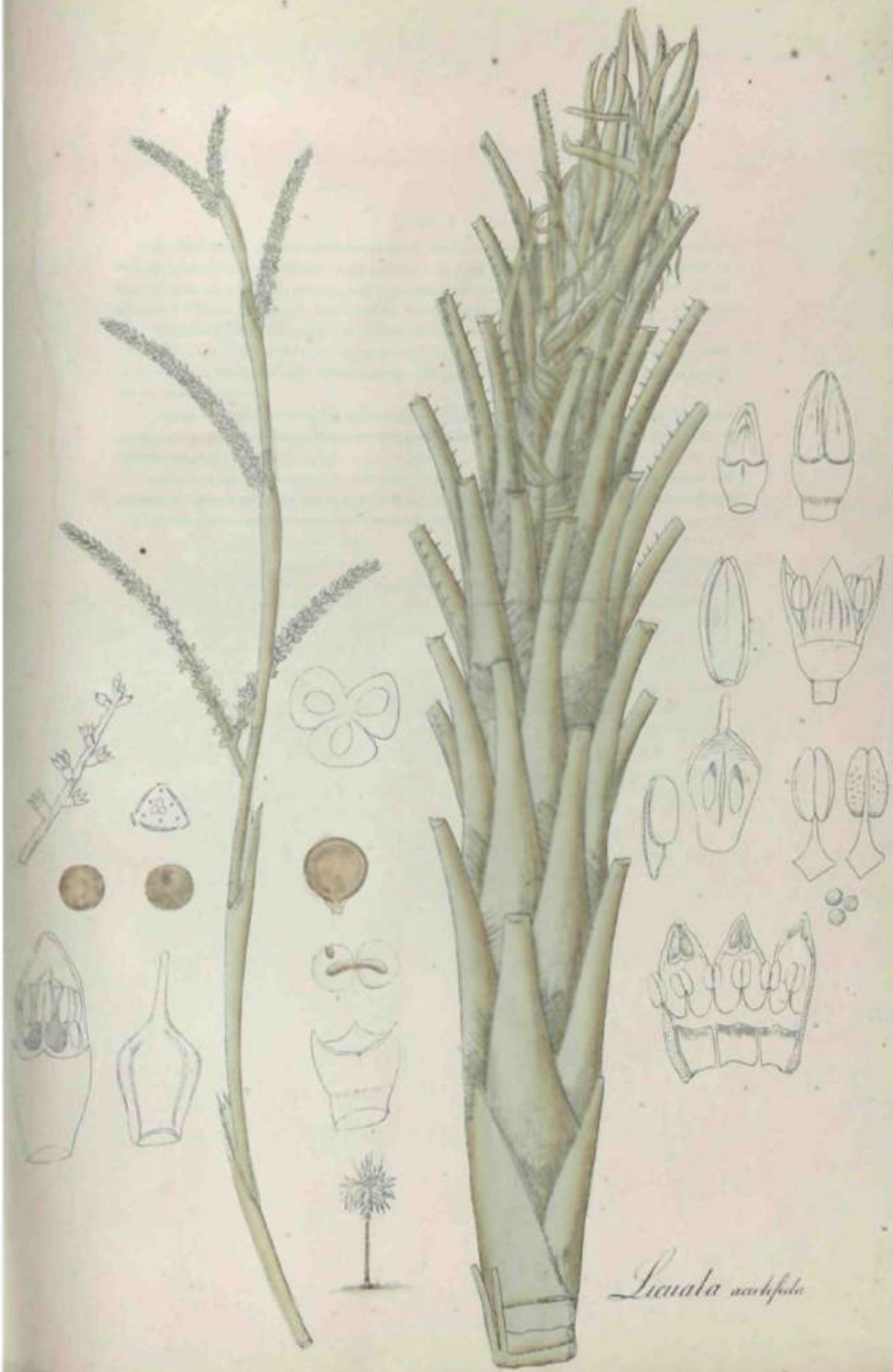
Flowers numerous, sessile, spreading in every direction, articulated on short stalks, lowermost in pairs, upper ones solitary. *Calyx* obconical, trifold to the middle, tawny pubescent, segments obtuse. *Corolla* one-third longer than the calyx, similarly pubescent externally, furrowed internally, tripartite to the middle, segments half lanceolate acute. *Annulus* of the *stamens* six toothed. *Filaments* (free) short, setaceous from a broad base. *Anthems* oblong. *Ovarium* smooth, sculptured at the apex, obovate-oblong, about the length of the tube of the corolla, of three carpeila, cohering by their apices; *ovula* solitary, erect, anatropous. *Style* about equalling the stamina, filiform, three-sulcate. *Stigma* obsolete cup-shaped, obscurely three-denticulate.

Fruit about the size of a large pea, roundish-oblong, surrounded at the base by the flattened-out limb of the perianth, and as it were, stalked by the tube of the same, dry. *Seed* pisiform, tinged with reddish; teguments very thin, adhering firmly to the albumen; from the hilum enters a deep process, so that it is horse-shoe shaped on a longitudinal section. *Albumen* horny, equal. *Embryo* subcentral.

HAB.—Penang, whence I have specimens from Mr. Lewis, and Dr. Oxley. Malayan name *Plass tikooss*.



Licuala amblyota



Licuala aschifolia

CCXXII. B

OBS.—The steins of this plant afford the well known walking sticks known by the name of "Penang Lawyers." These are prepared by scraping with glass, and polishing. Mr. Lewis informs me, that each stem is well-scraped, by which the epidermis is altogether removed; care must be taken not to take away much more, as the inside is like the substance of a rattan. It is on this account that the smaller, thinner sticks are so much sought for, and are so rare. The sticks are then straitened by fire. No other process is used.

The plant seems to be confined within narrow geographical limits; it is not known I believe about Malacca, where its place seems to be supplied by the following closely allied species. Martius, however, states it to be found throughout the Malayan peninsula.

I have an impression that under this species as given by Martius, two distinct ones will be found; for though the description agrees well with my Penang specimens, yet the drawing of the spadix represents the parts nearly of the same size as in *L. spinosa*.

L. pumila, Blume, appears only to be distinguished from this, by the broader equal teeth of the pinnules (the intermediate ones of which are the broadest) being described as sixteen to twenty-one lines broad, and six to eight toothed, while the two innermost ones are said to be only an inch broad.*

* Syst. Veg. ed Soli. 7, 2. p. 130.

s LICUALA GLABRA.

TAB. CCXXIU

Trunco gracili 3-5 pedali, foliis flabelliformibus, pinnis 16 subaequilatis lineari-cuneatis tricarinatis, lateralibus apice 3-4-lobis dentatisve, terminali 4-lobo, intermediis trilobis lobis (lateralibus exceptis) obtusissimis bipartitis sinibus latis, spadice folia subequante cum spathis spicis floribusque glabro, ramiis 3-5-partitis, spicis gracilibus, floribus inferioribus binatis, calyce cyathiformi brevissime tridentato, corolla triplo longiore infra medium tripartita, ovariis usque ad medium coherentibus.



This is a miniature palm, the *trunk* being from three to five feet high, and rather more slender than that of the preceding. The *petiole*, the *rete*, and the *ligula* are much the same as those of the preceding. The *lamina* is of the same size as that of the preceding, flabelliform; the *pinnules* about sixteen in number, linear-cuneate, tricarinate, the lateral ones obliquely and unequally three or four toothed or lobed, the central one four-lobed, the two inner lobes bifid, the rest three-lobed with the central lobe bifid; all the divisions obtuse.

Spadices about equal in length with the leaves, in some of the specimens three feet long, nodding, quite smooth. *Branches* distant, adnate to the spadix high up. *Spikes* several on one branch (except the uppermost ones), quite smooth, slender, two or three inches long, spreading. *Spathes*, smooth with acutely bipartite points.

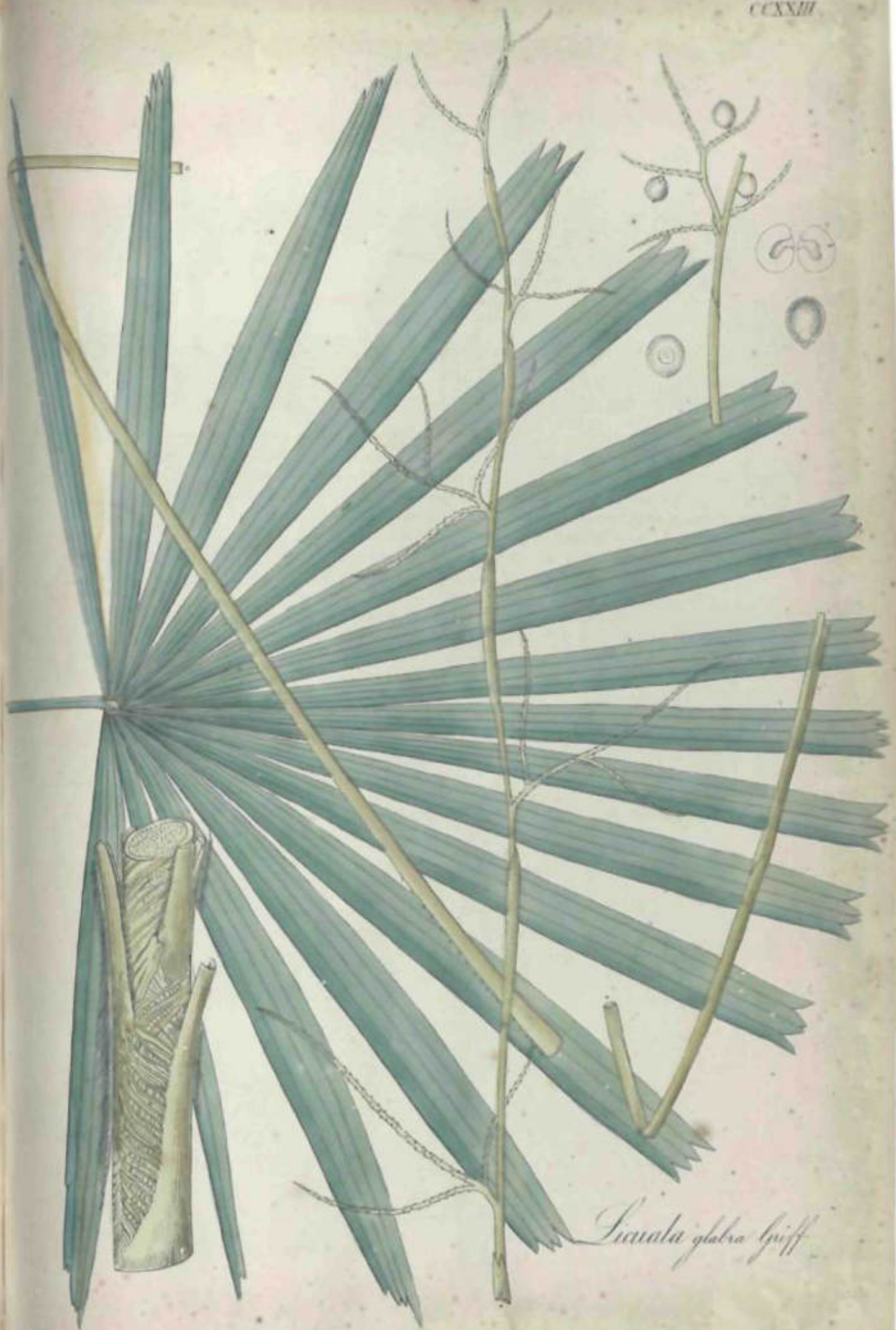
Flowers also smooth, rather distant, on short articulated stalks; lower ones in pairs. *Calyx* cup-shaped, with three very short teeth. *Corolla* deeply tripartite, three times longer than the calyx, segments linear lanceolate. *Filaments* (free) subulate from a broad base, rather long. *Anthers* ovate. *Pollen* ovate, one-plicate. *Ovarium*, obovate oblong, composed of three carpella adhering nearly to the middle. *Ovula* solitary, erect, anatropous. *Style* filiform rather shorter than the ovarium. *Stigma* sub-simple.

Fruit about the same size as that of *L. acutifida*, but obovate. *Seed* of the same shape, the intrant process is rather larger than in the preceding.

HAB.—Solitary on Goonong Miring, an offset of Mount Ophir. Flowers in February. Malayan name, *Plass Goonoong*.

OBS.—I first met with this species on Mount Ophir; subsequently I have received specimens of the same locality from my collector E. Fernandez. It is closely allied to the preceding, (Penang Lawyer), from which indeed the leaves are scarcely distinguishable, except by the broad sinuses of the lobes, and their more obtuse points. The smooth inflorescence and flowers however, at once distinguish it from both that species and *L. pumila*, of Biome. I am not aware of its stem being used for walking sticks.





Scaevola glabra Hoff

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Licuala longipes Griff.





Sidaea longipes Griff.

6 LICUALA LONGIPES.

TABS. CCXXIV. A.B.

Subcaulis, petiolis (4-5 pedicellatis) triquetris apicem versus inermibus, lamina orbiculari-peltata (atro-viridi), piana. circiter 20 euneatis lateralibus oblique truncatis 3-4-dentatis, terminali latiore truncata sub 11-dentata, dentibus omnibus bifidis et irregulariter denticulate spadice erecto petiolis multo brevioribus thyrsoido-ramosis, spicis (ramorum pluribus) undique patentibus, floribus solitariis. nervis paucis pilosis, calycis cylindracei dentibus rotundatis bifidis, ovario medio supra fusco-villoso.

This is a nearly stemless palm; otherwise it is of considerable size, with dark green peltate leaves. The leaves are five to seven feet long. The rachis consists of stout leathery fibres. Petioles stout, four or five feet long, rather obtusely triquetrous, armed (except the upper third) along the two inner angles with stout, horny, conical, tooth-shaped prickles. Lamina 2-2* feet long, three or four feet broad, peltate-lobelliform. Pinnules twenty or twenty-two in number, the lateral ones being the narrowest, obliquely cut off, unequally thin or firm in the middle. The middle ones are usually more or less lobed, lobes irregularly denticulate; the terminal one cuneate, five inches broad, truncate, eleven-keeled above. With so many short, truncate, broad, bifid, denticulate lobes as there are keels: intermediate ones narrower, generally three-keeled otherwise similar: the upper margins of all being blackish-brown.

Spa*, stout, much branched, much shorter than the leaves one and a half, to three feet long, erect, undulate, flexuose. Spathes compressed, lax, almost inflated, laceroso-fibrous at the ends when young, grey from a covering of cellular paleaceous cells. Branches adnate to the peduncle high up, bearing many spreading, subulate scurfy pubescent spikes, three to five inches long.

Flowers numerous, sessile, green, slightly hairy outside. Calyx- subcylindrical, three-toothed, teeth bifid; Corolla almost twice as long as the calyx, divided to a little below the middle into three broad, cordate lanceolate segments. Annulus of the stamina subtruncate, projecting considerably above the base of the corolla, filament (free) short, setiform. Anthers cordato-ovate, slightly inflexed. Ovarium turbinate, toward the base smooth in the part above entire and covered with fuscous villi. Ovule solitary, erect, anatropous. Style cylindrical rather shorter than the ovary, hollow at the apex. Stigmas three, minute, on a level with the annulus.

Fruit (immature) sub-baccate, sitting on the stout pedicel-like tube of the calyx surrounded at the base by the perianth and annulus, apiculate by the style, one seeded. Endocarp thin, sub-osseous. H - Mala ^ solit ^ in dense forests, Ayer. Ophir, but near to the south of Margai. It not above an elevation of a thousand feet. Tenasserim coast in forests near Lain. flowers nearly all the year. And is the Plass Bhatto of the Malays.

OBS.—This, judging from Schultes' description,* appears to be somewhat allied to *L. spinosa*, u- tu uiume s.jj. ramosa, quoted by Martius under *L. spinosa*.

It is very distinct from the other species known to me, especially in its inflorescence, which is so divided and short as to be almost a thyrsiform panicle, in its short trunk, but otherwise large stature and dark leaves, in the orbicular spreading of the divisions of which, it resembles *L. peltata*.

* Syst. Veg. of Schultes.

7 LICUALA TRIPHYLLA.

TAB. CCXXV.

Nina, wbacaulii, pinnis tribus pluridentatis (dentibus marginali excepto emarginatis), lateralibus oblique cuneatis premorsis, terminali abrupte pramoroa, spadice foliis brevioribus viz spithamaeo, floribus paucis solitariis, fructibus pisiformibus processu intrant! curvato.

This is a very small dwarf Palm, the whole height not exceeding two and a half feet; the *stem* being about three or four inches long.

Leaves one or two feet long. *Petioles* plano-convex or canaliculate, armed below the middle with straight or somewhat hooked, deflexed, rather long prickles. *Rete* well developed. *Lamina* of three cuneate *pinnules*, the lateral ones obliquely praemorse, the terminal (which is five or six inches long, and two and a half wide) truncate: as many short teeth as there are carinæ, all except the lateral one on either side emarginate; those of the terminal one being the shortest, and about twelve in number.

Spadix (fruit-bearing) nodding, cernuous, scarcely a span long, smooth, except the spike-bearing part, which is scurfy-pubescent. *Spathes* smooth, bipartite. *Branches* four, lowermost dichotomous. *Spikes* about an inch long, marked with the scars of a few flowers. *Berries* about five on the largest spike, sub-distichous, red, the size of a pea, seated as it were on a short stout stalk (the tube of the calyx), and surrounded at the base by the spreading cordate-ovate acuminate segments. *Seed* like a small pea. *Intrant process* curved, so that its upper part becomes nearly horizontal. *Embryo* subcentral.

HAB.—Malacca in dense forests, Ayer Punnus, (Rhim). Only one specimen was procured.

OBS.—The stature and leaves of this, will at once distinguish it. In the teeth of the *pinnules* it approaches *L. putnila*, and especially *L. longipes*.

It appears to be distinguishable from very young plants of *L. spinosa* by the longer petioles, and less deeply toothed *pinnules*. The perianthium also does not appear to be pubescent, and the fruit is pisiform.



Licuala hirsutella Griff

IX. LIVISTONA.

R. Br. Prod. Fl. Nov. Holl. ed. 2da. 123. *Syst. Veget. ed. Schult.* 7. No. 1491. P. 1307. *Mart. Progr. Palmar. Palm.* 102 (part, sub nom. *Coryphee rotundifoliaj*) 100, part. 110, 111, 135, 145, 146. *Endl. Gen. Pl.* p-252. No. 1754. *Livistonia, Gen. Pl. ed. Spreng. p.* 283. No. 1465. *Saribus Rumph. Hb. Ami.* 1. t. 8.

GENERIC CHARACTER.

FLOWERS hermaphrodite. CALYX and COROLLA each three-parted. STAMENS 6, filaments free from the corolla, distinct from each other, and dilated at the base. STIGMA sub-simple. DRUPE, only one matured, one seeded. ALBUMEN excavated in front. EMBRYO placed behind.

HABIT.—Perennial, often arboreous palms, native of Eastern Asia and Australia. PETIOLES of the leaves often armed, and the LAMINA deeply divided into bi-lobed segments which are sometimes acuminate and pendulous, the lateral ones being the longest. RETICULATED fibres at the base of the petioles copious. SPADICES axillary paniculately branching, peduncle covered by the sheath of the SPATHES. FLOWERS minute, white, clustered. DRUPE often unequalateral, of shining glossy blue colour.

OBS.—The true distinctions between this genus and *Licuala*, depends chiefly the palmate fan-shaped leaves, in the filaments although expanded at the base, being scarcely united into a free ring, and in the blue colour of the berry. The structure of the fruit in both is the same.

i. *LIVISTONA JEJVKIJVSIAJVA.*

TABS. CCXXVI. A.B.

20-30-pedalis, petiolis pertotam fere longitudinem armatis, lamina (folionim) reniformi-flabelliformi diametro extremo 5-6 pedali subtus glauco pruinosa, segraentis 75-80 obtuse bilobis, lateralibus sub-1½ pedalibus duplo longioribus, calyce rotunde et membraceim 3-dentato, fructibus subreniformi-rotundis magnitudine globuli sclopeti.

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The description is taken partly from living plants observed at Gubroo, partly from specimens received from Major Jenkins. It is twenty or thirty feet high, with a thick round crown.

Trunk in diameter six or seven inches, rough towards the apex from the adhering bases of the petioles.

Leaves six or seven feet long. *Petiole* channelled above, armed almost to the summit, *ligula* cordate. *Lamina* reniform flabelliform, greatest breadth five or six feet, length from the apex of the petiole three or three and half feet, divided into about seventy-six or eighty, obtuse, bilobed segments, of which the extreme lateral ones are the deepest, being eighteen-inches long, while the central ones are scarcely half that length, under surface glaucous caesious. The outline of the undivided part is almost exactly cordate.

Spadices axillary, two or three feet long; branches a span or a foot long, dichotomous opposite the ends of the spathes; branchlets (spikes) lowermost two or three times divided, the others simple. *Spathes* chesnut red, sometimes split, concealing the greater part of the peduncle; scurfy outside, the one next the first branch 1 to 1½ foot long, three or five keeled, with a large, oblong, deeply bilobed, split limb.

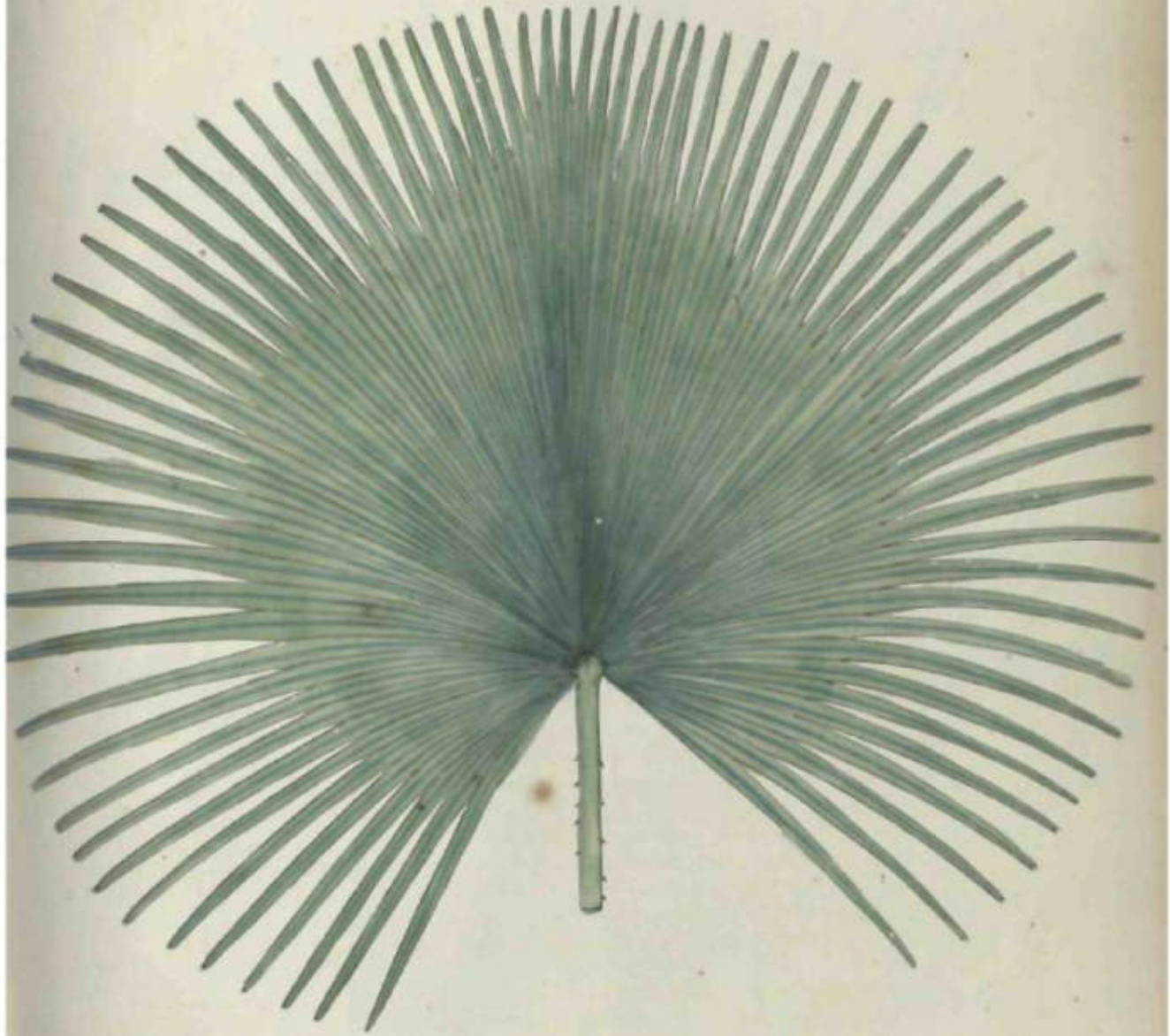
Spikes to each branch many, four to six inches long, spreading, rather stout. *Flowers* small, several together, sessile or raised on small knobs, greenish, without bracts. *Alabastra* oblong. *Calyx* short, with a broad as it were lobed base, cup-shaped, with three short rounded teeth with membranous margins. *Corolla* about twice as long as the calyx, divided to a short distance from the middle into three triangular segments. *Stamens* six, united as usual. *Filaments* free (at the faux), short, setaceous from a very dilated base. *Anthers* oblong, versatile. *Pollen* lanceolar with one fold. *Ovarium* obconical, yellow, with a depressed, red spotted, somewhat sculptured apex; *carpels* cohering by means of the short trisulcate filiform style. *Stigma* simple. *Ovule* solitary, erect, anatropous.

Drupe reniform, round, slightly attenuate at the base, the size of a musket ball, of a leaden blue colour, marked on one side with a depressed whitish line. *Seed* erect, presenting on the side corresponding with the above line on the fruit, a broad raphe-like line. *Albumen* horny, opposite the centre of the above line deeply excavated; cavity as usual filled with a spongy substance. *Embryo* opposite the excavation or situated in the centre of the dorsal face.

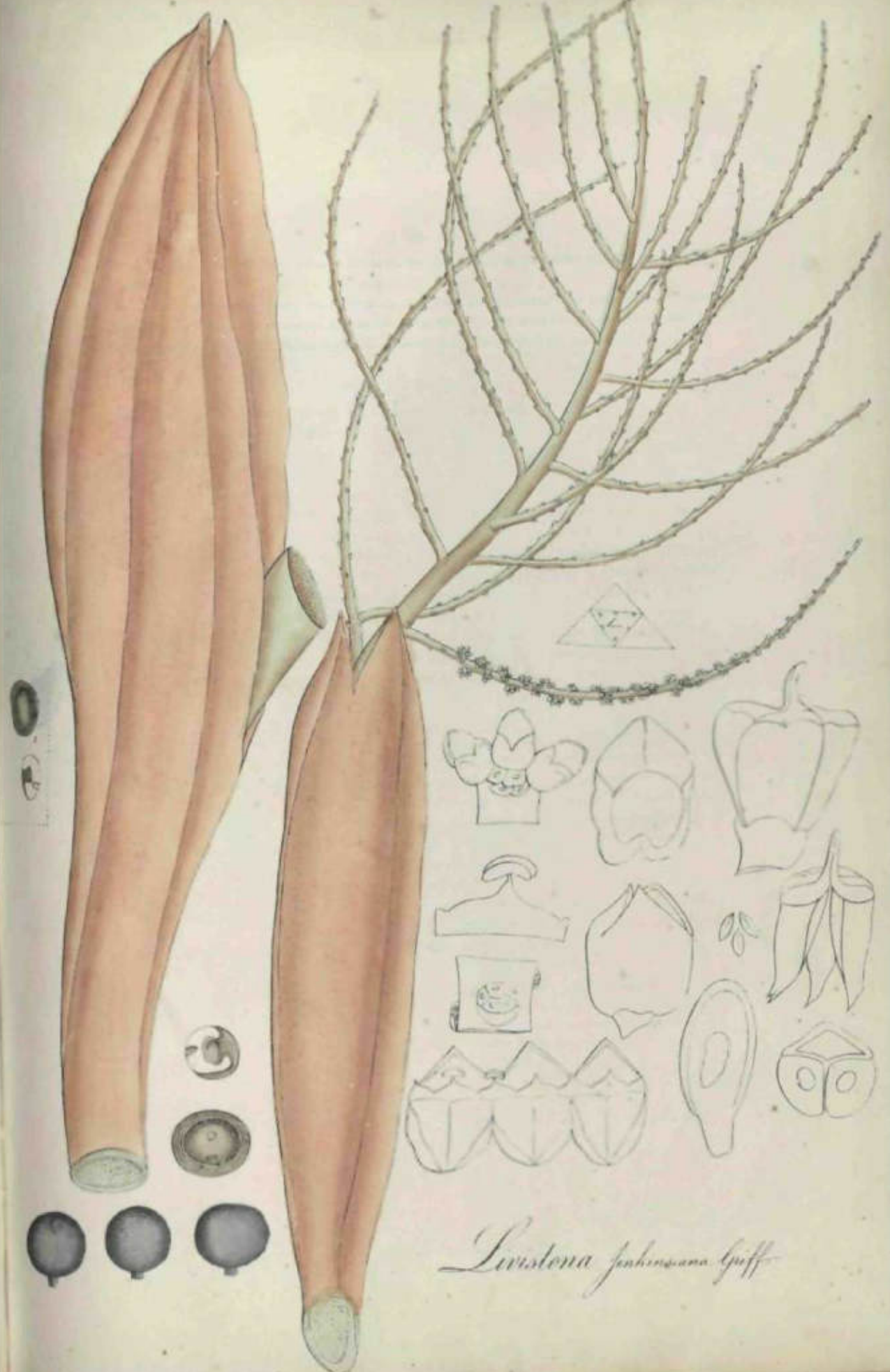
HAB.—Gubroo Purbut in Upper Assam, where it was found in flower, March 1836. Common throughout Assam, but most plentiful in the Nowgong district. *Toko Pat* of the Assamese.

OBS.—It appears to be quite distinct from any published species. The fruit is larger than that of any other species.

Major Jenkins tells me: "that this palm is an indispensable accompaniment of every native gentleman's house, but in some parts it is rare, and the trees are then of great value. I cannot call to my recollection having ever seen a Toko tree undoubtedly wild. The leaves are in universal use throughout Assam for covering the tops of doolees, (palanqueens) and the roofs of boats, also for making the peculiar hats, or rather umbrella-hats (*jhapeesj*



Srivistena fimbriata Griff



Livistona fimbriata Griff

of the Assamese. For all these purposes the leaves are admirably adapted **from their lightness, toughness, and durability,"**

It has been therefore deemed not inappropriate to connect with it the name of the present Commissioner of Assam, whose name is so honourahly and inseparably connected with that of the Province under his control. To **his** constant contributions the Botanic gardens are **indebted** for a number of seeds and young plants.

2. LIVISTONA SPECTABILIS.

TAB. CCXXVI. C.

Procerum, petiolis per totam longitudinem armatis, foliis orbiculari-peltatis diametro extremo 9-10-pedali, segmentis circiter 90 profunde bipartitis, laciniis in filis longis pendulis acuminatissimis, calyce ad medium tripartito, baccis subrotundis globali sclopeti minoris magnitudine.

This is a lofty palm, fifty or sixty feet high. *Trunk* smooth or armed towards the base with the hard persistent bases of the petioles. *Crown* ample, round. *Petioles* obtusely triangular, armed along the margins with very stout, conical, subulate, compressed, generally recurved thorns. *Lamina* orbicularly peltate, nine or ten feet across, plaited deeply, divided into about ninety divisions. These are ensiform, deeply bilobed, the segments being gradually acuminate into flat pendulous threads. The central divisions reach to two feet from apex of the petiole, while the outer ones reach almost to the petiole itself. The length of their segments 2J to 3 feet, those of the central divisions extending to about a foot from the base.*

Spadices axillary, four or five feet long, alternately branched, nodding. *Branches* one, or one and half foot long, spreading, dichotomous at the mouths of the spathes, much divided into forked or simple spreading branchlets (spikes), six or ten inches long. *Spathes* coriaceous, fuscous or chesnut coloured, concealing the whole peduncle, with erect adpressed acuminate limbs; the lower ones generally more or less reticulately split.

Flowers sessile, the lower ones several together, the upper solitary. *Calyx* minute, cup-shaped from a broad base, divided to the middle into three round teeth. *Corolla* (in bud) depressed, a little longer than the calyx, divided nearly to the base into three broad segments. *Stamens* six; *filaments* united to the corolla as far as the base of the segments, there (free) short, dilated. *Anthems* oblong-ovate or cordate-ovate. *Ovarium* oblong-obturinate, sculptured at the apex, the three carpels cohering by the style, which is tri-sulcate, filiform, about three times shorter than the ovarium. *Ovule* solitary, erect, anatropous.

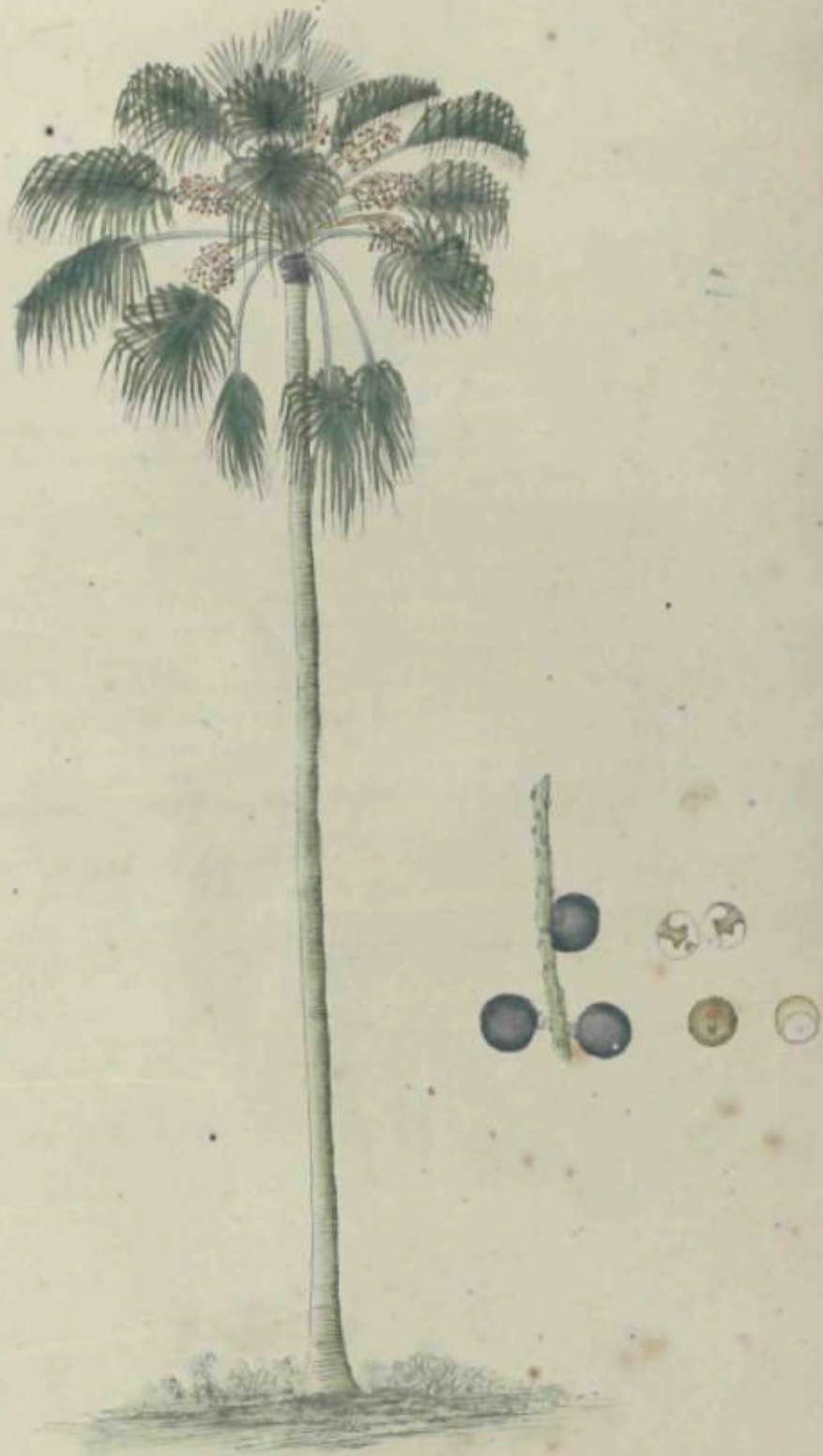
Spadix of the fruit nodding, otherwise unchanged, branchlets sub-secund, yellowish. *Berry* globose, of the size of a small bullet, nearly dry, of an azure blue; smooth, somewhat oblique, surrounded at the base by the perianth[^] *Endocarp* thickish, sub-osseous. *Seed* with a large cavity filled with the tegument. *Embryo* central.

HAB.—Malacca, solitary in the low littoral tracts, adapted to rice cultivation. Penang. Mr. Lewis. Malayan name. *Sardang*.

OBS.—Although the vernacular name given by Blume for *L. rotundifolia* is the same, and the fruit agrees well with the figure of Martius, yet there are so many discrepancies in his description, as regards the arming of the petiole, the degree of acumination of the segments of the leaves, (which is described as less than in *L. sinensis*), and their general size, that I am compelled to consider this distinct.

Rumph's figure, quoted by Blume and Martius, under *L. rotundifolia*, gives no idea of the habit except as

* The long diameter of the leaf is about 6 feet, the cross diameter about 6 feet. The lateral divisions almost reach to the base, and their secondaries again do the same, about 4 feet long. The intermediate reach to about 1 foot from the base, are 4 feet long, the secondary divisions about 3 feet long. The central divisions reach to about 3 feet from the apex of the petiole, are 3-3J feet long, their secondary divisions 3 feet long, and even more acuminate and filiform than the rest.



Livistona specabilis Griff



Tristena Luensis

regards the fruit-bearing spadix. And I do not think it probable that the retrofracted pendulous divisions of the leaves for which this species is more remarkable than perhaps any other, would have escaped Rumphius altogether. F. Bauer's beautiful figure* of *L. inermis* gives, excepting as regards the pendulous segments of the leaves and annulation of the trunk, a good idea of the habit of this palm. I am not aware of its being applied to any use.

3 LIVISTONA SINENSIS,

TAB. CCXXVI. D.

L. sinensis, Mart. Palm. p. 240. t. 146, 1-11.

20 pedalis, petiolis inermibus, lamina reniformi-flabelliformi, diametro 5-pedali, segments 80-85 ad medium bipartitis aubulato-acunna-tissimis pendulis, fructibus sub-oliveformibus intequilateralibus.

The largest specimen is twenty, or twenty-five feet high, with a stout obscurely annulated trunk. Crown round. Leaves much plicated, and also rounded along the centre, the lateral segments which are much the narrowest are 2 feet, or 2 feet 2 inches long, their divisions are about a foot long. Spadices smaller, but otherwise much like those of *L. spectabilis*.

Flowers white, of an unpleasant smell, generally four together. Calyx with three rounded teeth having membranous margins. Inffer than the calyx, divided below the middle into three cordate erect segments. Fruit bearing sub-second branches. Berries dull blue, oblong, seven lines long, and four and half wide. Seed-oblong, of a greyish longitudinal section reniform, intrant process sub-central; the embryo is situated opposite to the downward.

HAB.—Southern China, according to Dr. Martius. It is cultivated in the Hon. vCo.'s gardens under the name *Livistonia Mauritiana*; said to have been introduced from the Mauritius in 1821.

eg in the acuminate pendulous segments of the leaves, to *L. spectabilis*, but

OBS—This species approaches in otherwise it is quite distinct? It is not mentioned in the Hortus Mauntianus. A. D. 1837.

* Mart. Palm, 1.145.

X. CHAM^ROPS.

Linn. Muss. Cliff, p. 10. Gen. PL ed. 6ta. 1764. p. 571. No. 1219. ed. Schreb. p. 772. No. 1688. Jessieu. Gen. p. 39. Lam. Enc. 4. p. 709. (PalmwrsJ t. 900. Spf. Pl. ed. Schultes. 2. p. xciii. 1488. Endl. Gen. p. 253. No. 1759. Mar. Pnyr. p. 9. Pa/ro. j>. 247. *. 120. 124-5. PI As. Rar. 3. t. t. 211. ^ r w s . Bot. Rep. t. 599. £o*. Mag. t 2152. Lam6^ . m Unn. Trans. 10. *. 8. Chamaeriphes Gartn. Fruct. et. 8em. I. p. 25. t. 9.*

GENERIC CHARACTER,

FLOWERS polygamously moncecio-dicecious. CALYX and COROLLA each three parted. STAMENS 6 to 9, filaments united at the base. OVARIES 3. STYLE none. BERRIES 1 to 3, one-seeded. ALBUMEN hollow in front, smooth, or ruminately variegated. EMBRYO placed behind.

HABIT.—Perennial palms, shrubby, arboreous, either tall or dwarf, often with copious reticulated fibres. PETIOLES with the margins either spinous or smooth. LAMINA palmately many-parted, segments induplicately folded, with two-lobed points, and the intermediate threads often wanting. SPADICES either simply or compoundly branched. SPATHES coriaceous tubulose, branches few or deficient. FLOWERS yellow, bracteate. FILAMENTS united at the base. BERRIES fleshy olive-shaped or somewhat round.

OBS.—This genus is allied to *Livistona*, and presents an affinity to *Phoenix* in the polygamous flowers, the increased number of stamens, the nature of the berries, and the structure of the seed.

i. CHAJJLEROPS MARTIAN A.

TAB. CCXXVII. A.

C. Martiana, Mart, in Pl. As. Rar. 3. p. 5. t. 211.

Trunco elato, frondium ragina cylindrica reticulata, petiolls margine leviter dentatia et supra paleis albis furfuraceis, lamina reniformi subtus glauca, lacinia 70-75 conduplicato-canaliculatis, segmentia apice bifidis, spathis partialibus pluribus, bacois olivseformibus lepidotis (flavoscontibus).

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The description of this palm is taken from living plants in the H. C. Botanic Gardens, and that of the inflorescence and fruit is taken chiefly from Dr. Martius, *Palme he. tit.*

Trunk twenty feet high, irregularly annulate, of irregular diameter. *Crown* hemispherical, rather thin.

Leaves three feet long. *Petioles* two and half or three feet long, unarmed, generally partly twisted. *Lamina* reniformly orbicular or almost quite orbicular, concave, (rarely convex) two feet two inches long, and about four feet broad; latinise about seventy-five in number, conduplicately canaliculate, glaucous underneath, with nodding ends; the broadest ones about sixteen inches long, and obtusely bilobed to the depth of half an inch or an inch; lateral ones about a foot long, linear acuminate, very narrow, acutely bilobed; intermediate ones sixteen inches long, and also acutely bilobed.

Spadices three or five feet long, very much branched; furaised at the base (and under each primary branch) with spathes; peduncle about a foot long. Lowermost *spathe* one, or one and half foot long, two-edged, semi-bifid at the apex: the third or fourth suffults a flower-bearing branch. *Spikes* one, or one and half inch long. *Flowers* minute, solitary, or in pairs: at the base of each is a minute membranaceous bract. *Calyx* trifid; laciniae ovately triangular, sub-obtuse. *Petals* three times larger than the calyx, ovately orbicular, erectly patent or spreading. *Stamens* as long as the corolla. *Anthers* linear-oblong. *Ovaries* three, ovate, covered with a silky wool: the fertile ones have very short styles terminated by a capitate stigma: the barren ones have longer styles without any stigma. *Berries* shaped like an olive, but twice as small, furrowed slightly along on one side: yellowish, sprinkled with adpressed dry squamules. *Seed* erect, of the size of a coffee seed: ventral face with a depression, filled with cellular substance; dorsal face convex. *Albumen* cartilaginous-horny, horse-shoe-shaped on a transverse section. *Embryo* at the centre of the dorsal face.

HAB.-Bunipa in the valley of Nipal, at an elevation of about five-thousand feet above the level of the sea. Newar name, *Tuggu*.

OBS.-This elegant Palm thrives tolerably well in the H. C. Gardens in shady raised spots.

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2 CHAMJEROPS KHASYANA.

TABS. CCXXVII. A.B.C.

Trunco mediocri, petiolis per totam longitudinem denticulato-scarbris, fibrillitio e fibris erectis rigidiusculis, lamina reniformi-flabelliformi profunde 60-65 partita, laciniis induplicatis bilobis vel bipartitis lobis centralium brevibus obtusis recurvis, spadice (fructus) bipedali, ramis priuariis tribus, spathis subternis (basilaribus 2 rameo 1), pedunculum communum omnino tegentibus, fructibus oblongis livido-ceruleis.

The description of this species is derived from an entire specimen of a trunk and crown, and two fruit-bearing spadices. It is a palm of moderate height, (the specimen measures nine or ten feet), the *trunk* five inches in diameter in the thickest parts, and is obscurely annulate. Under the *crown*, which is thick, is an oblong mass (two feet long) consisting of the flattened bases of petioles, and their *rete* of stiff woody fibres.*

Leaves about three and half feet long. *Petiole* eighteen inches long, with irregular denticulate margins.

Lamina flabelliform, reniform, two feet long by three and a half feet wide: divisions about sixty-five in number, the lateral ones being the shortest, that is to say twelve or fourteen inches long, but they are more deeply divided than the others, down indeed to within five or six inches of the apex of petiole; linear, their segments one and half or two inches long, narrow, acute; central divisions ensiform reaching to within ten or twelve inches of the apex of the petiole, about sixteen inches long, shortly and obtusely bilobed, segments about half an inch long with recurved points; the intermediate divisions are also ensiform, about eighteen inches long, their segments narrower and deeper than those of the central part. Young leaves covered with thick, white, paleaceous tomentum.

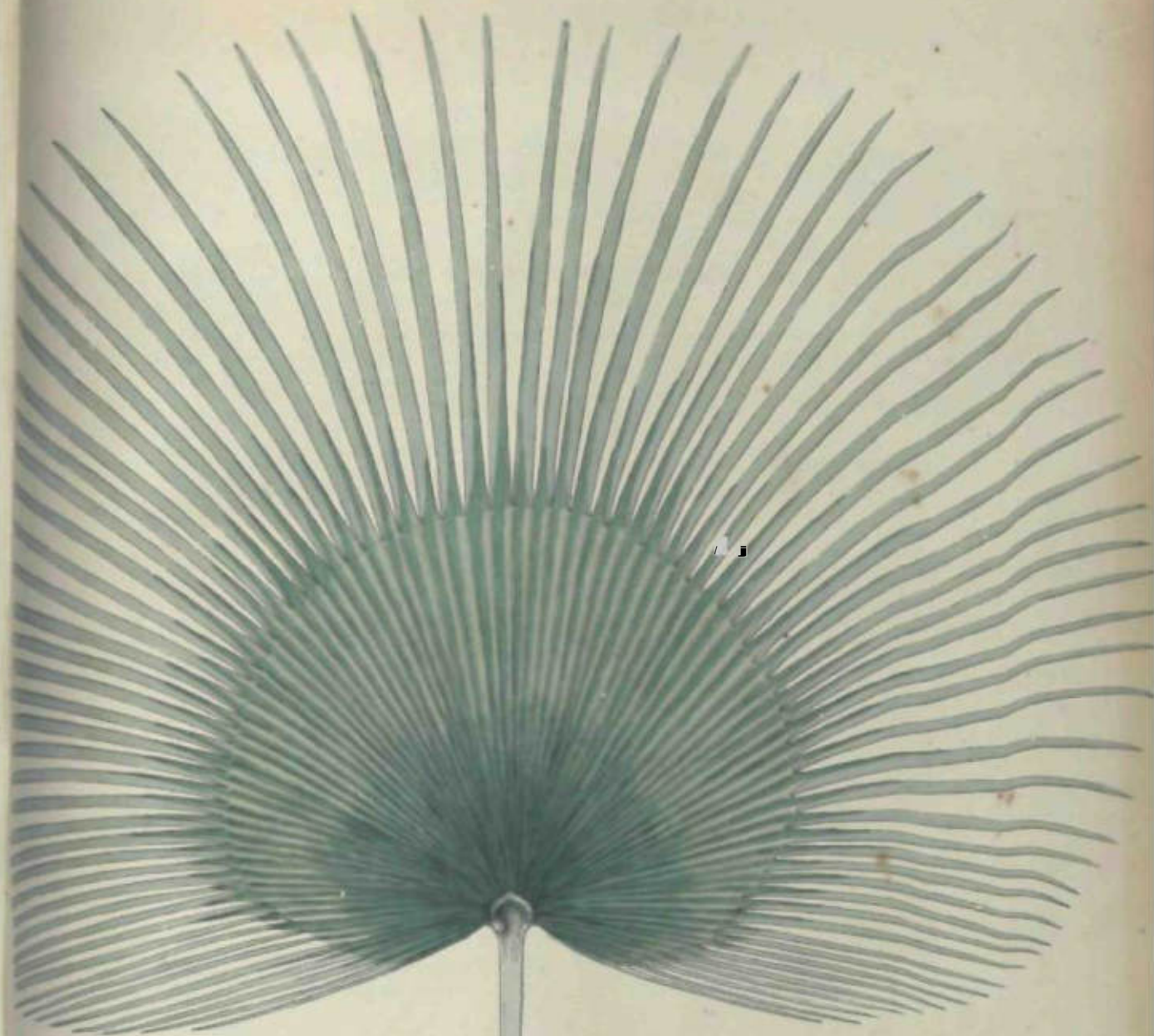
Spadix (fruit-bearing), two feet long, nodding, compressed: the lower half concealed by the *spathes*, of which there are three, two common ones, and the third belonging to one of the main branches. They are coriaceous brown, with oblique mouths and bilobed limbs, the lowest is about a foot long. *Branches* of the spadix quite exserted, quite naked, the terminal one dichotomous: divisions many. *Spikes* four or six inches long.

Fruit scarcely baccate, half an inch long, and two and half lines broad, either solitary or two or three together, but of distinct carpels, oblong, inequilateral, obliquely apiculate at the apex, surrounded at the base by the *calyx* which has a stout cylindrical base, and three deep, broad oblong divisions, and by a *corolla* of three cordate ovate petals equal in length to the calyx, as well as by six sterile stamens: and on one side may be found two abortive villous ovaries. *Seed* oblong, with the ventral face rather deeply furrowed, the furrow not reaching quite to the apex, reniform on a transverse section. *Albumen* with a scaly surface, and a cavity filled with spongy tissue: horny, otherwise equal, *Embryo* in the centre of the dorsal face.

HAB.—Khasya hills: on precipices at Moosmai and Mamloo, altitude four-thousand feet; not observed in flower or fruit. Takill Kemaon alt. 8000.—Major Maddan.

OBS.—This species is closely allied to *C. Martiana*: it differs in its shorter stouter stature, the petioles toothed throughout, in the nature of the rete, and the texture of the leaves which is more like that of *C. humilis*. The paleaceous tomentum is however much more developed, and the berries are bluish, not yellow. The divisions of the leaves are much the same, excepting the secondary segments of the central divisions, which are shallow, obtuse and recurved.

* Seeds recently received into the Hon. Co/s Bot. Garden have germinated.



Chamaedorea karyocarpus Griff.



Chamaerops khayana Griff.

XI. PH(ENIX).

Linn. *Gen.* n. 1224. Juss. *Gen.* 38. Gartn. 1. 23. *t.* 9. Roxb. *Corom. I* 74 et 273. Mart. *Palm. t.* 120. 124. 136. 164. Elata ait. *Hort. Kew.* 111-477. Endl. *Gen.* 1763.

GENERIC CHARACTER.

FLOWERS dioecious on a branching spadix. SPATHES simple and broad at the base. CALYX cup-shaped, 3-toothed. COROLLA 3-petalled. STAMENS 6 or 3. FILAMENTS short or nearly obsolete. ANTHERS linear. OVARY of 3 parts, united when matured. DRUPE one-seeded. SEED with a longitudinal furrow. ALBUMEN reticulated. EMBRYO placed behind.

HABIT.—Palms of the East Indies and northern parts of Africa, trees and shrubs, their STEMS marked with the scars of fallen leaves, or rough with the persistent bases of their petioles: in some cases stemless. The LEAVES are pinnate, the PINNULES linear. The SPADIX appears from between the leaves, the SPATHES coriaceous and sheathing. FLOWERS yellowish white. FRUIT edible soft and reddish yellow or brown.

PHCENIX ACAULIS.

TAB. CCXXVIII.

P. acaulis. Roxb. *Hort. Bengh.* p. 73. *Fl. Ind.* 3. p. 783. * *Icones Suppt.* 5. t. 15. *Buck. Hamilt. Comment in Hort. Malab. in Linn. Trans.* 15. p. 88. *Sprengel. Syst. PL* 2. p. 139.

Trunco brevissimo bulbifonni, foliis fasciculatis liaearibus couduplicatis sub-quadrifariis, spadixibus terminatis teretibus, e maxima parte inclusis, fructibus oblongis, embryone in centrum dorsii.

"Stem none in plants ten years old; at this age when in flower, the whole body of the inflorescence, but exclusively of the foliage is of an ovate form, and not exceeding six or eight inches in height from the surface of the ground. Leaflets (Fronds, L.) pinnate; from two to six feet long.

Leaves nearly opposite, rather remote fascicles; the superior ones folded, slender eighteen inches long; lower ones small, straight, rigid, and ending in very sharp spinous points near the base flat, towards the apex triangular, smooth.

MALE. Spathes and spadix as in the female hereafter described. Flowers alternate solitary pale yellow. Calyx one-leaved, triangular; angles or lobes acute, unequal. Corolla three lanceolate, acute, slightly united at the base. Filaments six, very short. Warts six, very short, linear, nearly as long as the petals. Pistil none.

FEMALE. Spathes universal, axillary, solitary, one-valved, about the surface of the earth, generally splitting into two portions down the middle composed of many simple short erect flexuose branches; all are smooth and solitary, sessile, in bractiform notches on the sides of the branches of the spadix. Calyx with three obscure points at equal distances on the margin. Petals three, sub-rotund, thick smooth. Nectary a small, six-toothed cup in which the germs sit. Germs three, each on a single ovulum attached to the middle of the cell on the inside. Styles three recurve small. Drupe oval, fleshy, small, smooth, of a bright red, of the size of a very small olive, one-celled solitary, oblong, with a deep longitudinal groove on one side. Embryo in the middle of the seed." Roxb. o. c. I. c.

HAB.-Behar, (to J. Elevated plains on the north side of the Ganges on Chota Nagpore. Burmah in plains between the valley of Hook-hoong and Mogam. Junglee Khujur. OBS.—This species varies considerably in the size of the leaves and breadth of the stem as well as degree of exertion of the male spadix. The male plant is probably scarcely distinguishable from the succeeding, but the female is at once distinguished by the shortness of the peduncle of the spadix which is shorter, and never, so far as I know, longer than the spathes.

Dr. Royle mentions a species closely allied to, if not identical with this, inhabiting the Kheree Hills, at an elevation of two-thousand-five-hundred feet, in company with Pinus longifolia.

Buchanan is here given as the authority, but this appears to be a mistake, see Linn., Trans, xv. p. 81-t. Illustr. p. 394, 397.

it is not accompanied with any defining characters. Most probably it is the succeeding or a third species of this form, which requires much more examination than it has received.

I subjoin the description of a specimen sent by Colonel Ouseley, who informs me that it is considered by the natives as a distinct species. The only differences I can detect are the shortness and less induplication of the pinnules, and the colour of the fruit.

P. acaulis var. *melanocarpa*.

A dwarf palm not exceeding two feet in height, including the leaves. *Stem* bulbiform, six inches long, covered with the protuberant hardened persistent bases of the petioles, their points being spreading recurved. *Leaves* one, or one-and-half foot long, ascending, then spreading. *Petiole* below flat, above quite compressed. *Pinnules* subfasciculate, fascicles subopposite, some ascending on either side, others spreading, attached by broad cartilaginous insertions above which they are conduplicate, glaucescent, spinous pointed, the upper ones the largest, seven or eight inches long, half an inch broad, conduplicate near the base, above this almost flat (at least the old ones); the lowermost are degenerated into strongish channelled three-gonal spines, the rest present intermediate characters.

Spadices of both sexes buried among the persistent bases of the petioles, of the fruit only partly exerted, without spathes; *spikes* two or three inches long, stout. *Fruit* suffulted by a green angular bract, sessile, alternate, of the size of a small olive, at first reddish, afterwards black-purple: apex distinctly cuspidate, base surrounded by an angular tridentate calyx, by the imbricated broad petals, and by six small abortive stamens. *Endocarp*? (tegument?) thin, like silver paper. *Seed* one, erect, greyish, deeply furrowed on one side, and with about seven striae on the remaining part of the surface. Along the same furrow the horny *albumen* is deeply grooved, the groove filled with spongy substance. *Embryo* at or a little below the centre of the dorsal face.

2 PHOENIX OTJSELEYANA.

Trunco brevissimo bulbiformi, foliis fasciculatis linearibus conduplicatissimis angustissimis, spadicebus feemiucis longe ezsertis spathia multo longioribus.

The description of this species is taken from specimens of male and female plants entire, but without flowers or perfect female spathes, communicated by Major Jenkins.

Bulbous *stems* ovate, imbricated conspicuously with the hardened scale-like bases of the petioles, about a foot in length and six inches in diameter. The *rete* consists of a few rigid fibres. *Leaves* two and a half or three feet long. *Pinnules* entirely conduplicate, about a foot long, from the conduplication two, or two and half lines broad, subulate-acuminate; lowermost degenerated into short spines.

MALE *spadices* about a foot long, the ends of the uppermost *spikes* rather longer than the bivalved carinate spathe.

FEMALE *spadices* two, or two and half feet long with a few short flexuose spikes towards the apex, much longer than the spathe, which appear to be about a span long. *Peduncles* of both *spadices* much flattened.

HAB.—Chota Nagpore, Col. Ouseley. Assam, Major Jenkins.



Phoenix aculeata

3 PHCENIX PEDUJVCULATA.

Monoica, sobolifera, plerumque acaulis, pinnis fasciculatis conduplicatissimis linearibus acutis spadicibus foliorum longitudine, factainoil oíto don-
gatis, fructus 3-4 pedibus fructibus oblongis, embryone versus medium faoiei dorsalis.

The description of this species is derived from complete specimens of young leaves, male and female spadices in flower, and fruit as well as the letters of Dr. Wight.

Monoecious, soboliferous, generally stemless. *Trunk*, if any, rough.

Leaves four or five feet long. *Rete* scanty. *Petiole* compressed in its lower eighteen inches or two feet, bearing marginal, rather long, solitary or fasciculate spines, which are degenerated pinnules. *Pinnules* fasciculate, quite conduplicate, about a foot long, acute, striately veined, two, or two and-a-half lines long, those next the spines are much the narrowest.

MALE *spadices* about a span long. *Peduncle* compressed, branched above the middle. *Bpathe* rather shorter, flat-navicular paleaceous carinate. *Branches* in flat fascicles, altogether nearly pennicillate, angular, flexuose, two to four inches long. *Flowers* solitary at the flexures, angular. *Calyx* small cup-shaped with three short teeth. *Petals* oblong, oblique, of the usual hard husky texture, striate, obtuse, three times longer than the calyx. *Stamens* six, filaments very short; anthers linear-oblong, shortly mucronate.

FEMALE *spadix* in flower a little larger than the male, scarcely exceeding the spathe. *Branches* inserted in flat fascicles, forming a more pennicillate bunch than the male, flexuose, less angular, and three or four inches longer. *Flowers* generally solitary at the flexures, sometimes with a tendency to be in pairs, roundish, small. *Calyx* broad, cup-shaped, three-toothed. *Petals* orbicular, convolutely imbricate; about twice as long as the calyx. *Rudimentary stamens* none? *Ovaria* three, nearly distinct, convexly bifacial interiorly. *Styles* three, recurved, stigmatose along inner faces. *Ovula* solitary erect. *Fruit-spadix* three or four feet long, the compressed *peduncle* having become exceedingly elongated.

Spikes much the same, apparently dull reddish. *Fruit* sub-distichous, oblong, about six lines long and three wide, red, shortly apiculate; pulp scanty, farinaceous, sweet. *Seed* oblong, deeply furrowed. *Albumen* horny. *Embryo* about the centre of the ventral face.

HAB.—Common and very gregarious on open ground of the hilly country about Courtallum, Coonoor, Nilgherries at an elevation of 6000 feet of the above the Sea—Wight,

OBS.—This appears to be allied to *P. Ouseleyana*, differing in the larger stature, the shorter, less acuminate pinnules, and the exceedingly long peduncles of the fruit. The elongation appears to commence before the ovjuria have commenced to enlarge. *P. farinifera* is at once distinguishable from it by the opposite pinnules.

Imperfect specimens of this were probably communicated many years ago to Dr. Martius, under the name *P. pedunculata*,

4. PHOENIX FARINIFERA. [^] *pussilla*

P. farinifera, Willd. *Roxb. Cor. Pl.* 1. p. 55. t. 74. *Icones.* 15. t. 32. (inflor.) *Fl. ind.* 3. p. 785. *Sprengel Syst. Pl.* 2. p. 139. *P. pussilla*. *Lour. Fl. Coch. ed. Willd.* p. 753. *Gart. Sem. et. Fruct* 1. t. 9.?^{*}

Dioecious. Trunco brevissimo, pinnis oppositis, spadicebus exsertis, fructibus oblongo-ovatis, embryo ad medium faciei dorsalis.

" *Trunk* ; the little it has is only about one, or at most two feet high, and so entirely enveloped in the sheaths of the leaves that it is never seen, the whole appearing like a large roujid bush.

Leaflets pinnate. *Leaves* opposite, sword-shaped, much pointed, smooth, of a deep green. *Spathes* axillary, one-valved, concave on the inside, this concavity is bordered by two sharp edges; convex on the outside, there splitting longitudinally, leathery, smooth, withering,

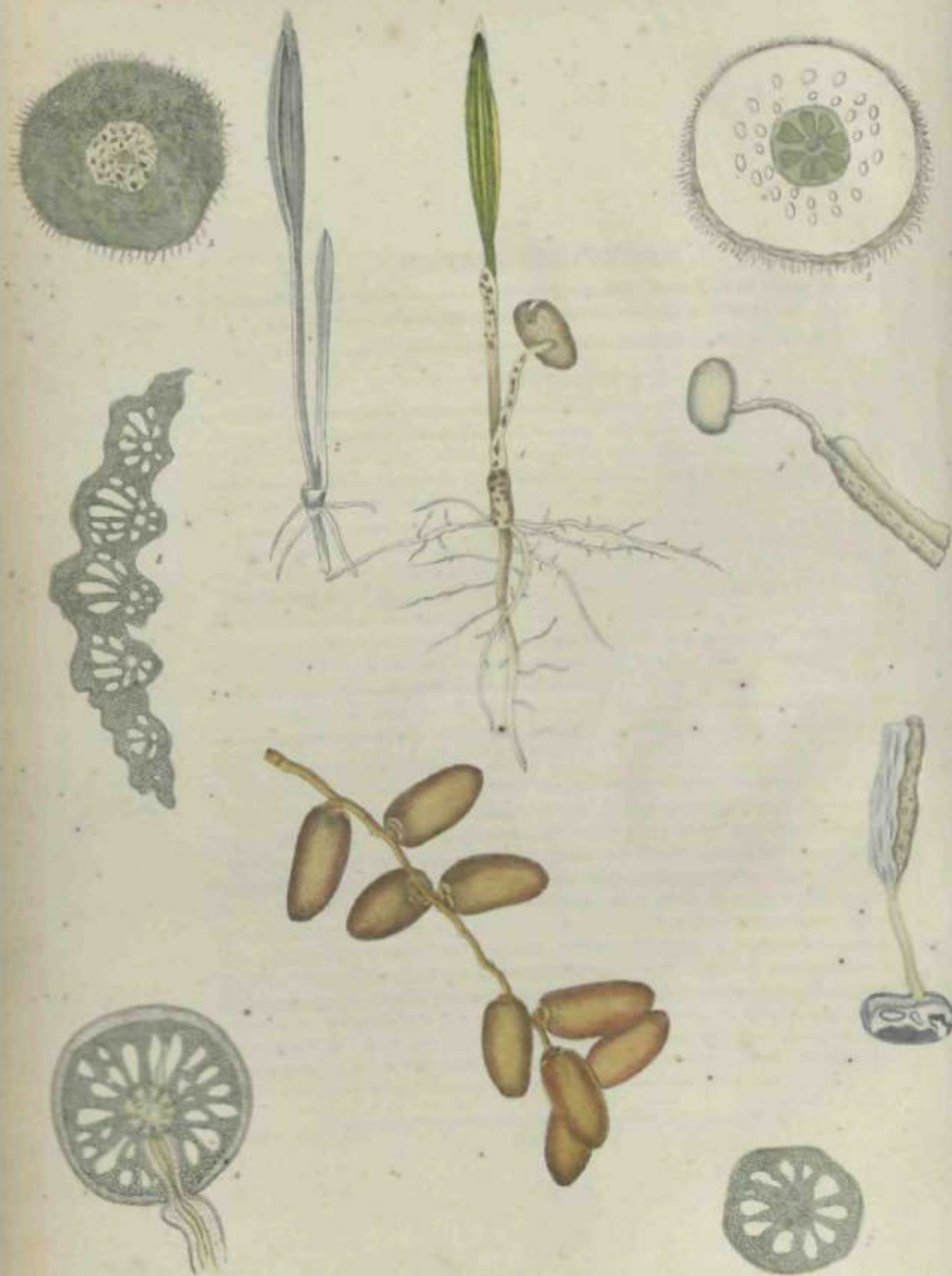
Spadix erect, very ramous, branches simple, spreading in every direction, from eight to twelve inches long.

MALE FLOWERS. *Calyx* small, slightly three-toothed. *Petals* three, oblong, white, rigid. *Filaments* six, very short, inserted into a fleshy globular receptacle. *Anthers* oblong, erect.

FEMALE FLOWERS on a separate plant. *Calyx* as above. *Petals* three, orbicular, concave, equal, rigid, lasting. *Germes* three, though never more than one increases in size, the other two always wither, although they contain the rudiment of a seed every way like the fertile germ; ovate, each ending in a short recurved style. *Stigma* simple. *Berry* when ripe,¹ of a shining black, of the size of a large French bean; the *pulp* is sweet and mealy, but in small quantity, the natives eat them as gathered from the bush without any preparation. *Seed* cartilaginous, of the shape of the berry, grooved longitudinally, as in the common date, pretty smooth, brown on the outside, of a light greyish white within, on the middle of the back there is a small elevation, under which is an oblong pit containing the embryo or first principle of the new plant."

The leaflets are wrought into mats for sleeping upon, &c. The common petioles are split into three or four and used to make common baskets of various kinds, but they are not so good for this purpose as the Bamboo, which is very elastic, much more durable, and splits easily. The small trunk when divested of its leaves, and the strong brown fibrous web that surrounds it at their insertions, is generally about fifteen or eighteen inches long, and six in diameter at the thickest part; the exterior or woody part consists of white fibres matted together, these envelope a large quantity of farinaceous substance, which the natives use for food in times of scarcity. To procure this meal, the small trunk is split into six or eight pieces, dried, and beat in wooden mortars till the farinaceous part is detached from the fibres ; it is then sifted to separate them, the meal is then fit for use. The only further preparation it undergoes, is the boiling it into a thick gruel, or as it is called in India, *Kanji*; it seems to possess less nourishment than the common sago, and is less palatable, being considerably bitter when boiled; probably a little care in the preparation, and varying the mode, might improve it; however, it certainly deserves attention, for during the end of the last, and beginning of this year, and again at this present time, May 1782, it saved many lives. Rice was too dear, and at times not to be had, which forced many of the poor to have recourse to this sort of food. Fortunately it is one of the most common plants on this part of the coast, particularly near the sea."—*Roxb. o. c. I. c.*

^{*} This synonyme is I think doubtful, as Roxburgh's figure does not agree with figs. f[^]g. of Gartner.



Phoenix sylvestris

H —D barren parts chiefly of the sandy lands at a small distance from the sea near Coringa. Flowers in Jan. Feb.; fruit ripening in May. Telinga name *Chilta-eita*. (Roxb) Common on all the hilly country between the Ganges and Cape Comorin *fuchanan* Hamilton J.

OBS - There is a male specimen called *P. fariniferain* the Botanic Gardens. It has a *trunk* four feet high, six or eight inches in diameter, rough with the persistent bases of the petioles. The *leaves* are three or four feet long, spreading, the lower very spreading, but oblique; the spinous ones, which occupy the lowest eight or ten inches of the petiole, are longest and narrowest. The *spathe*

This can scarcely be distinguished from *P. ...* It seems exactly intermediate in foliage between *P. ...*

5 PHOENIX SYLVESTRIS.

TAB. CCXXV in. A.

Roxb. Hort. Deny. 73. *Fl. Ind.* 3. p. 787. *Icones*. (fl. et. fr.) 15. t. 31. *Ham. Comm. Hort.* p. 15. *Katou-indel.* J. Aede. Hort Jlfai. 3. * 22-25.*

Aborea, p. 15. *fasciculatis* *ngiaw u* *ad yel supra centrum facti dorsalis.*

i. *Azme* palm, often when uninjured by extracting toddy, thirty-five to forty feet in height. persistent bases of the petioles. *Crown* about hemispherical, very large and thick. *Trunk* rough from persistent bases of the petioles; at the base bearing a few channelled *Pinnules* very numerous, densely fascicled, glaucous, rigid, ensiform, eighteen inches long, one triangular shape, duplicate at the base, then canaliculate, subulately acuminate, almost spinous pointed, four fanous, some spreading, others crossing these above and below in an ascending direction. *Spathe* of about the same length, very coriaceous, almost woody, separating into two boat-shaped valves. *Spikes*, exceedingly numerous towards the apex of the peduncle, and chiefly on its anterior face, generally in fascicles and simple, *Flowers* three lines long, very numerous, angular, oblique. *Calyx* four or six inches long, three short rounded, cup-shaped, with *Filaments* (free), scarcely any. *Anthers* linear, adnate, a

KB. sh. < < . I . * * * 1 by KUEEDB, is very much smaller, and of a different shape from what it is in Bengal, at least on uninjured trees.

FEMALE. *Bpadix* much the same as in the male, as are also *the* spathes. *Spikes* inserted in distinct groups, one, or one and-a-half foot long, not bearing flowers throughout the lower four or six inches, flexuose. *Flowers* distant, roundish. *Calyx* cup-shaped, obsolete three-toothed. *Petals* three, very broad, convolutedly imbricate, leaving a small opening at the apex. *Barren stamens* three or four. *Ovaries*, three; *ovules* solitary. *Style* recurved, inwardly papillose.

Spadw of the fruit three-feet long, nodding at the apex from the weight of the fruit, much compressed, of a golden orange colour. *Fruit* scattered on long pendulous nodding similarly coloured spikes, with brown orange swollen bases, oblong, very obtuse, fourteen inches long, seven or eight lines wide, with an oblique mark of the base of the style, surrounded at the base by the perianth. *Pulp* yellow, moderate, very astringent, lined by irregular cellular white tissue, part of this adheres to the thin envelope that separates with the seed. *Seed* oblong, deeply grooved (margins of the groove slightly wrinkled) along its whole length on one side, on the other side it has a slight incomplete furrow, in the centre of which is a depression with a mammillate fundus, marking the situation of the embryo. *Albumen* on a transverse section horse-shoe-shaped. *Embryo* at, or a little above the middle of the dorsal face.

HAB.—Common all over India, all soils and situations seeming to suit equally well.* It flowers at the beginning of the hot season, (Roxb.). The most common Palm of India. (Buchanan Hamilton). Beng. *Khujjoor*; Sansc. *Khurjura*; Teling. *Peddaeita*.

OBS.—My materials do not enable me to point out any distinction between this and *P. dactylifera*, the true Date Palm. In appearance they would seem to be indistinguishable. Roxburgh says nothing in the Flora Indica regarding this in explication of his specific character. But in a pencil note to the unfinished drawing of *P. sylvestris*, he says the male flowers of *P. dactylifera* are most exactly like. Buchanan Hamilton considers it the wild state of the true Date Palm so much cultivated in Arabia and Africa, and states, that on comparing young plants, he had not been able to see the smallest difference, except that the Arabian plant was rather the largest and more vigorous. ^ Compared with Gartner's figure of *P. dactylifera*, 1, t. 9. the fruit of *P. sylvestris* is considerably smaller. The embryo also is on the central line. I have only seen Martius' character of *P. dactylifera*, (loc. cit.)

" This tree yields *Tari*, or Palm wine during the cold season. The method of extracting it destroys the appearance and fertility of the tree. The fruit of those that have been cut for drawing off the juice, being very small.

" The mode of extracting this juice is by removing the lower leaves and their sheaths, and cutting a notch into the pith of the tree near the top, from thence it issues and is conducted by a small channel made of a bit of the

• This is hardly correct as it appears to me to be confined chiefly to the lower plains. It begins to disappear about 30 miles North West of Burdiran and is scarcely seen in the hilly districts of Behar, where almost the only palms met with are *Phoenix acaulis*, and *Borassus flabelliformis* ED.

t The plant called *Phoenix dactylifera* of these Gardens does not attain a greater height than 4-5 feet. *Trunk* remarkably stout, 1 foot or more in diameter, marked with the scars of the petioles. *Leaves* 7-8 feet long. *Petioles* compressed a long way down, in the lower 2 feet bearing many stout rigid channelled spines. *Pinna* fasciated, their direction as in *P. sylvestris*, but in a less marked degree, bifarious when young, 1 foot long, 1 inch broad, subulato-acuminata, those next the spines longest and narrowest.

Spadix 2-2½ feet long, branched at the apex; *peduncle* 12 to 18 inches long, much compressed.

This plant is evidently closely allied to *P. sylvestris*, and with *P. farinifera* of the Gardens, forms a complete transition from *P. sylvestris* to *P. acaulis*. Both it and this so-called *P. farinifera* require more examination.

Palmyra tree leaf, into a pot suspended to receive it. On the coast of Coromandel this Palm juice to A t e tank fresh from the tree, or boiled down into sugar, when it gives out a large portion of ardent spirit commonly called U e d n , Coromandel. Mate and baskets are made of the leaves, .. n. Bengalee, call this tree K < - T j r ^ ^ ^ hundred weight) ,, made annuaUy. At the age of

the trees will be about four feet high, they begin to give out juice and ears. It is extracted during the cold months of November, December, and January. Each tree is reckoned to yield

averages one hundred and eighty pints; every twelve pints or pounds is of Goor yield one of powder

boiled down to one

ounce of each tree is about seven or eight pounds annually. The larger produce, average produce of

..Another statement says that it yields two pounds of forty of molasses yield twenty five

sixteen pints of brown sugar. The difference is that I cannot reconcile them, but am inclined to give most

credit to the first. It is much esteemed as cane sugar, and sells for about one fourth less.

« Date sugar, as it is called, is

e PHCENIX PALUDOSA.

TABS. CCXXIX. A.B.

P. paludosa, Roxb. Hort. Bengh. p. 73. Fl. Ind. 3. p. 789. Icones. 15. t. 33, (indifferent).

Arbujcula, trunco basi annulate, pinnis solitariis bifariis eusiformibus acuroinatissirais patenti-nutantibus, spatkis antice apericentibus exsertis, fructibus ovatis, embryo hilum versus.

The specimens of this palm growing in the Botanic Gardens form very elegant impenetrable tufts. *Trunk* twelve or fifteen feet high, three and a half inches in diameter, annulate at the base, otherwise covered with the brown, retiferous, armed petioles.

Leaves gracefully spreading, eight or ten feet long. *Petiole* covered with scurf, brownish-glaucous, in the lower three feet bearing irregularly spreading, hard, brown, triangular, channelled, rather long spines.

Pinnules bifarious, solitary, spreading, then curved downwards, not rigid, two feet long, eight lines wide, exceedingly acuminate, bifarious, conduplicate at the base, otherwise flat, underneath glaucous-caesious, the lowest being both the longest and the narrowest.

MALE *spadix* about a foot long. *Spathes* coriaceous, bicarinate, opening anticously, orange brownish; keels with irregular edges, *flowers* yellow, more distant than in the other species. *Calyx* cup-shaped, less regularly three-toothed than in *P. sylvestris* or *farinifera*. *P^otals* three. *Filaments* six, short.

FEMALE *spcdix* about one and half foot long, flowers greenish. *Calyx* as in the male. *Petals* roundish, concave. *Sterile stamens* six. *Ovaries* three, styles recurved, longer than in the other species.

Spadix of the fruit three or four feet long, erect, yellowish orange, branched at the apex. *Spikes* of the same colour, generally several together, with cartilaginous thickened bases, about a foot long, nodding, rarely branched.

Fruit sessile, on thickened knobs, spreading or pointing downwards, first yellowish, then red, lastly black-purple, oval, six or seven lines long, three or four wide, with a small oblique apiculus at the apex; at the base, the more or less split perianth.

Seed ovate, compressed, with a rather deep furrow on one side, ceasing just above the middle, and with an indistinct furrow on the opposite side. Groove of the acumen deeper at either end than in the middle. *Embryo* placed near the base.

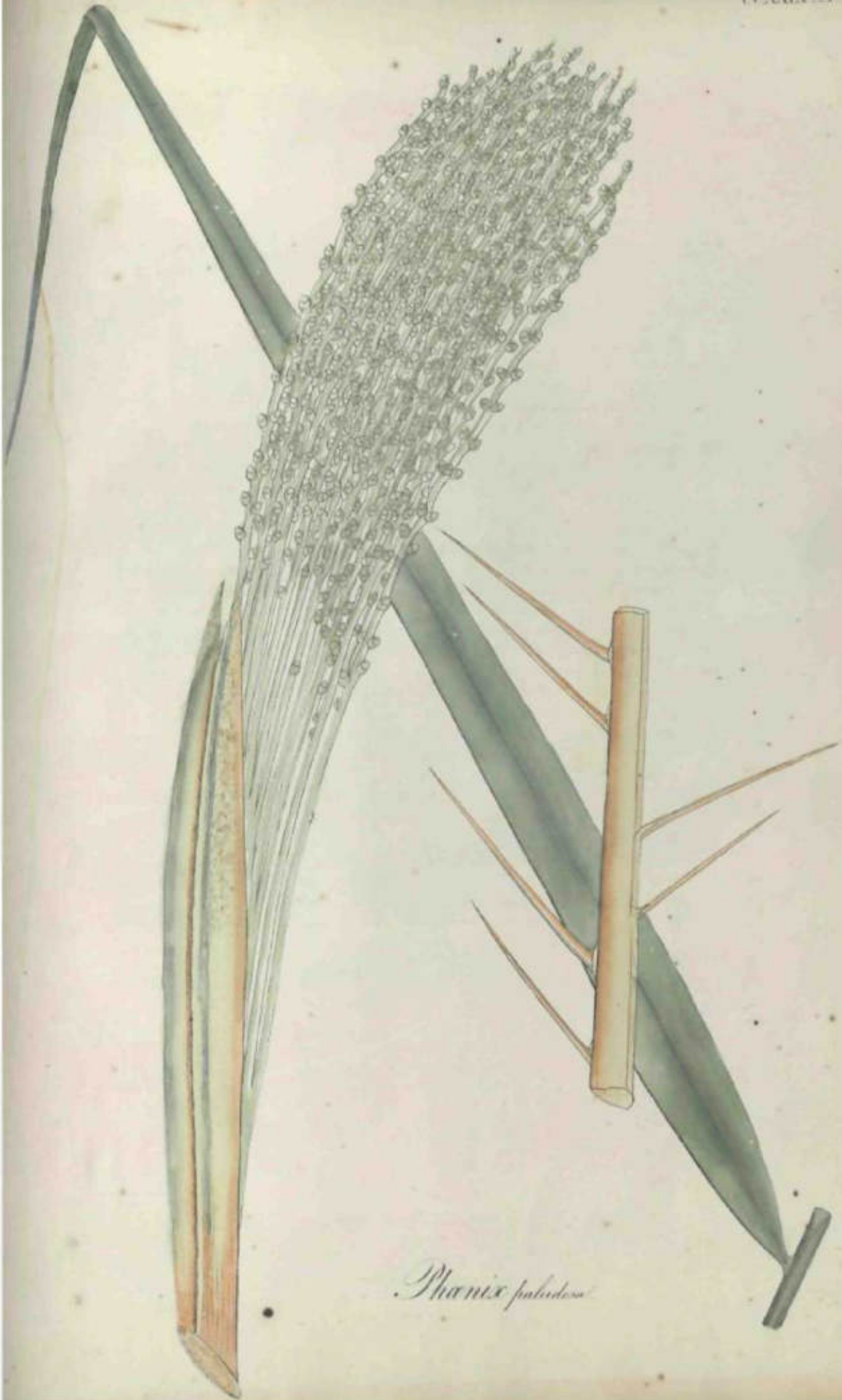
HAB.—The Sunderbuns, where it forms a considerable portion of those impenetrable woods which completely cover that extensive tract of country, (Roxburgh). Along the Salween, between Amherst and Moulmein. Penang, (Mr. Lewis), where it is known by the name *Dangsa*. Sansc. name *Hintala*; Bengal, *Hintal*.

OBS?—This species is not likely to be confounded with any other, its habit is less genuine than that of the others. It is at once distinguished by the bifarious flaccid flat solitary pinnules, the shape of its fruit and the situation of the embryo.

"The trunks of the smaller trees serve for walking sticks, and the natives have an idea that snakes get out of the way of any person having such a staff. The longer ones serve for rafters to their houses, and the leaves for thatch." Roxb.

It is well worth cultivation on account of its elegance, and its being adapted for bank scenery.

So far as I know, it is the most southerly species of the genus, at least of the northern hemisphere. %



Pharus pulcherrimus



Phoenix paludosa

XII. ARECA.

*Linn. Gen. p. 516. No. 1225. (partim.) ed. Spreng. p. 284. No. 1473. Juss. Gen. p. 38. Gartn. \.p. t. 7. Lam. III. t. 895. Roxb. Icones. 14. t. 75-77 Suppl. 5. t. 64-65. Cororo. PL t. 75. (ex Endl.) FL Mica 3. j>. 615. Mart. Palma 169. *. 102, 149, 158./ 4, 5. (ex Endl.) Endl. Gen. p. 247. Vb. 1728.*

GENEIC CHARACTER,

SPATHE 1 or 2 complete. FLOWERS monoecious in the same spadix, one feminine between two masculine. STAMENS 3, or indefinite. OVARY 1 to 3-celled. OVULA 1. FRUIT drupaceous or somewhat like a berry, sometimes oblique, one-seeded. ALBUMEN ruminated. EMBRYO near the base.

HABIT.—Arboreal trees or shrubs, often unarmed. TRUNK ringed. LEAVES pinnately divided, seldom twice divided or bipinnate. SHEATH coriaceous, striated. SPADIX axillary paniculate or racemosely divided, rarely simple, often broken. FLOWERS often distichous or ranged in two rows, with a centrifugal expansion or evolution. ANTHERS linear, FRUIT either drupes or berries, the former ovate often orange, the latter globose and of bluish colour.

s. ARECA TRTAFcDRA.

TAB. CCXXX. A.

-A. triandra. *Roxb. Icones. Suppl. 65, (incompl.) Fl. Ind. 3. p. 617. Buck Hamilt. Comm''. Hb. Amb. in Mem. Wern. Soc. 5. p. 310. Mart. Palm. t. 149,*

Fruticosa, sobolifera, foliis pinnatim fissis, pinnis longe et oblique acuminatis, superioribus apice fissis, terminali furcata plurifissa fissuris bidentatis, spatha 1, fl. masculis binatis, petalis oblongis obtusis, staminibus 3, femineis ad basin ramulorum solitariis, drupa olivteformi mammillata.

The description of this species is taken of from plants in the H. C. Botanic Gardens, that of the fruit is borrowed from Roxburgh aided by Dr. Martius' figure.

It is shrubby, throwing out offsets at the base. The stem is five to seven feet high, green, distinctly annulate, one and a half inch in diameter.

Leaves four or five feet long. Pinnules alternate, linear ensiform, thirteen to sixteen inches long, one and a half to two inches broad, often falcate, much, and obliquely acuminated; above, one to three keeled according to the breadth, which is variable; colour bright green, the upper ones more or less split at the apex: the terminal ones are broadly cuneate, deeply bipartite, forked, lobes truncate, divided into as many narrow, bidentate lobes as there are keels on the under surface.

Spathes green, smooth, with a short blunt point, varying from six inches to a foot long, and two to three inches broad: texture leathery. Spadix highly divided; peduncle and branches compressed; at the base of the lowermost branch a linear bract occurs, half inch long; branches spreading, ascending, much divided; secondary divisions stoutish towards the base, where they bear a female flower, close to which they branch into two slender flexuose spikes, (on which the male flowers are seated), or more frequently are attenuated into one.

MALE flowers angular, small, cream-coloured, in pairs pressed together and secund on the outer side of the spikes. Sepals three, minute, ovate-oblong, unequal. Petals oblong, obtuse, valvate, three or four times longer than the sepals. Stamens three, opposite the sepals; filaments stout, short, united at the base; anthers sagittate. Rudiment of the Pistillum conical subulate.

FEMALE flowers rather large, generally placed between a pair of rudimentary males, suffulced by two broad, short pointed bractes. Sepals roundish, green. Petals similar, but smaller and less tough. Six very small rudimentary stamens. Ovary ovate, one-celled, white. Ovule one, ascending. Style 0. Stigma of two, or generally three erect unequal acute lobes.

Fruit oblong, of the form of an olive, but longer, distinctly mammillate, smooth, when ripe of a lively orange colour a* length becoming red. Pulp in small quantity, and mixed with many longitudinal strong, ligneous fibres! Seed conform. Albumen much ruminated. Embryo basilar.

HAB.—Woods; Chittagong, Rungpore. Bengallee names *Bungooa, Ramgua. R_mi Sunari m_L*
Cultivated in the H. C. Botanic Gardens; in flower most of the year. »^uP^{an}. CBuchanan HamiUonJ.



Arca huandru

3 ARECA LAXA.

A. Laxa, *Buck. Hamilt. Comm. in Hb. Amb. in Mem. Wern. Toe.* 5. p. 30. *Pinanga sylvestria glandiformis secunda*, *Rumph Hb. Amb.* \p. 39. ?

Arborea, truncus minus incurvus unquam stricto, foliis pinnatis, pinnis lanceolatis acutis integerrimis equidistantibus, spathe 1-phylla, staminibus 3, rudimento pistilli nullo.

The following description of this species is taken from Buchanan Hamilton.—*Trunk* twenty or thirty feet high, annulated, green, tumid, generally incurved, never straight as in *A. Catechu*. *Leaves* pinnate; *pinna* lanceolate acute, quite entire, aequidistant, two-nerved with four-plaits; *petiole* pinniferous from the middle upwards ?

Spathe one-leaved, lanceolate, acute, margined. *Spadix* panicled, branches angular.

MALE *flowers* very many minute, in pairs. *Sepals* three, rigid, lanceolate, acute. *Stamens* three j *filaments* scarcely any; *anthers* oblong. *No rudiment of Pistil*

FEMALE *flowers* situated towards the bases of the spikes, solitary, few, much larger than the males. *Sepals* convolute, ovate, concave. *Petals* convolute, ovate, acuminate, longer than the calyx. *Ovary* obsolete trigonal, ovate, acuminate. *Style* none. *Stigma* acute. *Fruit*—

HAB.—Andaman Islands. *Buchanan Hamilton*.

OBS.—Buchanan Hamilton, from whose description the above is adopted, states that it is closely allied to *A. triandra*, and that the nuts are used instead of the Betel-nut by the convicts confined on the island. Buchanan Hamilton makes no mention of the petals of the male flower. I have no knowledge of the species myself.

4. ARECA NAGENSIS.

Arborea, procera, foliis pinnatis, pinnis linearibus obliquis acuminatissimis, spindice spithameo, fl. femineis ramorum pluribus, fructibus angusto-ovatis utrinque attenuatis presertim apice mammillato.

The description of this species is derived from imperfect specimens of leaves, and an imperfect spadix with immature fruit with which I was favoured by Major Jenkins, and a perfect fruit received from Mr. Owen. "Trunk thirty or forty feet high, attached to the soil by innumerable black fibrous roots." Naked part of the *petiole* about three feet long. *Lamina* four feet long. *Pinnules* sub-opposite or alternate, falcate, very acuminate, nineteen or twenty inches long, about one and half inch broad, above with two or three stout keels ; the terminal one deeply bilobed, variously partite, the lancinate or divisions bidentate; the less divided broader part is obliquely truncate with irregular teeth.*

Spadix about a foot long; peduncle compressed, branched from near the base, branches stout flexuose. A scale-shaped *bract* under each *female flower*, several of which occur on the lower parts of the branches.

* The leaves may be open to doubt, from their resemblance to those of *A. gracilis**

Sepals round oblong, obtuse, *petals* larger sub-cordate with a short obtuse cuspis. *Fruit* oblong-ovate, one inch long and five lines wide, attenuated to both ends, base surrounded by the *perianth*, apex rostrate mammillate, truncate, with a small mammilla in the centre: fibres numerous, stout, whitish. *Seed* erect, ovate, half an inch long, marked with many veins arising from the hilum, these are generally dichotomous, anastomosing reticulately on the dorsal face. *Albumen* cartilaginous, horny, ruminant, opaque white. *Embryo* basilar.

HAB.—Assam? *Major Jenkins*, Naga Hills, up to an elevation of eight hundred feet above the level of the sea, affecting banks of rivers. Name of the tree in Naga, *Tal-pàt*; Singpho name, *Tongtau*; of the nut, Nagas *Kàve*; Assam, *Tàmul*. (Mr. Owen J.)

OBS.—This appears distinct by its roots and fruit. The latter is according to Mr. Owen, used by the Nagas and Abors instead of the Betel-nut; the leaves are much like those of *A. gracilis*. Mr. Owen informs me, that it is very scarce, and courts high situations generally on river sides.

Both this and *A. laxa* require further examination.

5 ARECA COCOIDES.

TAB. CCXXX. B.

Arborea, procera, fuitis pinnatis pinnis linearibus acuminatis bipartitis, spathis—fl. masculis binatis polyandris, faemineis paucis bases versus ramulorum undique insertis, stigmatibus 3-revolutis, drupa ovata magnitudine ovi galliui.

This is a lofty palm. *Trunk* forty feet high. *Crown* dark green, ample. *Leaves* pinnate; *petiole* scurfy plano-convex: *lamina* eight or nine feet long, four, or four-and-a-half broad, in outline lanceolate acuminate; *pinnules* two feet long, \ to 1J inch wide, linear, acuminate, unequally bipartite, shining, very smooth, uppermost inequilateral, sub-erose at the points: central vein and five others forming as many keels above, the central one underneath bearing scales attached by the base.

Spadix ascending, altogether green; branches stiff, stout, above flexuately torulose owing to niches in which the flowers are lodged. The *spathes* were not seen.

Lower *flowers* one female between two males, upper males, in pairs.

MALES small; *sepals* imbricate, carinate, hard, much shorter than the corolla, margins sub-membranaceous, denticulate, inner rather the longest. *Corolla* valvate, hard, tripartite to the base; *petals* oblong-lanceolate, sub-obtuse. *Stamens* numerous; *anthers* linear-sagittate. No rudiment of a *pistil*.

FEMALE (in bud); *sepals* and *petale* scarcely distinguishable, imbricate, with very broad bases. No rudiments of *stamens*. *Ovary* large, white, oblong, one-celled, sub-compressed, divided at the apex into three-cuneate sub-recurved lobes, each with a line of stigmatic tissue along the central line of the inner face. *Ovule* one, attached nearly along its whole length; *foramen* inferior.

Spadix of the fruit spreading, presenting one or two annuli on its very stout base: branches angular, thickened at the base. *Fruit* pendulous from its weight, ovate, the size of a large egg, surrounded at the base by the perianth, at the apex presenting the three styles: colour orange, smell unpleasant like spoiled sour fruit; outer substance thick, firm,



Avca coarctata. Guss

consisting of yellow cellular tissue and longitudinal fibres, which are more numerous towards the putamen. This is thin, hard, crustaceous. *Seed* one, erect; *tegument* thin, shining, light brown. *Albumen* densely horny, much ruminated. *Embryo* basilar.

HAB.—Cultivated at Malacca, but not commonly. It occurs in a garden at the Dutch Redoubt; also half way to Malim. Malayan name, *Pinang Punowur*.

Ous.—The aspect of this Palm is very different from that of *A. Catechu*, the size being much greater, the crown blackish-green, the leaves stiffer, and at a distance having a truncate appearance. The Malacca specimen when viewed closely has the appearance of a cocoa-nut tree. It is also to be known from *A. Catechu* by the round torulose branches of the spadix, the binary not solitary distichous polyandrous males, by the females not being secund, and by their greater number, by the recurved not connivent styles, and by the fruit.

The fruit is, I believe, considered a medicinal kind of betel-nut, I have not however been able to trace the history of the plant, or its native place. Can it be *Pinanga Calapparia* of Rumphius?

6. ARECA PUMILA.

A. pumila, *Mart. Palm. t. 153. l. iv. v.* (spadice inverso).

Arbuscula, foliis pinnatis, pinnis alternis 2J-pedalibus lineari-ensiformibus prae-acuminatis, spadicis ramis sub-4 undique florigeris, fl. masc. sepalis subulato-setaceis quam petala obliqua ovato-cuspidata paullo longioribus, staminibus 6, fl. fom. stigmae obtuse-conico trisulcato, fructibus undique insertis ovatis (aurantiaceis).

Stems ten or twelve feet in height, 1J to 1| inch in diameter, distinctly annulate.

Leaves eight or nine feet long; *sheaths* subventricose, about two feet long, inside of a shining chesnut colour. *Petiole* bearing pinnules nearly to the base where it is channelled, elsewhere trigonal; *pinnules* alternate, two and a half feet long, $\frac{1}{2}$ an inch to 1 $\frac{1}{2}$ inch broad, sword-shaped, very acuminate, coriaceous, bright-green, above two keeled with an obsolete intramarginal keel on each side.

Inflorescence whitish-yellow. *Spadix* while included in the spathes shortly sword-shaped. *Spathe* about a foot long, linear, two-edged, flattish posticously anticously ventricose, coriaceous, chesnut-coloured, obtuse and sometimes trifid at the point, here and there presenting spots of adpressed hairs.

Spadix peduncle about one and half inch long, and on the middle of the outer face, is a semi-circular scar marking the attachment of the spathe, a little above this, is a membranous spathelle, acuminate from a very broad base : a smaller one at the base of each lateral branch; *branches* about four, level-topped, pendulous, about a span or a foot long. *Flowers* about four-ranked, sessile, whitish-ochroleucous, throughout one female between two males.

MALE flowers; *sepals* nearly an inch long, triangular-subulate, canaliculate, and exceedingly acuminate. *Petals* oblong-ovate, oblique, valvate, long cuspidate, but shorter than the sepals. *Stamens* six; *anthers* linear, those opposite the petals longest. *Pollen* ovate, one plicate, white. No rudiment of a Pistil?

FEMALE flowers; *sepals* roundish, imbricate. *Petals* similar, a good deal smaller. No rudiments of stamens.

Ovary white, roundish, one-celled; *ovule* one, appense. *Style* waning. *Stigma* obtuse, conical, large, obscurely trisulcate, almost three-lobed.

Spadix of the fruit with about four simple, roundish, greenish-white branches. *Drupe* oblong ovate, one inch long, five or six lines broad, orange-coloured, mammillate at the apex, base surrounded by the perianth. *Seed* erect, oblong. *Albumen* horny, ruminant. *Embryo* basilar, rather oblique.

HAB.—In a ravine of the dense forest near Ching, Malacca; one specimen only has been observed. Its Malayan name is *Pinang Jirong*.

OBS.—This species is closely allied to *A. malaiana*, but is at once distinguishable by the tetrastrichous not distichous inflorescence, the sepals, number of stamens and the orange, not sanguineous colour of the fruit.

Figure 11, 6, Plate *Seaforthia Reinwardtiana*, Mart. Palm, gives a tolerable idea of the fruit-spadix of this species. Judging from Dr. Martius' figure, it varies a good deal in the size of the inflorescence and fruit.

7 ARECA MALAIANA.

TAB. CCXXX. C.

Seaforthia malaiana. Mart. *Palme*, p. 184. t. 158, f. 3.

Arbuscula, foliis pinnatis, pinnis alternis 1-2-pedalibus linearibus valde acuminatis subtus glaucescentibus, spadice 3-S-ramoso, fl. raucis. sepalis lanceolato-acuminatis quam petala obliqua acuta inaequalia multo minoribus, staminibus circiter 40, fl. feminei nullis, stigmatibus discoideis, fructibus distichis ovatis (sanguineo-purpureis).

An elegant Palm, eight to twelve feet in height, having the appearance or habit of the preceding. *Stem* distinctly annulate, in diameter scarcely an inch, internodes generally subclavate. *Crown* composed of five to eight spreading leaves.

Leaves five to eight feet long; *sheaths* one, or one and a half foot long, leathery, striate; *petioles* (below the pinnules) li to 1½ foot long, channelled, otherwise triangular. *Pinnules* alternate, linear, one and half to two feet long, and eight or ten lines broad, very much acuminate; above two-keeled* underneath with one-keel and a vein on either side, of whitish glaucescent colour: upper pinnules cuneate, deeply bipartite, segments bilobed, lobes generally bifid; terminal portion deeply bipartite, obliquely prsemorse, segments with several lobes, themselves obtusely bifid.

Spathes oblong, ten inches long, and two and half broad, of a leathery or papery texture, with a broad obtuse cuspis, opening along, the upper face. *Spadix* about six inches long; the undivided part of the peduncle an inch and half long, compressed, with one oblong-linear bract a little above the middle; *branches* 3 to 5 in number, crowded with flowers, compressed, flexuose.

MALE *flower* large, pressed, together and flat, quite concealing the female. *Sepals* three, membranaceous, lanceolate acuminate. *Petals* much larger, unequal, one as large as both the others, cordate, the others half cordate, all acute or acuminate, and of a hard texture. *Stamens*, inserted on a convex torus, about 40 in number; *filaments* very short; *anthers* linear, about twice as short as the petals.



Arceuthobium / *Arceuthobium* / *Arceuthobium*



Arca Dicksonii

FEMALE flowers less advanced, occasionally two together, occupying the bends of the flat faces of the spikes distichous : under each is a broad, membranous, much acuminate bract. Perianth urceolate. Sepals cordate shortly cuspidate. Petals smaller and shorter, with minutely fimbriated margins. No rudiments of stamens. Ovary roundish. Style very short. Stigma large, discoid, concave.

Spadix the fruit of a bright sanguineous colour; branches four or five, about a span long, compressed flexuose.

Fruit distichous; occupying the flat faces of the branches, ovate, at first sanguineous, afterwards blackish-purple, mammillate at the apex, surrounded at the base by the perianth; outer substance fleshy cellular, middle fibrous, inner hardened crustaceous. Seed one, erect; tegument very thin, membrano-cellular, veiny, brown, shining, generally adhering to the fruit. Albumen horny, deeply ruminant. Embryo conical, basilar, obliquely situated.

HAB.-In forests, Ayer Punnus, and Rhim, Malacca; where it is not uncommon. Malayan names, that of Malacca, Penang Booreng; of Penang, Kurdo.

OBS.-This species is at once distinguishable by the colour of the spadices and fruit; its nearest affinities are with A. disticha and Dicksoni. It varies in the degree of compression of the spikes, and also somewhat in size.

A rough sketch of this species is annexed, Tab. CCXXXI. C. Fig. II. A. hematocarpus Or. M». ED.

8 ARECA DICKSONI.

TAB. CCXXXI.

A Dicksoni, Roxb. k M. 3.p. 616. Icones. 14. *. 76. Seaforthia Dicksoni. Mart. Palm. p. 184.

frondibus pinnatis, pinnis linearibus 1-2-pedalibus, pice p r a x i s dentatis, spadicis ramis 4-8, floribus, distichis, mase. sepalis canaliculatis longit-dine petalorum acuminatorum, stamiibus 20-30, f. m. stamiibus sterilibus 6 pice penicillatis, stigmate capitato trilobato, fructibus distichis oblongis.

the height of about sixteen or eighteen feet, with a very straight, simple trunk, of about two feet in diameter.

extremities bifurcate like the ... Leaves pinnate, ... with numerous pinnules ... linear, ribbed, compound retrofracted; ramata from four to eight, alternate, simple, equal, distichous. Spathe simple. numerous, approximate, alternate in two exactly opposite rows, a single ... from six to eight inches

male on each side. three left, divisions subulate, nearly as long as the corolla. Corolla, petals three, cordate,

MALE flowers. Calyx very short. Anthers from twenty to thirty, linear.

with slender tapering compound of three reniform leaflets. Corolla like the calyx. Nectary, composed of six

FEMALE flowers. Style short. Stigma three-lobed. Berry oblong, dry and fibrous, clavate hairy-headed seeds about an inch long, by ... base." (Roxb. l. c.)

HAB.—Mountains of Malabar, where according to *Dr. Dicfoon*, and *Dr. Wightj* it flowers and ripens fruit in August.

"Mr. Dickson, the Surgeon at Bedanore, who first brought the plant under my observation, observes that the nut is used by the poorer people, as a substitute for the common *Areca*, but no other part of the tree is turned to useful purpose." (*Roxb.*)

9. ARECA GRACILIS.

TABS. CCXXXII A.B.C.

A. gracilis. *Roxb. Icones Suppt.* 5. t. 64. *Fl. Ind.* 3. p. 619. *Buck. Hamilt. Comm. in Hb. Amb. Mem. Went. Soc.* 5. p. 311. *Seaforthia gracilis*. *Mart. Palm.* p. 185.

Fruticosa, foliis pinnatim fissis, sub-pedalibus falcatis oblique acuminatissimis, spadice simplici vel 2-3 ramoso undique florifero, spatha 1, fl. masc. calyce minuto, petalis oblique cordatis acutis multoties majoribus, staminibus numerosis, fl. rudimentariis o. stigmatibus infundibuliformi, fructibus ovatis undique insertis.

The description of this species is derived chiefly from specimens without the spathes communicated by Major Jenkins. *

Stem slender, arundinaceous, about eight feet high, six to eight lines in diameter, distinctly and distantly annulate. *Grown* of about five or six leaves, which are about three feet long; *sheath* half foot long; the naked part of the *petiole* is three or four inches long. *Pinnules* about a foot long, two or three inches broad, much and obliquely acuminate; above 2 or 3-keeled: the terminal ones are obtuse, about a foot long, and six inches broad across the sinus, truncate bipartite to the middle, about eight cleft, divisions bidentate, emarginate, or entire and acute.

Spadices generally simple, sometimes twice or thrice branched, six to nine inches long, compressed, bearing flowers on all sides. An annulate scar is situated just above the base of the peduncle, and a second one at the commencement of the pendulous part.

MALE FLOWERS. *Calyx* minute, three cornered. *Petals* three, obliquely cordate, acute, many times longer than the calyx. *Stamina* numerous, shorter than the corolla.

FEMALE. *Flowers* occupying large shallow niches with three toothed margins. *Sepals* broad, round. *Petals* like the sepals, but smaller. No rudimentary stamens. *Ovary* ovate, one celled; *ovule* one, erect. *Style* very short, stout. *Stigma* large, infundibuliform, with ragged edges. (*Roxb.*)

Drupe reddish, ovate, with an attenuated base and blunt point, eight lines long, and three or four broad. *Seed* ovate. *Albumen* highly ruminant. *Embryo* basilar.

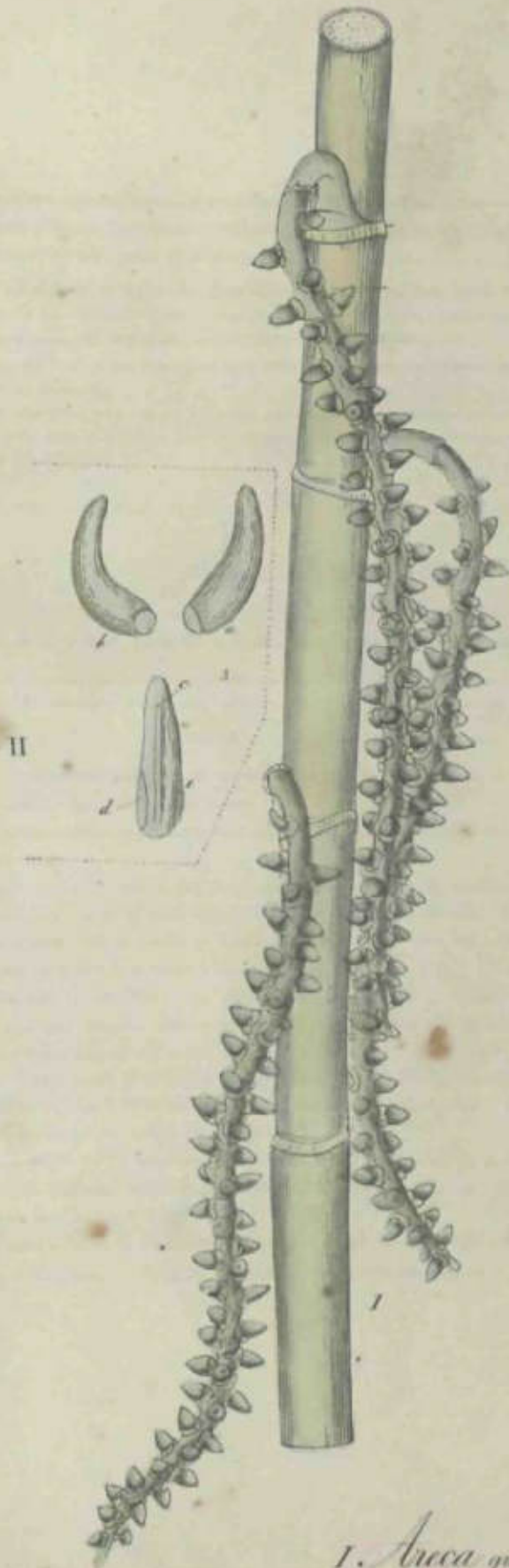
HAB.—Hills near Sylhet, (where it is called *Gooa*, *Supahmd Ramgoa*), Chittagong and the Eastern border of Bengal (*Roxburgh*). Goalparah, (*Buchanan Hamilton*). Assam, where it is called *Girgoa?* (*Major Jenkins*). About Kujoodo, and Ningrew in Upper Assam, where it fruits in January; and in the mountains below Darjeling.



Arcaea guineensis



Areca quadrata Presl



1. *Areca guacalis*

Obs.—I have some specimens communicated by Major Jenkins, and others collected by myself in Assam and on the Khasya Hills, of which I subjoin descriptions, as they either shew a tendency in this species to vary, or the existence of two other nearly allied species.

The *stem* apparently is very slender. *Leaves* scarcely more than a span long; *petioles* 2-3 inches long, triangular, ferruginous scurfy; *sheaths* of the same length; *lamina* cuneate, bilobed to or beyond the middle, 7-8 inches long, 2 broad across the sinus, not coriaceous, lobes obliquely acuminate with twice as many acute teeth at the apex as there are keels.

Spadix with 4 sub-digitate branches, the lowest arising about 2 inches from the base of the peduncle, they are 3-5 inches in length, spreading and not compressed.

Fruits tetrastichous, ovate, attenuate at the base and surrounded by the cup-shaped *perianthium*, 6℥ lines long, 3] broad, distinctly mammillate at the apex; substance thin, fibres tolerably copious. *Seed* one, erect. *Albumen* horny, very much and deeply ruminant. *Embryo* basilar, rather obliquely situated.

io ARECA raSTICHA.

TAB. CCXXXIII. A.

A. *Disticha*, *Roxb. Icones.* 14. t. 77. *Fl. Ind.* 3. p. 620. *Seaforthia disticha*, *Mart. Palm.* p. 184.

Fructifera, foliis bipartitis vel pinnatis, pinnis oppositis acuminatis, spadice simplici vel 2-3-ties ramoso, fl. maso. petalis inaequalibus obliquis cuspidato-acuminatis calycem minutum multo excedentibus, staminibus circiter 15, fl. femine nullis, fructibus ovatis attenuatis distichis.

Stem arundinaceous with distinct subclavate lengthened joints; varying in height from one and a half, to three or four feet; parts lately exposed scurfy.

Leaves rather distant, in the larger specimens four and a half feet long, of which the naked base of the *Petiole* is about six inches.

Pinnules opposite, about a foot long, exceedingly and obliquely acuminate, above three or four-keeled; terminal lobe deeply bipartite, many keeled, truncate and lobed at the apex: the bilobed leaves of the smaller specimens cuneate, forked, twelve or fourteen inches long, and two and a half inches across the sinus, apex obliquely prsemorse, four or five-parted, divisions obtuse, bifid.

Spadix three or four inches long, simple in the smaller specimens, two or three times branched in the larger; *branches* compressed, flexuose, *Spathe* oblong, about four inches long, and one inch broad, acute. *Flowers* closely packed; one female between two males: the former distichous.

MALE *flowers* rather large, angular *Calyx* membranaceous, minute, three-toothed. *Petals* much larger, unequal (one nearly as large as both the others), oblong, oblique, cuspidate-acuminate. *Stamens* about fifteen; *filaments*, short; *anthers* linear. No rudiment of a *Pistillum*.

FEMALE *flowers* with a broad short bract at their base. *Perianth* consists of six coriaceous leaves, about equal in length; the inner (petals) are the smallest. No rudiments of *stamina*. *Ovarium* oblong-ovate; *style* very short; *stigma* large, obliquely discoid.

Fruit spadices three to six inches long, branches slender, flexuose. *Fruit* orange-coloured or red, exactly distichous; one at each flexure, oblong, 6J lines long, 3℥ broad, mammillate-attenuate at the apex, surrounded at the

base by the cup-shaped perianth. *Seed* of the same shape, covered by a chartaceous integument, marked with longitudinal lines along which the integument is inflected. *Albumen* horny, ruminant. *Embryo* minute, conical, basilar.

HAB.—Malacca in dense forests, Ayer Punnus, not uncommon; and Pinang, Malayan name, *Pinang Boorang Paday*. It also occurs in Khasyah mountains, at an elevation of 4000 feet. Moosmai, near Churra Punjee: also I think in Assam.

OBS.—This is closely allied to *A. disticha*, but is distinguishable by the more branched stouter spadix, the tetrastichous fruit, its larger size, and distinctly mammillate apex. The stigma^judging from one abortive pistillum, is also 5-lobed. If the specimens of the leaves belong to the same plant as the spadix, it becomes probable that they are the mature form.

It would also appear to be allied to *A. Dicksoni*, from which it may be distinguished by the absence of sterile stamina, and the small mammillate fruit

This plant varies much in size. Roxburgh describes the branches of the spadix as woolly: his drawing also, represents the petals as acute, not cuspidato-acuminate.

In the Assam and Khasyah plants, the stem and leaves are much the same as in *A. gracilis*. The *spadices* more slender, and 3 or 4 times branched. *Female flowers* distichous, distant. The specimens from Malacca called *Pinang Boorang Paday*, from which the description of the male and female flowers is taken, are of a much larger stature in every respect, the *spadices* also are branched, the fruit much more elongated, and with a tendency to be curved. Further examination may show them to be distinct species.

ii. ARECA PARADOX A.

Fruticosa, nana, foliis pinaatim fissis, planis inaequalibus oblique acuminatis, spadice simplici, fructu subulato curvato (albo) albumine sequabili.

Stem slender, five to seven feet high, three or four lines in diameter, annulate, upwards roughish with ferruginous down. *Crown* consisting of six or eight leaves.

Leaves one and half foot long, and eight inches broad; *petiole* with a long, coriaceous, striate, ferruginously downy *sheath*, above which it is channelled, the lower naked part being about six inches long; *lamina* pinnate, *pinnules* six or eight inches long and very obliquely cuspidato-acuminate, very unequal, with three or four or many keels; terminal unequal at the base, bifurcate to the middle, irregularly toothed, teeth bifid sometimes split.

Spadix issuing from the stem below the crown, simple, four or five inches long, obtuse, pendulous, glaucescent.

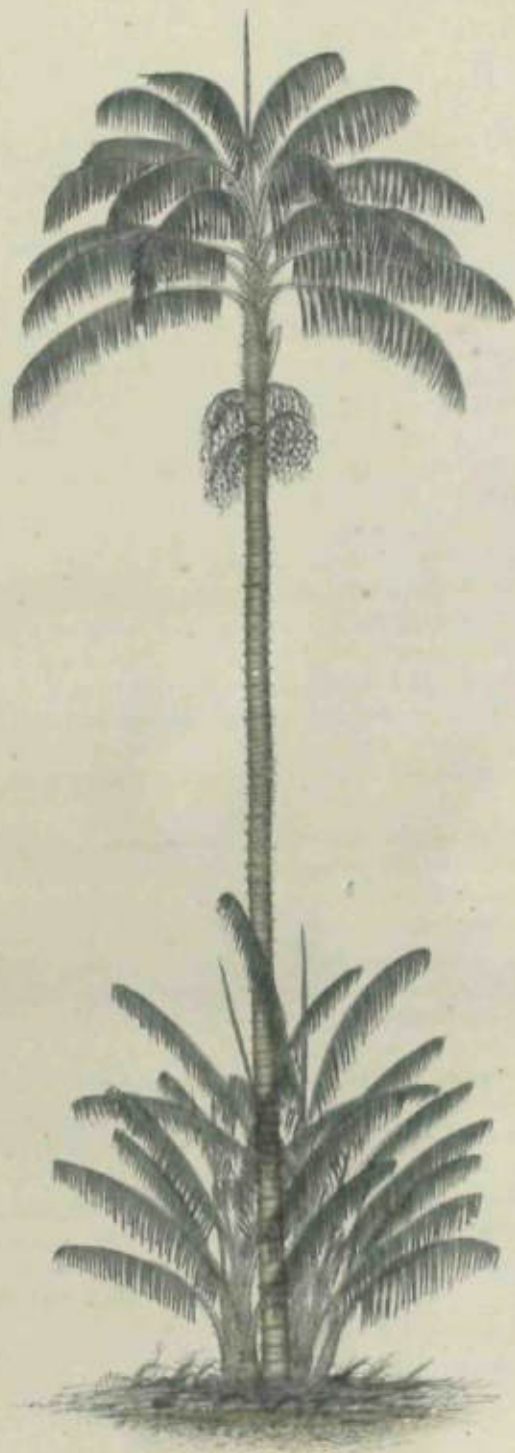
Fruit distichous, suffulted by a minute but broad bract, and by a double cup, (calyx and corolla) of six round imbricate broad scales. They are of a white colour, obtusely subulate, eight lines long, and one and a quarter in the diameter of the widest part or just above the base, curved in shape, and of a fibrous substance.*

Seed one, conformable; *tegument* very thin membrano-cellular; *raphe* of three fascicles, the central one reflexed near the apex of the seed, becoming confluent with the longer of the lateral vessels; the shorter one reflexed about the middle of the dorsum. *Albumen* solid, horny, slightly furrowed along the course of the vessel. *Embryo* minute, basilar, conical.

* Tab. CCXXXH. Fig. HI. a, fruit; b, Embryo, c, raphe, d, longer lateral vessel, e, shorter ditto.



Areca disticha



Arca togillaria

B.—Dense forests near the base of Goonoong Miring, Mount Ophir; in fruit February, 1841.

HAB.—The specimen is scarcely distinguishable, except in the form and structure of the fruit and seeds, from

Th t structure however is so different as to suggest the probability of its constituting a new genus.

12 ARECA TIGELLARIA.

TAB. CCXXXIII. B.

A. tigillaria. Jack. Mai Misc. (Calc. Journ. Nat. Hist. 4. p. 12 J

Arhorea, pinnis bipedalibus penanun, i, gpa tha exteriore pedunculoque armatis, interiore subiuermi, fioribus diatantibus, s«pe 1 faemineo 1 masculo,
 A. s. in setas subito attenuatis, fructibus globuli sclopeti minoris magmitudina.

This is a very elegant *Trunk* thirty or forty feet high, distinctly annulate, armed, surrounded with
 at the base. *Crown* dense and graceful.

Leaves pinnate, ten or twelve feet in length; *petiole* roundish, armed, upwards very scurfy; *pinnules* about two

the base very much acuminate, pendulous, coriaceous, many-veined, the principal keel
 underneath bearing scales attached by their middle.

above exc of lately fallen leaves; *peduncle* slightly armed; branches many, long, undulately

Spadices arise from the axm* simple with a rudimentary &racf at the base of the lower ones,
 the lower ones divided, tuc u

Snathes (complete) two, Doai-biiay* ,
 the dorsum, especially about the carinae; the inner almost unarmed, but more
 whitish ferruginous scurf, armae

f and velvety to the touch.
 scurfy, anu female between two males, or in pairs consisting of one male and one female, the former

Flowers crowded, ong

the more advan
 the anticous one* the largest. *Petals* three, valvate, coria-

MALE flowers. *Stamens* six; *filaments* short, stout, cohering slightly

ceous, suddenly acu
 with the petals: *stamens* large,

leaves which are
 flowers suffulted by
 FEMALE flowers *stamens* three or none. *Oranm* roundish, of the

ceous. *P*als* larger
 size of a smau p*
 Spadix oi
 appearance.
 the apex on oi

branches one or two feet long, pendulous, purplish-sanguineous, with an articulated

of a small musket ball, surrounded at the base by the perianth, marked towards

in the centre the remains of the stigmata, *endocarp* fibres few, thin. *Seed*

at below the areoia,
 appense just
 thin, scarcely sep

Albumen horny, deeply ruminant. *Embryo* oblong-conical, basilar.
 d- swamps, Malacca where it is common. Malayan name, *Nibong*. Also in

HAB.—On the borders of way

forests at Lainea
 OBS.—The trunk
 that the flowers are

of house-posts. Jack (1. c.) says, that there is only one
 females, but that Author does not notice any obliquity of the fruit,

spalbe, and

13 ARECA HORRIDA.*

TAB. CCXXXIII. C.

A. Nibung.f Mart. Palm. t. 153, f. V?

Arborea, pinnis 2-3 pedalis patentibus spathis pedunculoque spadiceis armatissimis, floribus congestis, faemineo inter duos masculos, petalis lanceolato-oblongis in setas attenuatis, fructibus globuli sclopeti majoria magnitudine.



The description of this species is derived partly from dried specimens, but perfect spadices at the time of opening of the spathes were not seen. It is an elegant Palm, thirty or forty feet in height, sending off offsets at the base.

Trunk. • This is annulate, and the spaces between the rings are much armed. *Crown* rather thin.

Leaves spreading in every direction, fourteen or sixteen feet long, five feet broad; *sheaths* leathery, much armed, two feet long; *petiole* bearing pinnules nearly from the base, green, stout, flattened at the base, compressed at the apex, otherwise trigonal, covered with brown irregular scales, armed throughout, but especially underneath, with black-brown flat not very strong spines; *pinnules* alternate or sub-opposite, nearly linear, two or three feet long, subulate-acuminate, coriaceous, dark-green, above keeled along the centre, with two lateral plaits on either side, spreading or oblique, never pendulous, as in *A. tigillaria*; a few scales attached by the middle extend along the central vein underneath. *Threads* very fine, pendulous and at length become deciduous.

Spadix axillary; *peduncle* stout, yellow, flattened at the base, much armed on the spaces between the insertion of the spathes, above these unarmed; *branches* pendulous, flexuose, about equal, two or three times branched or simple, one or two feet long, each suffulted by a yellow bract with a broad base, the upper of which degenerates into scales.

Spathes complete two, acutely margined, coriaceous, armed with rather thick brown-black spines, 1 or 1½ foot long, of a greenish colour outside when mature, yellow and polished inside: the inner one is furnished with a stout, unarmed cuspis; and incomplete also two in number, cuspidate, armed, and very unequally conduplicate. *Flowers* about four-ranked, inserted just above a protuberance of the branch of the spadix; lower ones, one female between two males, upper males in pairs.

MALE. *Calyx* of three imbricate, carinate, sepals sub-membranaceous. *Petals* three, valvate, subulate or almost setaceo-acuminate. *Stamens* six, sagittate. *Rudiment* of a *Pistillum* rather large, of three, sometimes two, imperfect carpel-leaves.

FEMALE. *Calyx, sepals* roundish-cordate, imbricated. *Corolla* conical in the bud. No rudimentary *stamens*? *Ovarium* of one large complete carpel, and two incomplete ones*. *Style* none. *Stigma* (of the perfect ovule-bearing carpel) linear, running nearly half way to the base of the ovarium. *Ovulum* anatropous.

A third species of the section *Euoplus*, with the habit of this species but smaller, is common on the cliffs of the sea-shore a little to the North of Kowloon, near the ... it is not seen in flower or fruit.
f This name is untenable, the true Nibung being *Areca ilibri* JACK.
} This is the general character of the armature.
f There are ... evidently volcanic.



- *Hity/ horrida* Griff

Microseris horrida Griff

spadice of the fruit; branches two or four feet long, pendulous, without spathes, each suffulted by a coriaceous acuminate broad-based bract. *Fruit* sessile, about the size of a musket-ball, of purplish-black colour, surrounded at the base by the perianth, oblique, the true apex pointed out by a conspicuous mammilla on one side near the middle; *epicarp* coriaceous /fibres very few: *endocarp* membranous. *Seed* round, appense pendulous, attached by a broad base, whitish-brown, reticulate with white veiny lines; *hilum* large, with a tendency to have an entering process. *Albumen* horny, deeply ruminant. *Embryo* not observed.

HAB.—Malacca. Common in densely wooded valleys and ravines, at Ching, and on wooded hills, at Laydang Soobubi, but rare.. In woods at the base of Battoo Bakar. Malayan name, *Bhyass*.

OBS.—This species is allied to *A. tigillana*, but is very distinct in the spathes and fruit. The flowers also are much more crowded, and generally appear to have the usual arrangement; viz. one female between two males. The young spadices (from the contrast in colour between the spathes and their spines and the waviness and adpression of these) have the appearance of tortoise-shell.

XIII. BENTINCKIA.

Berry MSS. *Roxb. Fl. Ind.* 3, p. 621. *Mart. Palm.* p. 229. t. 139. *Endl. Gen.p.2S* No. 1749. *Kepleria*.
Mart. Endl. Gen. I. c. No. 1750. (e Martio).

GENERIC CHARACTER.

SPATHES 2 or more the inner one complete. FLOWERS monoecious, in distinct spadices or seldom polygamous, immersed in niches, the masculine alternating in rows with solitary feminine. MASC. STAMENS 6. FJ3M. OVARY trilocular. OVULE 1. BERRY oblique. STIGMA nearly sessile. SEED sulcate. ALBUMEN solid. EMBRYO basilar.

i BENTINCKIA CODDAPANNA.

Bentinckia Coddapanna, *Berry MSS. in Roxb. Fl. Ind. I c. Mart. Palm. I. c.*,

Truocus tenuis, arundinaceus, annulatut, frondes pinnate spadix infra folia erumpens, paniculatum ramosiu, rubesce/is, flores parvuli, compage svbglumacea, rubentes, bacce purpurascetes, parvula.

The description of this species is here chiefly derived from Prof. Martius and Dr. Wight as well as from portions of leaves and some immature spadices for which I am indebted to the last named author. It is an elegant, slender palm, about twenty feet high. The *trunk* is about an inch in diameter. *Pinnules* linear, two feet; or more in length, nearly an inch broad, much acuminate, rigid, closely inserted, generally split at the point into two exceedingly narrow triangular portions, two to four inches long, the fissure often bearing a thread; above about three-keeled, the mid-keel below furnished with paleae.

Spadices one, or one and a half foot long. *Spathes* membranaceous; the outer being one or two in number, short, truncate, incomplete, longitudinally striate. *Common peduncle* two or three inches long, of violet colour towards the base, *branches* few, each with a membranous broad semi-amplexicaul bract, three or four times divided; of the female simple, generally only with two divisions. Colour of the male spadices scarlet, of the female pale lilac or violaceous. *Spikes* six inches to a span in length, subfastigate.

MALE *flowers* disposed in rather loose spires, immersed in niches, which are at first nearly closed, afterwards opening vertically. In each niche are two, three, or even four flowers, with occasionally a female in those towards the base of the spikes, the upper ones opening first. An ovate-triangular *bract* is situated under the lowermost flower; and a small *bracteole* bearded on the upper margin is situated on the outer side of the upper ones. *Calyx* about a line long, *sepals* glumaceous, oblong, concave, rather obtuse. *Petals* nearly twice the length of the calyx purplish, ovate, rather acute, valvate. *Stamens* six, included; *filaments* subulate; *anthers* ovate, subcordate. *Rudiment of the Pistillum* subtriangular, nearly as long as the stamens.

FEMALE *flowers*. *Perianth* subglumaceous, imbricate, striately-veiny. *Filaments* without anthers. *Ovarium* ovate three-celled. *Style* almost wanting. *Stigmata* three, triangular.

Berry ovato-globose, rather compressed, six or seven lines long, surrounded at the base by the perianth, bearing the stigmata near the base. *Seed* sub-globose, brown, with a rather deep complete furrow, and several other shorter ones. *Testa* obscurely chesnut-coloured, with veins arising from the groove near the embryo, and converging towards the base on the opposite face. *Albumen* solid, horny. *Embryo* basilar, conical, nearly a line long.

HAB.—I* i mountains, Travancore. {*Roxburgh* and *Wight*}. Flowers in June, seeds ripen eight or nine months afterwards. Telinga name, *Codda-panna*.

OBS.—Martius describes the petals of the male flowers as equal in length to the sepals, and the perianth of the female, as similar to that of the male. This last, which attributes a valvate corolla to the female flower, I do not find to be correct, and in the plate quoted, the petals of the male are represented as I have described them.

This Palm was re-introduced during my superintendence of the Honourable Company's Botanic Garden, from Travancore, through the kindness of Dr. Wight and Mr. Thomas the Collector of Tinnevely.

XIV. SLACKIA.

GENERIC CHARACTER.

FLOWERS monoecious immersed in niches in the same spadix. FEM-
INE situated below, either solitary or along with a masculine. MASCULINE-above in pairs. STAMENS 6,
filaments united at the base. Ovary 3-celled with one ovule, STIGMATA sessile. DRUPE very
oblique. EMBRYO basilar.

AT BUMEN horny, simply ruminated. Malayan Peninsula, resembling *Geonoma*, having the leaves pinnately divided, and
Shrubby palms

HABIT. Cespitose axillary drooping. SPIKES simple, often two in number, but sometimes
without any rachis. DRUPE blackish purple, obovately oblong.

RS sub-glumaceous, waxy. This genus is nearly allied to *Bentinckia*, but differs from it in the spathes and ruminated Albumen. The

OBS.—Amey, 5. This genus is nearly allied to *Bentinckia*, but differs from it in the habit of *Geonoma*, from which genus it differs in the connate colum-
nately divided, and the

leaves are likewise pinnately divided, and the divaricate cells of the anthers, in the basilar style, and the even albumen.
Henry Slack, a botanist of great promise, who was unfortunately cut off

Bi is named in honour of the late
from life at an early age-

i SLACKIA GEONOMJIFORMIS,

TAB. CCXXXIV.

The *stem* is slender, two to four feet high, about half inch in diameter, and distinctly annulate.

Leaves pinnately split, three, or three and a half feet long, and one, or one and half broad, outline linear-oblong; the *sheaths* are striate, and about a span long; the naked base of *petiole* is about a foot long, and scurfy pubescent.

The *pinnules* are a foot or more in length, obliquely acuminate and nearly entire, or obliquely pramorse and eroso-dentate, varying in breadth from half an inch to two inches, with two or more keels according to the breadth; terminal bilobed, lobes broad, eroso-dentate; threads very fine.

Spathes about two, incomplete, leathery membranous, the lower one bicarinate; the upper twice as long, conduplicate, open, interiorly to about its middle, like the spadix covered with brown pubescence. *Spadix* nodding, generally dichotomous, sometimes racemosely branched; a scale-shaped scurfy pubescent acute bract at the base of the divisions. *Spikes* roundish, rather thick, of a spongy aspect, six or ten inches long.

Flowers partly immersed in niches with fimbriate membranaceous margins.

MALE flowers in pairs, tribracteate. *Sepals* three, oblong-concave, striate, sub-coriaceous. *Petals* valvate, ovately-lanceolate, sub-acute, coriaceous. *Stamens*- six; *filaments* stoutish, united at the base, upper part inflexed in aestivation; *anthers* large, linear-oblong, two-celled, versatile. *Pollen* one-plicate. *Rudimentary Pistillum* angulately sulcate, conically cylindric, stout, with a discoid three-lobed apex.

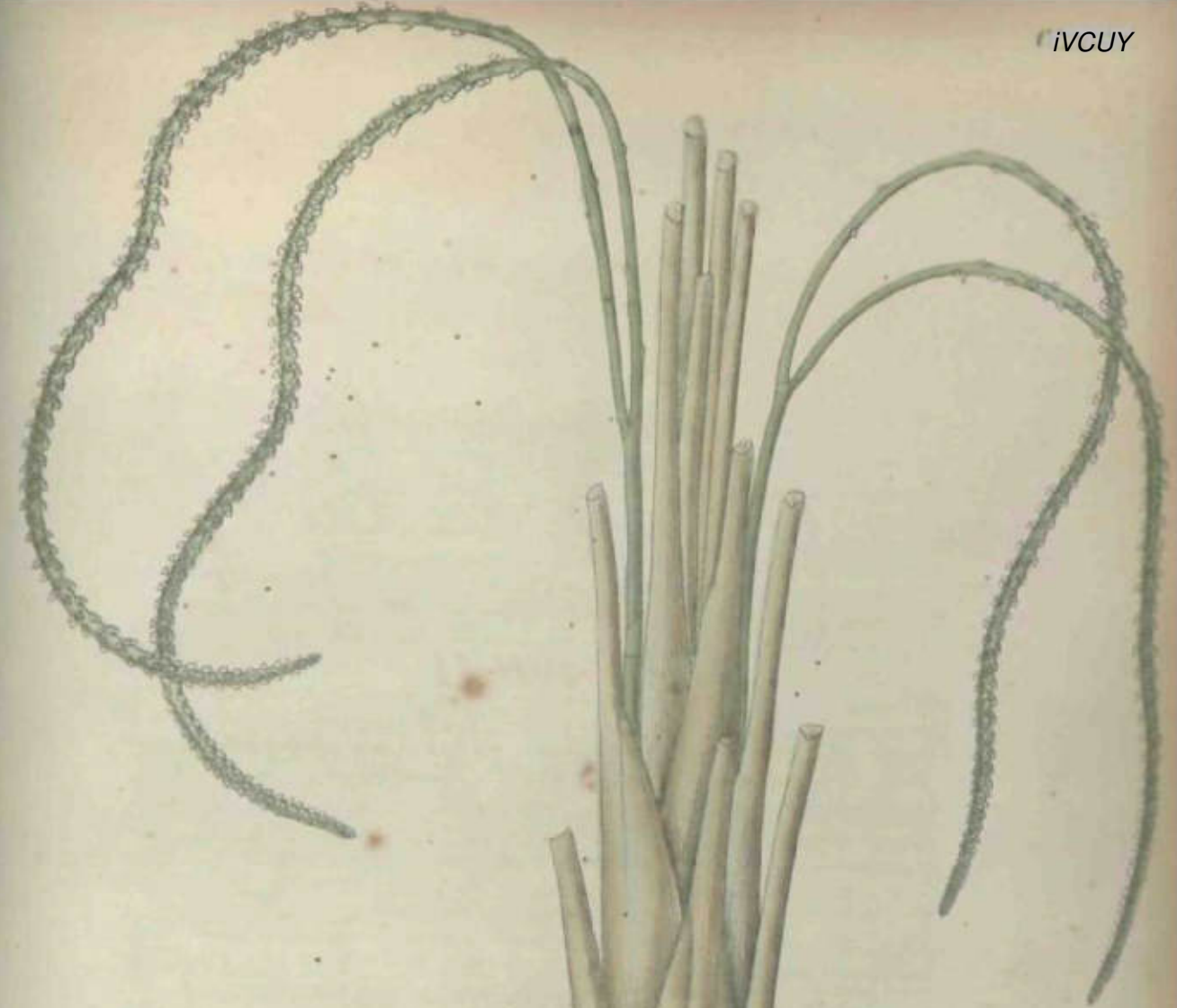
FEMALE flowers in the lower part of the spikes, tribracteate. *Sepals* as in the male. *Petals* broad, with a short broad point, imbricate. Six *rudimentary stamens*. *Ovarium* roundish, gibbous on one side, attenuated into a short stout style; with one cell on the gibbous side, containing one appense-pendulous ovule. *Stigmata* three, ovate, small, spreading or recurved.

Fruit spadix elongated, one, or one and a half foot long, presenting at the base the remains of the spathes, nodding; *peduncle* compressed or sub-trigonal. *Fruit* sub-drupaceous, oblong obovate, five and a half to six lines long, four wide, surrounded at the base by the perianth, very oblique, presenting the style on one side near the base. *Seed* erect, obovate roundish; *tegument* membranaceous, inflexed along simple lines, which are visible on the surface of the seed, converging towards the foramen. *Albumen* horny, simply ruminant. *Embryo* basilar,

HAB.—Forests, Ayer Punnus (Rhim) near Malacca, rather common. In flower and fruit in July, Malayan name, *Pinang Rambah*.

OBS.—It is scarcely distinguishable at first sight from *Areca disticha*, and like it, varies much in the size and shape of the pinnules.

I have placed both this and *Bentinckia* in *Arecinm*, as the bulk of their affinities seems to me to indicate. I cannot perceive the necessary affinity between any of the genera arranged in Endlicher's *Genera Plantarum* as pinnate-leaved *Borassina*, and the true genera of that sub-family.



Stackia g. ~~multisp.~~ II

XV. AKENGA.

(Areng.) *La Billardiere Mem. V Instit.* 4. p. 209. (Martius). *Mart. Progr.* p. 23. *Palm.* p. 193. t 208. *Endl. Fl.* 248. No. 1734. *Saguerus* (vel *Gomutus*). *Rumph. Hb. Amb.* 1. p. 57. t. 13. *Roxb. Icones.* 14. f. 81. *Fl. Ind.* 3. p. 626. *Borassus.* *Lour. Fl. Coch.* p. 67. ex. pte. *Gomutus. Spreng. Gen. PL* p. 450. No. 2222.

GENERIC CHARACTER.

FLOWERS moncecious, generally but not always in different spadices. **STAMENS** indefinite. **OVARY** trilobular. **BERRY** depressed and three-cornered at the apex, imperfectly three-lobed, three-seeded. **ALBUMEN** even. **EMBRYO** dorsal.

HABIT.—Handsome arboreous palms flowering only once, seldom with creeping stems. **TRUNK** ringed, towards the apex surrounded by the scaly bases the petioles. **LEAVES** pinnate with copious black rigid fibres intermixed with the petioles. **PETIOLES** sometimes prickly. **PINULES** linear fasciculate and in several rows, or solitary and in two rows with auriculate or lobed base, and eroded, truncate, dentate or bilobed apex, lower surface white. **SPADIX** nodding pendulous. **SPIKES** pendulous often in bundles (fastigate) like the tail of a horse. **FLOWERS** large. **ANTHERS** mucronately apiculate. **BERRIES** green, round and large. **SEED** (cohering to the endocarp) often berried. **JUICE** acid.

i. ARENGA SACCHARIFERA.

TAB. CCXXXV. A.

A. saccharifera. *Labill. Mem. VInst. Lam. Enc. Suppt. 1. p. 441. Mart. Palm. p. 191. t. 108. Sagerus s. Gomutus. Rumph. Hb. Amb. I. p. 57. t. 13. Sagerus Rumphii. Roxb. 3. p. 626. Borassus Gomutus. Lour. fl. cock. p. 648. Gomutus saccharifer. Spreng. Syst. 2. p. 624.*

Elata, petiolis inermibus, pinnis fasciculatis 4-5 fariis lineari-ensiformibus basi utrinque auriculatis (auricula inferiore longe producta) apice bilob et varie dentata.

This is a handsome palm, reaching to the height of thirty or forty feet. *Crown* oblong, very dense, of a sombre aspect.

Leaves very large, twenty feet (or more) long, and ten broad, outline oblong-ovate. *Petiole* very stout, channelled at the base, sprinked with blackish scurf.

Pinnules generally fasciculate, four or five farious, the middle ones five feet long, four, or four and a half inches broad, linear-ensiform, coriaceous, dark green above, underneath white, margins with distant spinescent teeth, towards the apex becoming more frequent; apex itself bilobed or bifid, eroso-dentate; base with one, or generally two unequal auricles, of which the lowermost is much the longer.

MALE *spadix* four or five feet long. *Spikes* attenuate at the apex, and there furnished with a few rudimentary or abortive flowers. *Flowers* very numerous, oblong club-shaped, of a rich purple black colour, and a disagreeable smell, of considerable size, often an inch long. *Sepals* three, rounded, broad. *Petals* nearly three times longer, oblong obovate. *Stamens* 00; *filaments* short and slender; *anthers* nearly as long as the petals, aristato-mucronate.

FEMALE *flowers* solitary, large, about an inch across. *Sepals* three, very broad. *Petals* three, cordato-ovate, coriaceous. *No sterile stamens.* *Ovarium* shortly obturbinate, three-celled, apex three-lobed, concave in the centre, whence arise three tooth-shaped, triangular, erect *stigmata*; substance thick, fleshy. Down the back of the lobes which are opposite the sepals, runs a slight keel. *Ovula* erect.

Fruit oblong-round, 2 to 2½ inches long, surrounded at the base by the perianth; apex flat or nearly concave, marked with three lines, running from the backs of the persistent stigmata to the now nearly obsolete lobes; outer substance coriaceous, thick, inner berried-cellular, gelatinous, adhering for the most part to the seeds, abounding in raphides. *Seeds* dull black, convex on the outer, bifacial on the inner face, and attenuate at the base. *Albumen* horny, cartilaginous. *Embryo* so eccentric as to point almost to the junction of the bifacial side.

HAB.—Malacca Province, generally cultivated, but less common in the littoral districts. It is the *Anowe* of the Malays. It succeeds sufficiently well in the H. C. Botanic Gardens, flowering throughout the year.

OBS.—This is one of the handsomest and most useful Malayan Palms. It is very commonly cultivated in the interior, at Malacca in lines of trees recalling to mind the form of gothic arches. The parts chiefly employed for useful purposes are the black fibres forming the rete, the juice, and the young albumen; the former are twisted into ropes or cordage, renowned for its power of resisting wet; the juice is either drank as toddy or made into sugar, which appears to be in great demand. The young albumen preserved in syrup forms one of the well-known preserves of the Straits. Mr. Lewis informs me, that trees that have died after the ripening of the whole crop



*t^w&na&j**haufna*

of fruit, which is the natural course, are almost hollow, and particularly adapted for making troughs, spouts or channels for water, and that they last extremely well under ground.

In short it is so valuable a palm, that it early attracted Dr. Roxburgh's attention, who introduced it largely, The natives of Bengal however have never taken to it, preferring the coir of the cocoa-nut, and the toddy and sugar of *Phoenix sylvestris*. The following are Dr. Roxburgh's words.

"With respect to the various and important uses of this most elegant palm, I have nothing to offer myself, but refer to what Rumphius and Marsden have written on the subject. At the same time, I cannot avoid recommending to every one who possesses lands, particularly such as are low, and near the coasts of India, to extend the cultivation thereof as much as possible. The palm wine itself and the sugar it yields, the black fibres for cables and cordage, and the pith for sago, independent of many other uses, are objects of very great importance, particularly to the first maritime power in the world, which is in a great measure dependent on foreign states for hemp, the chief material of which cordage is made in Europe.

From observations made in the Botanic Garden, well grown, thriving trees produce about six leaves annually, and each leaf yields from eight to sixteen ounces of the clean fibres.

In the same garden are now (1810) many thousand plants, and young trees, some of them above twenty years growth, with trunks as thick as a stout man's body, and from twenty to thirty feet high, exclusive of the foliage. They are in blossom all the year; one of them was lately cut down, and yielded about 150 pounds of good sago meal." *fRob. op. citj*

2 ARENGA WESTERHOUTIL

TABS. CCXXXV. B.C.D.

Petiolis inermibus, pinnis alternis bifariis linearibus bus! uni vel ex-auricuiatis apice exattenuato truncatis sgpius bilobis et varie dentatis.

The description of this species is derived from an entire specimen of a young palm, procured from Naning by Mr. Westerhout, two male spadices, and several specimens of female flowers and fruits. It is a palm of about the size of the preceding.

Leaves ample, linear-oblong in outline, twenty feet long, ten feet across in the broadest part; *rete* as in *A. saccharifera*.

Pinnules sessile, about five feet in length, three inches broad, alternate or sub-opposite, solitary, bifarious, very spreading with deflexed points, attenuate towards the base; the upper ones alone auriculate at the lower side, coriaceous bright green above, white underneath; and together with the petiole, scurfy towards the base; margins with irregular spinescent teeth; apex praemorse, dentate and erose, sometimes bilobed.

Spadix curved-pendulous. *Spathes* fibrous, coriaceous, often split. *Spikes* about level topped.

MALE *flowers* in pairs, without an interposed rudimentary female, or solitary, with a rudimentary female. *Calyx* cup-shaped, *Petals* oblong, fuscous-purple. *Stamens* numerous; *filaments* short, subulate; *anthers* with mucronate or aristate ends. *Pollen* hispid, with a longitudinal fold.

FEMALE *flowers* solitary, sessile. *Sepals* broad. *Petals* three, cordate, concave, obtusely carinate. *Ovarium* roundish, trigonal, (angles opposite the sepals), depressed at the apex, and there marked with three lines running from the angles to the stigmata, which are three in number, tooth-shaped, and connivent, so as to form a cone.

Fruit roundish, about the size of a small apple, with a depressed three-lobed trigonal vertex, terminated by the sphacelated stigmata, surrounded at the base by the perianth, two or three-celled; outer substance thick, fibrous-fleshjr. *Seed* separating with the thick gelatinous-cellular endocarp, of black colour; when, three, convex-bifacial. *Embryo* oblique, and situated in the centre of the dorsal face of the horny *albumen*.

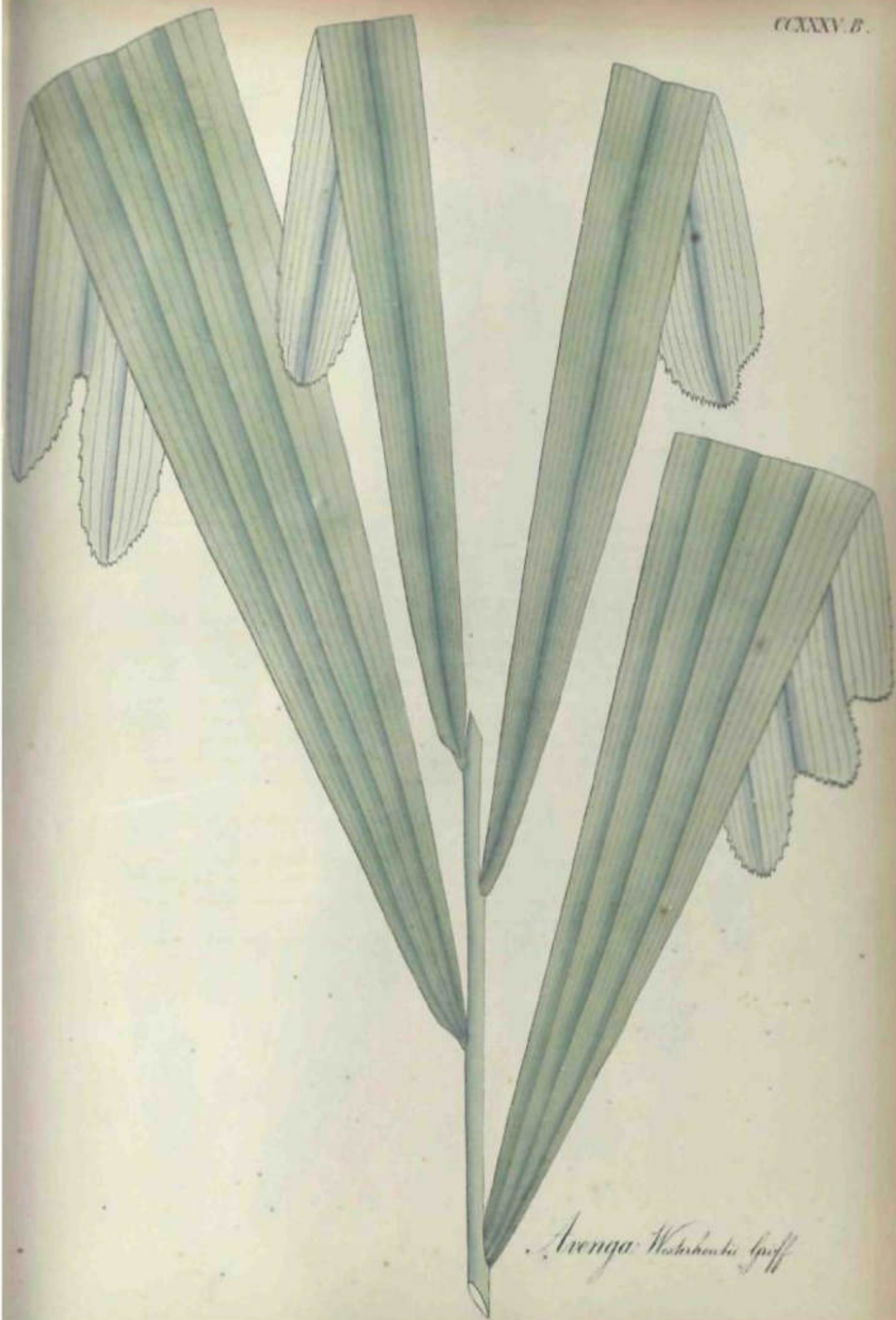
HAB.—Malacca Peninsula at Naning, Mr. Westerhout. Penang. Mr. Lewis. Malayan names, *Attorn kutaree*. (Malacca); *Langkup* (Penang).

OBS.—Not having seen this palm growing, I am unable to say any thing regarding its habit, The chief difference from *A. saccharifera* is in the leaves. *A. obtusifolia*, Bl., has the petioles furnished with marginal aculei.

The *Langkup* of Penang may probably be distinct, the pinnse being smaller and more truncate, the branches of the fruit spadix spreading, short, and the fruit larger and more oblong.

I am not aware of its being applied to any use. I have Mr. Westerhout's authority for stating it to be quite local, being only found in one place, although there abundant.

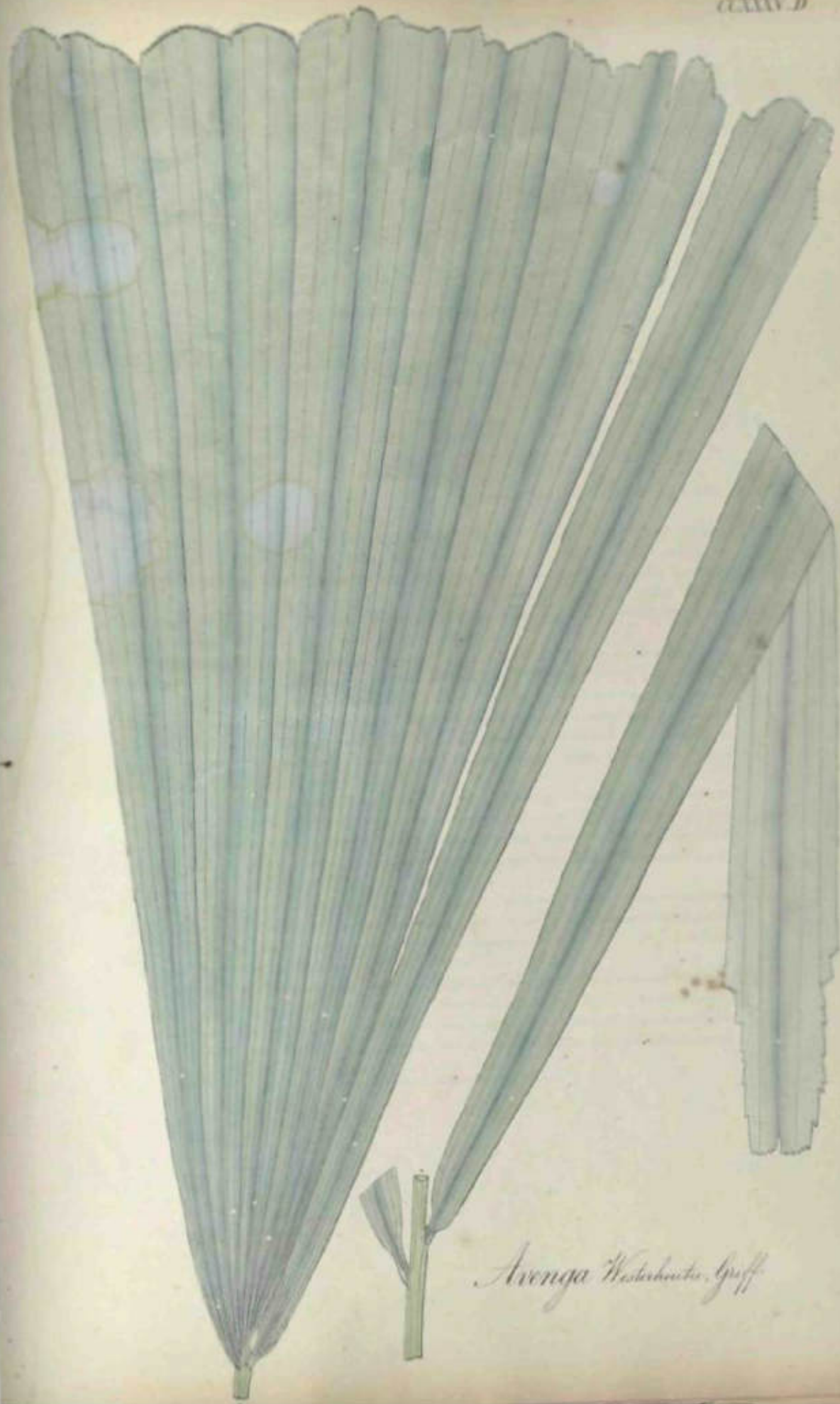
—————



Arenca. Watschbentii. Griff



Arenga Westerhoeki Griff.



Avoucaea Westerhoutii, Griff.

3 ARENGA WIGHTII.

TAB. CCXXXV. E.

~~Sebol~~ era, runco humili 3-8 pedali, petiolis inermibus, pinnis altemis linearibus basi bi-auriculatis (auricula inferiore maxima) apice attenuate erosio maequaliter bilobis, spadice ramis suffastigiatis, fl. fem. staminibus sterilibus pluribus, semine venoso, embryo supra medium.

The description of this species is derived from specimens consisting of portions of a leaf; an entire male, and female fruit spadix, communicated by Dr. Wight, with a letter describing the habit, together with a drawing of the male spadix, male and female flowers, and a fruit-bearing branch.

It is a monoecious palm, forming by means of suckers dense clumps. *Trunk* stout, as thick as man's thigh, generally three to five feet high, rarely eight feet.

Leaves eighteen to twenty-eight feet in length; the lower naked part of the *petiole* is six or eight feet long.

The *pinnules* are alternate, crowded, linear ensiform, three, or three and half feet long, and one and half, to two inches broad, white underneath, with two large auriculae at the base, the lower of which being very large indeed, 1½ to 2 inches long, obliquely overlying the petiole, with a few distant teeth from the middle upwards; apex attenuate, unequally bi-lobed, erose; the terminal lobe is narrow-cuneate, two, or three-lobed, base shortly bi-auriculate, apex truncate, lobulose, cuneate, and jagged-dentate.

Spadices decurved pendulous, about four feet long; *peduncle* before branching, about two feet long, and quite concealed & by the sheathing imbricate lacerate spathes.

MALE; *branches* or spikes about two feet long, sub-fastigiate, slender. A scale-shaped *bract* at the base of each. *Flowers* rather distant, (altogether forming a rather thin mass of inflorescence), rather large, in pairs, with a vertical scale interposed. The *calyx* consists of three roundish imbricate sepals, with thick bases. *Petals* three, oblong, very thick and coriaceous. *Stamens* 00; *filaments* short; *anthers* linear, adnate, terminated by a longish subulate point. No rudiment of a pistillum.

FEMALE; *branches* of the *spadix* attenuate towards the ends, where they bear rudimentary flowers. *Flowers* solitary, under each is a shallow entire or bi-lobed cup. *Sepals* broadly cordate, small. *Petals* roundish-cordate, acute or cuspidate. *Abortive stamens* several.* *Ovarium* roundish, three-celled. *Styles* three, short, recurved. *Ovula* solitary. *Fruit* crowded on the lower halves of the stout spikes (the upper halves naked), about the size of a crab-apple.

Seed convex on one face, and unequally bifacial on the other, separating easily except at the base, from the black papery endocarp, brown, surface conspicuously marked with slightly branched veins, converging at the apex of the seed. *Albumen* horny. *Embryo* on one edge of the convex face, above the middle.

HAB.- -Dense forests on hills about Coimbatore, Dr. Wight.

OBS.—This species approaches in its inflorescence closely to *A. Westerhoutii*. The main differences from it seem to regard the pinnules, which are attenuate and bi-lobed at the apex, (not as in that species undiminished or even wider and more or less truncate, and ex-auriculate at the base), and the seeds. It also disagrees in stature with the *forego*ⁱⁿ₀₁, in which respect it differs from *A. saccharifera*, as it also does in the solitary pinnules and the veiny seeds.

* In flower shortly after fecundation, however, I find none.

I believe it is the first species hitherto found on the continent of British Indiji; it is dedicated to Dr. Wight its discoverer, to whom Indian Botany is so deeply indebted.*

* I subjoin a short description of another species observed in the second Kiouk-dweng, or mountain defile of the Irawaddy.

Stem stout, 10-15 feet high, covered with the bases of the petioles. *Leaves* 10 feet long; *rete* scanty, stout, with very long, black twig* like processes; *pinna* ensiform, 2-2½ feet long, 1½ inch broad, white underneath bi-auriculately lobed at the base, the lower lobe very large and decurrent. *Spadices* ample, nodding, pendulous.

HABIT.—In densely shaded places of the second Kiouk-dweng, or rocky defile of the Irawaddy in descending that river from *Uogm*, 7th May, 1837.

OBS. - This is the most northern species of the genus. In the same locality *Orophea*, *Dillema*, *Heematospermum*, *Campanula*, and *Esculus*, were noticed.

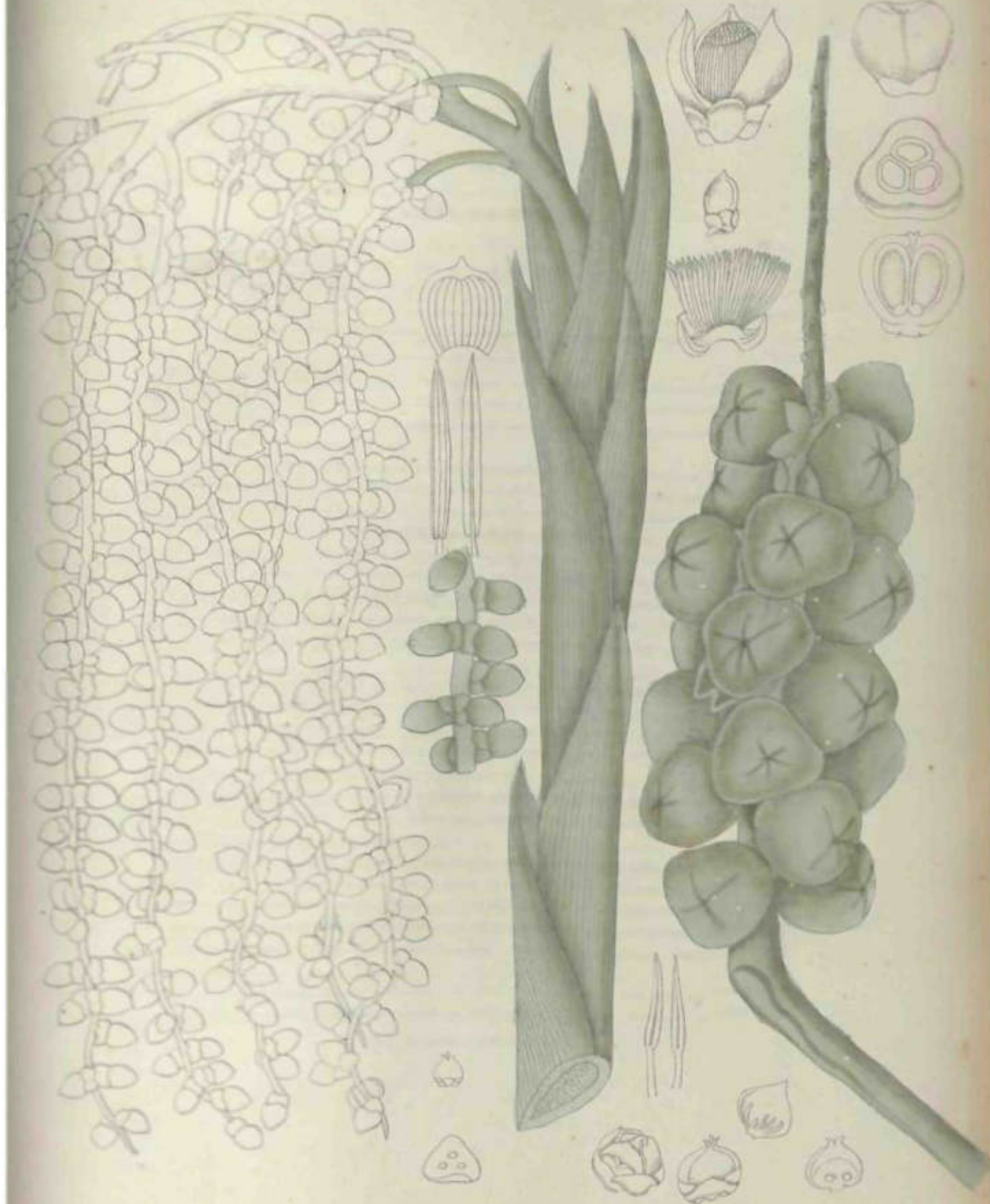
XVI. CARYOTA.

Linn. (*Mus. Cliff*, p. 12) *Gen. PI ed. Sta.* p. 517. No. 1228. *ed. Schreb.* p. 779. No. 1701. *ed. Spreng.* p. 449. No. 2218. *Juss. Gen.* p. 38. *Gart Sem. et. Fruct.* 1, p. 20. t. 7. *Roxb. Icones.* 14. t. 80. *Fl. Ind.* 3. p. 624. *Jacq. Frang. Bot.* p. 20, t. 12, l. 1. *Lam. Illustr.* (t. 897) *J. Marti Progr.* p. 18. *almæ. d.* 193. *. 107. 701, (bad), t. 162, (bad)- (*Tab.* 5, l. 1, *tab.* Y, l. 1, 2). *Endl. Gen.* p. 248. No. 1735. *Seguaster Major, Rutnph. Hb. Amb.* 1. p. 64. *. 14. *Schunda-pana, Rheede Hort. Mai.* 1. p. 15. t. 11.

GENERIC CHARACTER.

FLOWERS monoecious, one feminine between two masculine. STAMENS indefinite. BERRY somewhat dry, often one-seeded. ALBUMEN ruminated. EMBRYO dorsal.

HABIT.—Elegant palms often lofty, frequenting woody mountains, and flowering but once, sometimes perennial. TRUNK closely ringed. LEAVES bi-pinnate, large, reticulated, fibres slender. PINNULES wedge-shaped, obliquely eroded, on both sides of the same colour. SPADICES nodding, pendulous. SPIKES pendulous, often hanging down in bundles like the tail of a horse. FLOWERS feminine with 3 rudimentary stamens. BERRIES subglobose somewhat red. JUICE sour.



Aconitum napellus L.

i- CARYOTA URENS.

C. urens. Linn. *fl. zeyl.*, r 187. No. 396. Willd. *sp. Pl.* 4. p. 493. Gert. *fruct. et. sem.* 1. p. 20. t. 7. Roxb. *Icones.* 14. t. 80. FJ. *Ind.* 3. p. 625. Mar*. *Palm.* p. 193. f. 107. t. 108, (indifferent), *. 162, (very bad). *Schunda-pana.* Rheede. *Hort. Mai.* \p. 15. t. 11.

Arborea, pinnulis coriaceu spinuloso-dentato-lobatis et erosis, lateralibus obliquissimis margine exterior! produoto caudato-acuminatissimis, staminibus sub-38, antheris septa emarginatis, baccis depresso-globosis 1-2 spermis globuli sclopeti magnitudine.

The description of this species is taken from specimens in the Botanic Gardens. It is a lofty, and extremely elegant palm. The *trunk* is a foot in diameter, and thirty-five or forty feet high, with distinct distant annuli. The *crown* is rather thin, consisting of several ascending gracefully curved bi-pinnate leaves, of great size, being eighteen or twenty feet long, and ten or twelve broad.

The *petiole* is very stout, at the base measuring about three inches across; the lower foot in its length is naked, and the margins of the sheath continued upon it as an elevated confluent line. *Rete* moderate, and coarsely fibrous.

The *pinna* or primary *pinnules* are fascicled, or generally alternate, inserted on large knobs, are five or six feet long, curved or even drooping. The lowest secondary *pinnules* are attached to the petiole itself, crowded, broad-cuneate, less obliquely praemorse, and generally not produced on the outer side; but the upper ones gradually assume the form of the other *pinnules*, which is narrow-cuneate with the outer edge caudately acuminate; there are about twenty-two, or twenty-four to each pinna or primary pinnule, twelve or fifteen inches long, and 1½ to 2 inches broad; those of the uppermost pinnae are very narrow, even so as to be almost equilateral. All are sharply toothed, lobed, and erose, coriaceous, plicate, and green. The *terminal pinnules* are broadly cuneate, two-lobed, or perhaps generally three-lobed.

The *spadices* are very large and long (ten or twelve feet): the upper ones flowering first, and so on, until that next the ground has flowered, when the tree dies. The *peduncle* is curved, stout, entirely covered with large, greyish, coriaceous leathery *spatites*, one, or one and a half foot long, and closely imbricated. *Spikes* very long, pendulous, level-topped, resembling a huge docked horse-tail. *Flowers* immensely numerous, placed in threes, the central and lowermost being female, and later than the others in development.

MALE FLOWERS. *Sepals* three, roundish, cordate ciliate, and imbricated. *Petals* oblong, and reddish. *Stamens* thirty-eight, *filaments* short and white, the *anthers* being about as long as the petals, linear, generally with bifid or emarginate points. No *rudiment* of a *pistillum*.

FEMALE FLOWERS much the same, as the male, but the *sepals* are broader, more ciliate, the *corolla* shorter, and of greenish colour. *Sterile stamina* three, placed opposite the sepals and angles of the ovarium, resembling young anthers. *Ovarium* subtrigonal, roundish, bilocular, cells anterior and posterior. The *ovule* solitary, erect. *Stigmata* two, cordate, white. *Berry* reddish, " about the size of a nutmeg, covered with a thin, yellow, acrid bark, but nothing that deserves the name of pulp. *Seed* generally solitary," (Roxb.) "*Albumen* horny. *Embryo* conical, and central." (Martius).

HAB.— In sandy places, Malabar. *rRheedeJ.* On Hills Cavila-Cutty, with Teak and wild Mango trees, at Velater. Malabar, where it is called *Evim-pannah*, and Dinagepore in Bengal, *Buch. Hamilton** A native of the

various mountainous parts of India, flowering-time the hot and rainy season. Roxb. & Assam. Telinga name *Jeroogoo*. The Dianapore name *Ramguoah*, *Bon-khejur*. Assam, name *Bura flawar*.

OBS.—This and the *Phoenix sylvestris* when allowed to reach their full size unmutilated, are the handsomest and most useful palms of the peninsula of India.

"This tree is highly valuable to the natives of the countries where it grows in plenty. It yields them, during the hot season, an immense quantity of toddy or palm wine. I have been informed that the best trees will yield at the rate of one hundred pints in the twenty-four hours. The pith or farinaceous part of the trunk of old trees, is said to be equal to the best Sago; the natives make it into bread, and boil it into thick gruel; these form a great part of the diet of those people; and during the late famine, they suffered little while those trees lasted. I have reason to believe this substance to be highly nutritious. I have eaten the gruel, and think it fully as palatable as that made of the Sago we get from the Malay countries." *Roxb. op. cit.*

2. CARYOTA OBTUSA.

TAB* CCXXXVI. A.B.

Arborea, pinnulis valde inaequalibus erosis dentibus brevibus obtusissimis, floribus masculis distantibus, antheris mucronatis.

The description of this species is taken partly from notes made on the spot, and from dried specimens of a portion of the leaf and a spadix. It is a very large *palm*; the diameter of the *trunk* being one and a half or two feet.

The *leaves* are very large the *pinnules* cuneate, very unequal-sided, coriaceous, when dry remarkably striate; the outer side scarcely at all produced; the teeth short, and very obtuse.

The *branches* of the male spadix are long, flexuose, and scurfy.

The *flowers* are distant, three together, the central (female) are later in development.

MALE flowers about five lines long. *Sepals* rounded, scurfy and ciliate. *Petals* two and half times longer than the sepals. *Stamens* indefinite, *anthers* linear, mucronate.

FEMALE flower (in bud). *Calyx* as in the male. *Petals* much smaller, valvate. *Sterile stamina* three, opposite to the sepals. *Ovarium* sub-turbinate with a trigonal vertex, one or two celled. *Ovula* solitary, erect. *Stigmata* two, oblong, cordate-subreflexed.

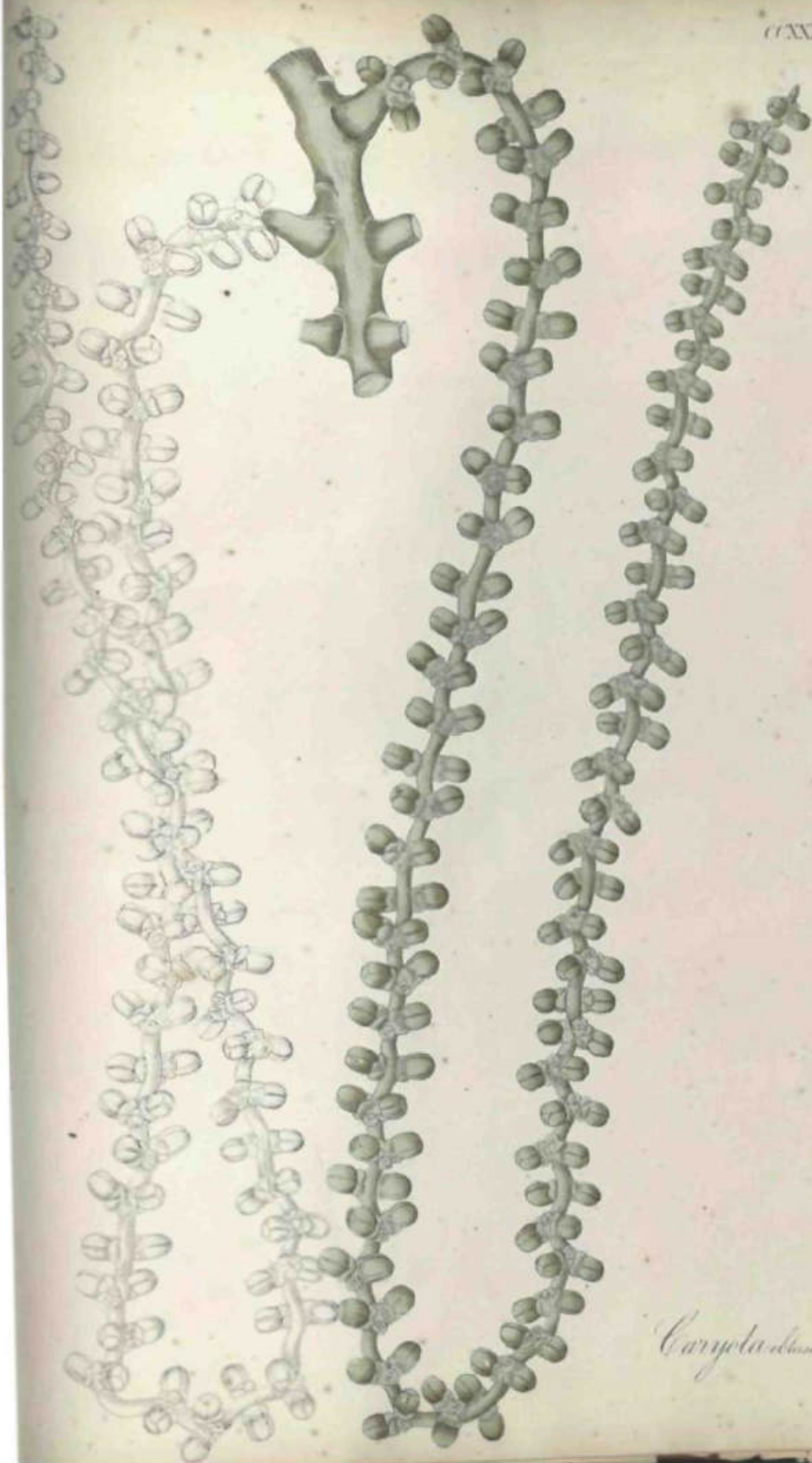
HAB.—Mishmee Mountains in woods about Yen. Altitude above the sea 3,400 feet.

OBS.—I met with this palm in 1837, during a hurried journey to the Mishmee Mountains. Its habit is that of *C. urens*, from which the obtusely toothed pinnules at once distinguish it. The Assamese coolies who were with me called it Bura Suwar, their name for *C. urens*. The Mishmees make use of the central soft portion of the trunk as food.

The secondary pinnules are not unlike those of *Seguaster major*, Rumph. *Hb. Am.* t. 14 but my specimens do not contain an entire primary pinnule with the attaching part of the petiole.



Caryota obtusata Griff.



Caryota obtusidentata Griff



Caryota solitaria

found in my notes mention made of a second species inhabiting the Mishmee Mountains, with the inflorescence yellow colour. Attention should also be directed to the "*Semoong-koong*"* of Sikkim, which is probably a species of *Caryota*.

• See Journal of the Agricultural Society of India, vol. 2. p. 823.

a CARYOTA SOBOLIFERA.

TAB. CCXXXVI. C.

C. sobolifera. Mart. Palm. p. 194.

Arbuscula, sobolifera, pinnulii
 Us subobtuse erosis et dentatis latere exteriori cuspidato-acuminatis, staminibus circiter 17, atheris mucronulatis, baccis saepius monospermis depresso-globosis magnitudine globuli scolopetarii minoris.

This is a very elegant *Palm*, forming by its offsets very thick compact tufts. Stems twelve to fifteen feet high, four or five inches in diameter, of greenish colour and distinctly annulate.

Trunks eight or nine feet long, spreading, nodding towards the apex, glaucescent greenish; petioles and sheaths very downy; pinnules (bifid) sub-opposite, (the rest alternate), obtuse-deltoid, obliquely praemorse, the outer margin acuminate, regularly and rather obtusely jagged.

Spathes concealing the whole peduncle, almost boat-shaped, at length deciduous. Spikes very numerous about a foot long, altogether resembling a docked horse-tail, axis or rachis of green colour, and sulcate.

MALE flowers very numerous, oblong, flesh-coloured, with reddish points. Calyx cup-shaped, sepals broad, imbricate. Corolla of three, coriaceous, striate, petals, almost distinct. Stamens about seventeen in number; filaments united at the base, very short; anthers linear, adnate, generally slightly mucronulate. Pollen ovato-lanceolate, one or three plicate.

FEMALE flowers at the time of expansion of the males, minute, rudimentary, not developed until after the males of the same spadix have fallen off. They are smaller than the males, not always solitary, but sometimes in pairs, or in threes, or solitary with a scar of one male only. Bracteoles two, placed right and left. Sepals rounded, with a brown intromarginal line, and ciliate edges. Corolla twice as long, tripartite to a little below the middle, coriaceous, brown, valvate. Barren stamens three, united to the corolla as far as the sinuses of its segments, ends thickened, glandular yellowish. Ovarium roundly ovate, with three obtuse angles, one or sometimes two-celled. Stigma one, or sometimes two, cordate, channelled down the middle. Ovules one or sometimes two according to the stigmata and the cells of the ovary.

Fruit surrounded at the base by the perianth, depressed, rather round, about the size of a small bullet, greenish red, or red, presenting generally at the apex an oblique cordate stigma; epicarp brittle, sub-fibrous. Seed one. Albumen horny, ruminant. Embryo situated obliquely above the middle of the albumen.

HAB.—About Malacca and on Pulo Bissar in woody places. Malayan name, *Tookkus*. *Doodoor* of Penang according to Mr. *Lewis*. It was introduced into the Botanic Gardens in 1816 from the Mauritius, where it flowers during the greater part of the year.

OBS.—I can find no distinction between the Malacca and the Botanic Garden specimens, the former, however, were not observed to be soboliferous.*

The substance of the ovarium, the buds and the outer surface of the albumen abound with raphides.

Dr. Martius, *Palms I c.* mentions his having only met with one ovulum, and a simple stigma. I find however, often two stigmata when the ovarium is two-celled; in the other case the stigma is oblique, and the ovarium smaller.

Dr. Martius is to be considered the authority for the species.

* The figure here given was taken on the spot from the Malacca Tookus, and was marked *Coryota mna*, in case it should prove distinct.

XVII. HARINA.

Harina. *Ham. Mem. Wern.* 5. p. 317. *Spreng. Gen. pi* p. 792. No. 4110. *Mart. Palm.* p. 188. t. 136. part mala.) *Endl. Gen. pi* p. 248. No. 1732. *Roxb. Corom. PI* 3. t. 295. (1819 Sprengel.) *Mart. Progr.* p. 17. *Reichenb. Consp. Reg. Veg.* p. 72. No. 1647. *Bartl. Ord. Nat.* p. 65. *Spreng. Gen. pi* p. 285. No. 1476. *Lindl. Int. Nat. Ord.* p. 346—non D. C. nee Reinwdt. *Orania. Blume. Man. Palm.* p. 186. t. 157. *Endl. Gen. pi* p. 248. No. 1731. *B. Rumphia.* t. 85. *Seguaster minor. Rumph, Hb. Arn.* 1.1. 15.

GENERIC CHARACTER.

FLOWERS monoecio-dioecious, MASCULINE in pairs, STAMENS 6 or indefinite. REMININE solitary, or with masculine. BERRY somewhat dry, 1 or 2-seeded. ALBUMEN even. EMBRYO dorsal.

HABIT.—Low spreading shrubby PALMS, flowering but once, with reed-like TRUNKS, sometimes creeping, (solitary or monoecious). LEAVES pinnate, and furnished with net-like fibres. The lower PINNULES, often fasciculate, the superior solitary wedge-shaped from the base, entire, variously and dentately lobed, the dentate lobes being spinosely eroded and striated; below, whitish with black dots. FLOWERS monceciously dioecious or polygamous in different spadices, or monoecious on the same spadix.

ALBUMEN. SPADIX axillary, nodding, pendulous, with branched spikes included for the most part within the spathe, or sometimes (particularly in one section of the genus—*Orania*, terminal) with few branches and the spikes exerted. The inferior flowers are disposed in pairs, with, or without rudimentary female ones. The upper flowers are solitary.

REMININE. SPADIX terminal, branches few, exerted, sometimes simple. SPIKES attenuated at the apex, polygamous. FLOWERS solitary, hermaphrodite. Fruit oblong sometimes oblique, of red or white colour. JUICE caustic.

The genus is subdivided into two sections as follows.

SECTION I.

FLOWERS monoecious. STAMENS 6.

1. *Harina caryotoides* Roxb.
2. „ *oblongifolia* Griff.

SECTION II. ORANIA. Blume.

FLOWERS dioecious. STAMENS indefinite.

3. *Harina nana* Griff.

i. HARINA CARYOTOIDES.

TAB. CCXXXVII.

H. caryotoides. Roxb. *Corom. pi.* 3. t. 295. *Wrightea caryotoides.* Roxb. *Icon.* 14. t. 78. *Fl. Lid.* 3. p. 621.

Harina caryotoides. Ham. in *Mem. Wern. Soc.* p. 317. *Mart. Palm.* p. 188. (excl. syn. Hamilt) t. 136, (mal.)

Pinnis inferioribus 3-4-natis fasciculatis cuneatis panduriformi-lobatis apice ambitu triangularibus, floribus faeminois distantibus tribracteatis, alabastris rotundo-conicis, petalis tribus acutis erectis ovario subduplo longioribus.

.....

This is an elegant tufted palm, each tuft consisting of several very short stems.

Leaves ascending curved, eight or nine feet long, two and half feet broad, oblong in outline. *Petiole* naked and roundish throughout the lower four feet, among the pinnules it is bifacial on the upper side, and sprinkled with brown and grey scurf.

Pinnules lowermost disposed in threes, sometimes in fours, the intermediate ones in pairs, and the uppermost solitary, cuneate, twelve to eighteen inches long, and six or seven broad, coriaceous, with a deep notch corresponding on either side towards the middle, and a shallower one at the apex on either side of the midvein: the margins of these are lobed *find* erase, teethe lose set, almost spinous; the *terminal* pinnule cuneate, bilobed at the apex, sides above the middle lobed, and similarly erose-dentate.

MALE *spadix* not seen.*

FEMALE *spadix* terminal, shorter than the leaves, erect, or almost nodding. *Spathes* closely imbricated, concealing the peduncle. *Spikes* spreading, stout, marked under each flower with a distinct areola, with attenuate points, bearing *neuter* flowers, which are cylindrical, with six barren stamens and no pistillum.

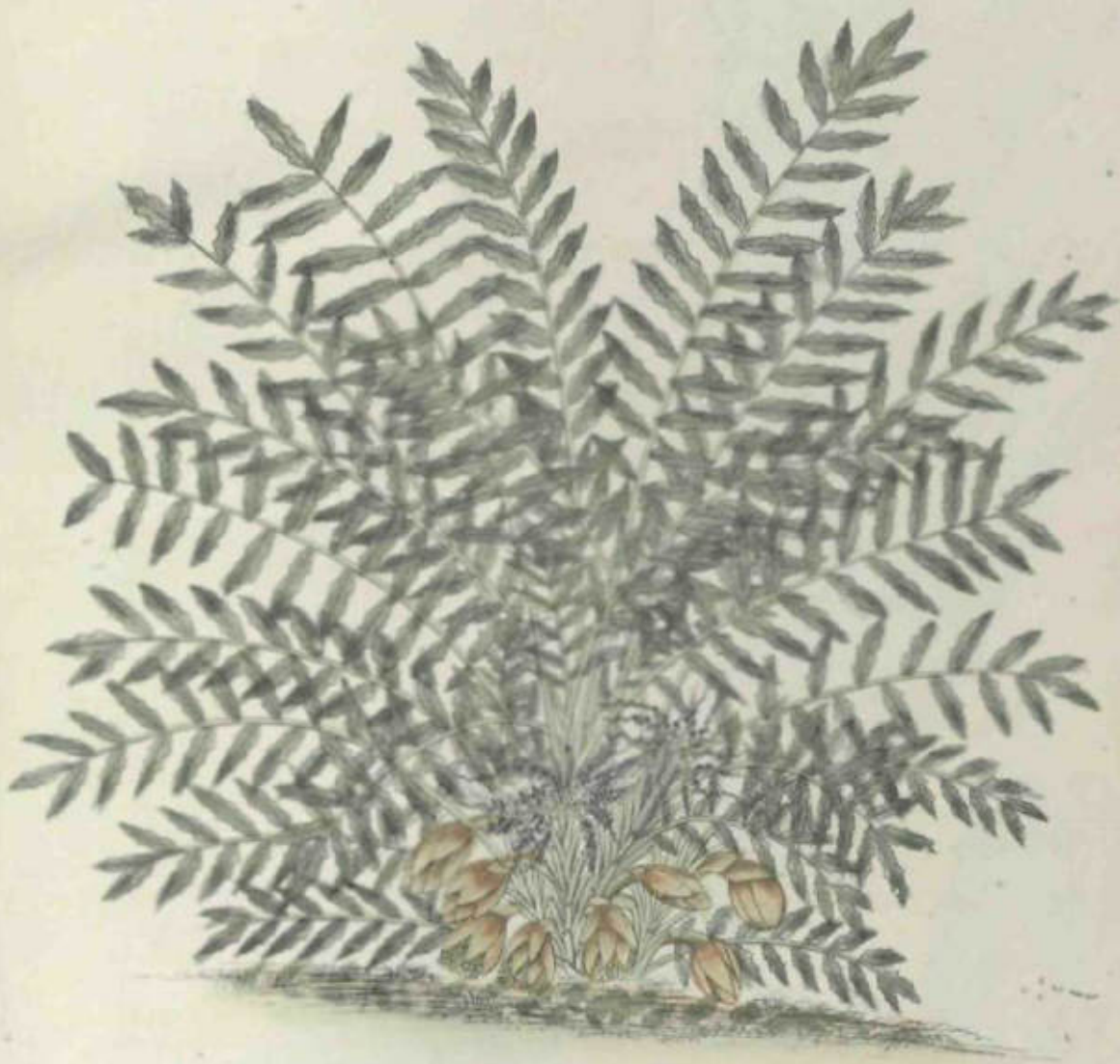
Next to these, occur some nearly if not quite *hermaphrodite*, with generally three full sized stamens, and seepingly a well developed Pistillum. The other flowers *are female*, and are in the bud roundly conical. *Sepals* three short and rounded. *Petals* three, ovately cordate, erect, acute, almost spinously pointed, about twice as long as the calyx, and ovarium, of greenish colour. No rudiments of *Stamens*. *Ovarium* roundly turbinate, two-celled, with a very short conical *style* and an emarginate *stigma*. *Ovules* solitary, ascending.

Fruit oblong, about half an inch long, reddish, with a thin coat of flesh. *Seeds* generally two, about the size of a coffee-seed, plano-convex, with an indistinctly reticulate-veined surface; *tegument* adhering to the *albumen*, which is horny and solid. *Embryo* conical, and placed a little above the centre of the convex or dorsal face.

HAB.-[^]Chittagong, where it is called *Chilputta* or *Belputta*, (Roxb). Cultivated in the H. C. Botanic Gardens.

OBS.—This I believe is Roxburgh's plant, the pinnules agreeing in shape with the outline figure given in one of his original drawings. Still however, there are many discrepancies, Roxburgh representing the *spadix* as terminal, with

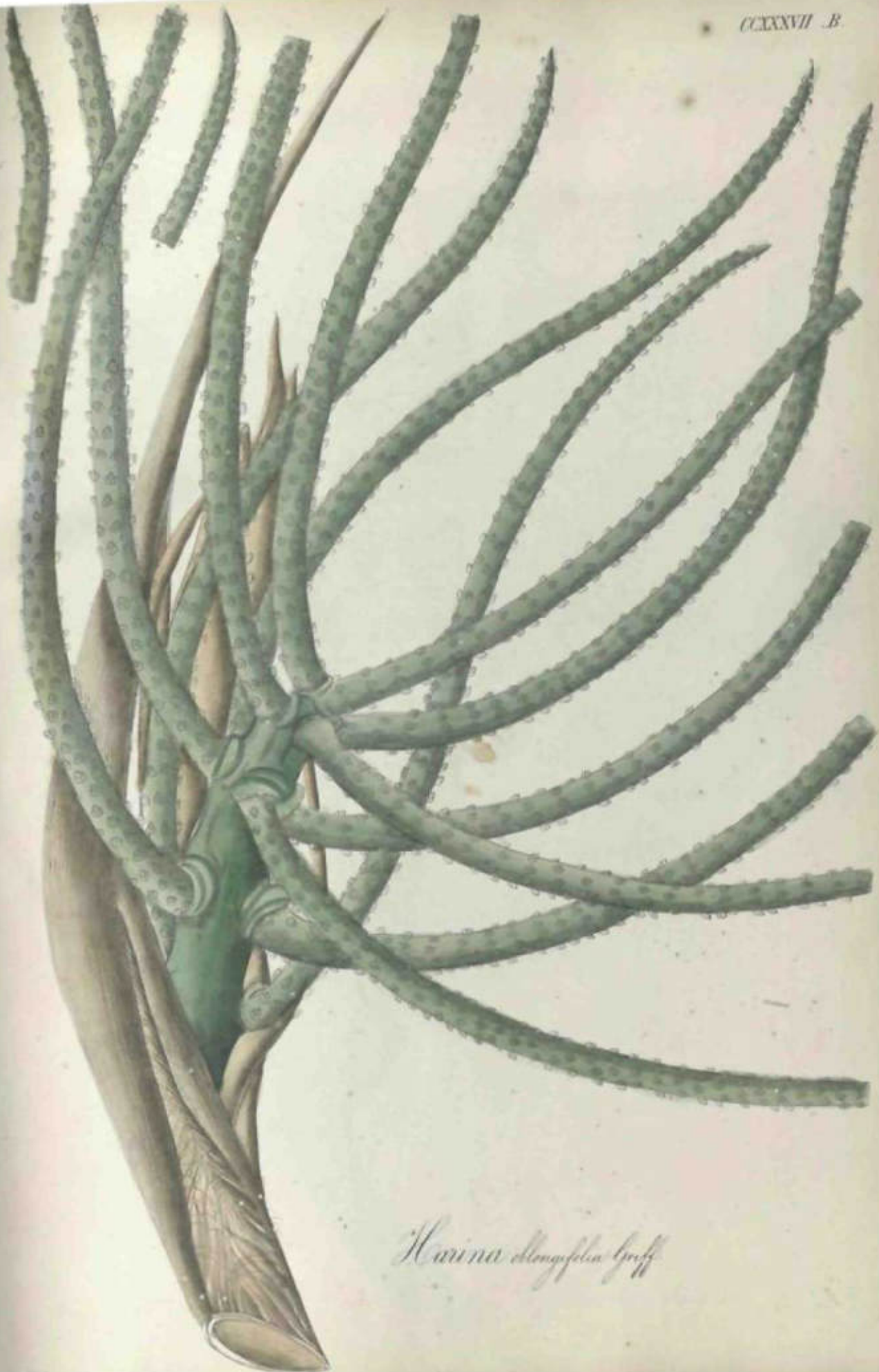
• Roxburgh's drawing represents the *spadix* terminal, nodding, the flower-bearing part pendulous. The *spathes* acuminate, not entirely appressed to the peduncle, those next the flowers distichous, and rather shorter than the spikes, all being of a grey-green tint. The leaves next the inflorescence have the pinnules almost truncate, with one or two notches above the middle, the lowermost being in pairs.



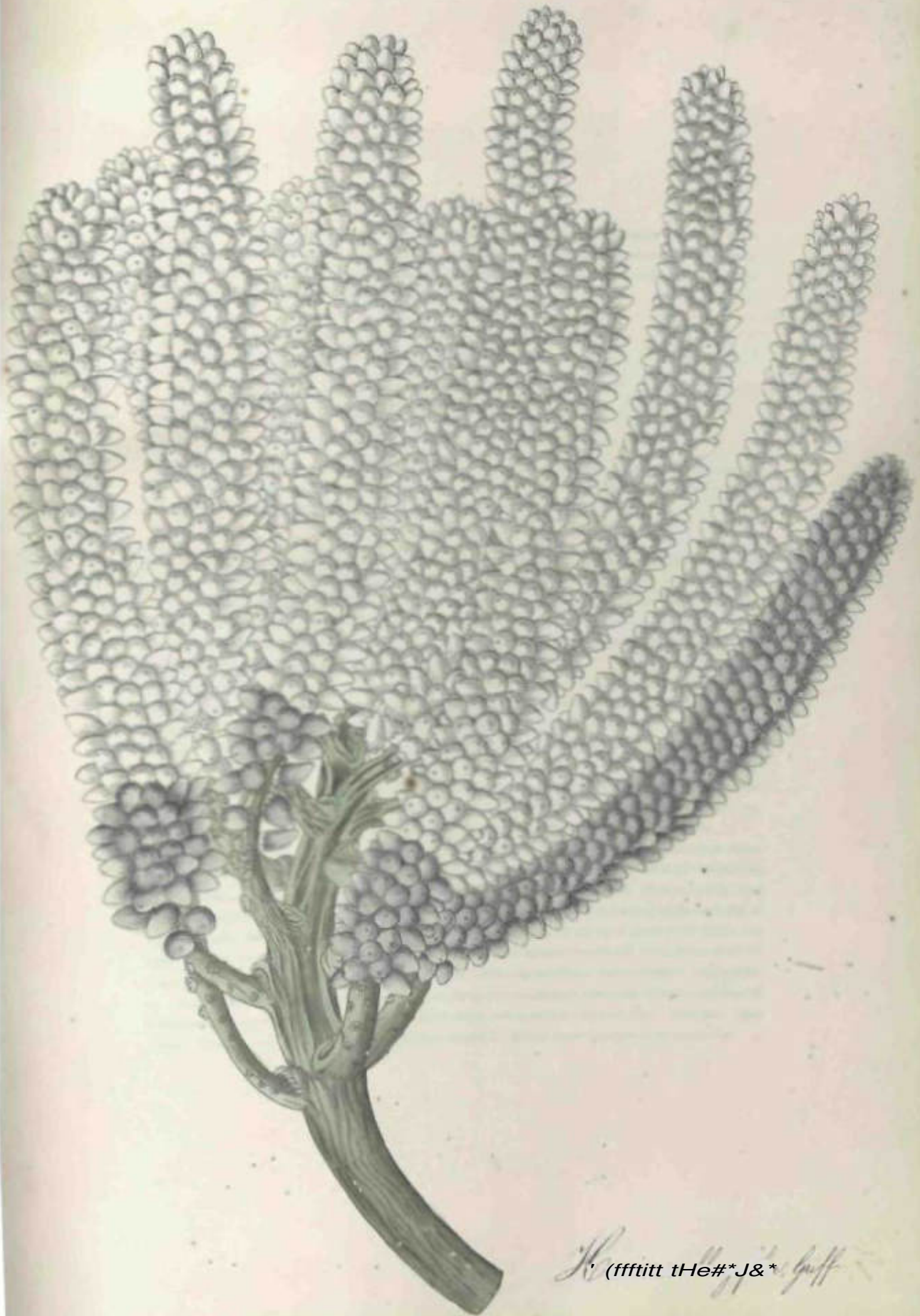
Harina caryocoides



Hauna elongifolia



Marina elongifolia Griff



*H. (ffitt tHe#*J&* Guff*

both male **and** female flowers, **and** resembling in most respects the male spadix of the succeeding, whereas the garden plants are as I have described them, their spadices evidently corresponding to the female spadices of the succeeding.

Buchanan Hamilton's plant, which he considered the same as Roxburgh's, appears to me from his description distinct. I have therefore quoted his synonyme doubtfully.

2 HARINA OBLONGIFOLIA.

Harina caryotoides. H. B. C. non Roxb. H. densiflora, *Mart. Palm. p. 189.*

Pinnis imis binatim fasciculatis (reliquis solitariis) lineari-oblongis basi breviter cuneatis integerrimis ceterum sinuoso-lobatis dentatisque ut plurimum eroso-serratis obtuse acuminatis, apathis (spad. masculi) ventricosis spadicem e maxima parte obcludentibus, floribus faemineis densis bibracteatis, corolla tridentata quam orarium brevioribus aegmentis depressis.

This is a very elegant Palm forming thicker tufts than the preceding, but the *leaves* are rather larger, and the lower ones are spreading; the *petiole* is much the same as that of the preceding.

Pinnules alternate or often sub-opposite, the lowermost only in pairs, linear oblong, eighteen or twenty inches long and four broad, from a short entire cuneate base sinuato-lobate and dentate, undulated, eroso-dentate almost throughout, white beneath, with a brown midrib, the terminal pinnules are broadly cuneate, three-lobed, the central lobe being itself bilobed, and similarly eroso-dentate.

MALE *spadices* axillary, curved, often nutant or pendulous; the ends of the lowermost touching the ground, scarcely more than one and a half foot in length. *Spathes* densely imbricated, the innermost almost membranous, striate, tinged with dark purple, equalling the flower-bearing part of the spadix, and often disposed round it in an urceolate form. *Spikes* slender, very numerous, level-topped, pendulous, their points projecting beyond the opening of the *spathes*.

Flowers very numerous, ochroleucous, the lower ones in pairs, with a rudimentary female between; the upper ones solitary. *Calyx* cylindrical, nearly entire. *Corolla* as long as the calyx, tripartite nearly to the base, segments reflexed. *Stamens* six; *filaments* cohering rather high up to the petals. No rudiment of a *Pistillum*.

FEMALE *spadix* much like that of the preceding species; *spathes* brown, conduplicate, the outer one sometimes very long, and acuminate. *Branches* very stout, green, variously ascending, tapered at the ends, where they are caudiform and notched, the notches bearing rudimentary flowers. *Bracts* two, right and left. *Flowers* purplish, closer than in the preceding species, sometimes (especially in the wild specimens) quite crowded, occupying the lower part of a flattish areola, bases somewhat immersed; in the bud almost globose. *Calyx* very short, divided to the middle into three broad rounded teeth. *Corolla* shorter than the ovarium, trifid, segments broadly half ovate, obtuse, depressed. No rudiments of *stamens*. *Ovarium* round ovate, two-celled. *Stigma* an indistinctly emarginate point. *Ovule* solitary.

Fruit crowded, oblong, surrounded at the base by the perianth, on the apex presenting a brown spot, being the remains of the stigma; *epicarp* tough, rather thin; flesh scanty, with a mucilaginous acrid juice. *Seeds* two, piano-convex; *tegument* greenish and veiny. *Albumen* horny and solid. *Embryo* about the centre of the convex face.

HAB.—Assam. *Major Jenkins, Mr. Masters.* Sub-Himalyan range. Darjeling. Cultivated in the H. C. Botanic Gardens, flowering in May and June.

Oss.—This species is quite distinct from the first, though at first sight they are scarcely distinguishable from each other. The main differences are the linear-oblong, sinuate-lobed or toothed, obtusely acuminate pinnules,—the lowermost only occurring in pairs—the male spadices, which are, judging from Roxburgh's figure, quite different—the shape of the flower bud, and the trifid corolla with depressed segments which are shorter than the ovarium.

It is more common in the Botanic Garden than *Harina caryotoides*, for which it has been mistaken.

3 HARINA NANA.

TAB. CCXXVIII.

Pinnis subquinis oppositis basi cuneatis ceterum obliquis irregulariter lobatis vel dentatis, spatliis vaginantibus distichis conduplicatis, fl. femineis tripetalis ferrugineo-furfuraceis, spadicibus (faem.) simplicibus vel 2-3 ramosis, fructibus oblongis 1-spermis (albis).

The description of this species is derived from fresh specimens of the entire plant communicated by major Jenkins. This is a small erect palm, from three to five in height. The *trunk* is slender, throwing out roots from the base, and covered with the sheaths of the leaves.

The *leaves* are about two feet long; the *petiole* short, roundish, obliquely sheathing at the base, with a thin *rete*, above produced into a bipartite liguliform body; the *pinnules* are alternate or sub-opposite, cuneate towards the base above this oblique, variously lobed, toothed and spinuloso-serrate: the terminal one irregular in shape generally bilobed, striately veined, above green, underneath glaucous white.

Spadices axillary. *Spathes* several, distichously imbricate, ferrugineo-furfuraceous, conduplicate, entirely concealing the peduncle.

Spadix simple, or with two or three divisions, densely ferrugineo-furfuraceous, the flower-bearing part exerted about the length of a finger. *Flowers* densely spiked, small, white, with (at least in the female), an inverted order of expansion.

MALE. *Calyx* composed of three rounded sub-membranous sepals. *Petals* three, oblong, with almost introflexed points, furrowed inside from the pressure of the stamens. *Stamens* about fourteen, inserted on a small prominent torus, rather shorter than the petals; *filaments* very short; *anthers* linear, adnate. No rudiment of a *Pistillum*.

FEMALE. *Flowers* also white, crowded on a generally simple spadix, attenuate at the apex and probably bearing neuter or hermaphrodite flowers. *Calyx* tripartite nearly to the base, segments very spreading greenish. *Corolla* composed of three broad, ovate, sub-connivent striate, coriaceous petals. No rudiments of *stamina*. *Ovarium* white or reddish, a little shorter than the corolla, triangular-conical, the angles alternating with the petals, two-celled of a thick coriaceous substance. *Style* none. *Stigma* emarginate. *Ovules* solitary, erect.

amvm i



Harina nana Griff

f



Arisaema (Griff)

Fruit sub-baccate, white, obliquely oblong, straight on the upper side, convex on the other, seven lines long, 41 broad; base surrounded by the perianth, apex presenting a bi-dentate sphacelated stigma, one-seeded, two celled, one-cell being almost obliterated. *Seed* one, of the same shape, whitish; *tegument* adhering to the albumen; *raphe* on the straight face, palmately divided, branches often dichotomous. *Albumen* solid, radiating from a central line. *Embryo* about the centre of the convex (dorsal) face.

HAB.—Lower Assam, in woods about Gowahatty. *Assam Major Jenkins*, Flowers in July, August.

OBS.—This species appears to be allied to *Orania regalis*, Blume, *Rumphia*, t. 85. and *Orank porphyrocarpa*, Mart. *Palm.* 1.157. It differs from both in the number and the irregular shape of the pinnules, the crowded flowers, and three petalled females. In the shape of the fruit it is nearly intermediate.

Besides these three species, I have bits of three others, collected on the north-east frontier, (one from Yen in the Mishmee Mountains). If to these Buchanan's *Harina caryotmes* be added, the total number of our Indian species will be seven of which increase, the most unexpected part is the finding an undescribed species in the Botanic Garden, in which it has existed at least twenty-five years.

XYIII. MACROCLADUS.

GENERIC CHARACTER.

FLOWERS monoecious, MASCULINE and FEMININE sometimes placed in pairs. SPATHES double, the inner one complete, clavately fusiform and woody. COROLLA valvate. STAMENS 6. OVARY three-celled, cells with one ovule in each. FRUIT somewhat dry. ALBUMEN cartilaginous and even. EMBRYO laterally placed.

HABIT.—Lofty Malayan unarmed palms, with dense hemispherical crown. LEAVES pinnate; PINNULES linear with the apex irregularly toothed or lobed, below white, SPADIX axillary, paniculately branched. FLOWERS white minute.

OBS.—The leaves and female flowers are as in *Arenga*, the spathes as in *Com* and the fruit as in *Corypha*.

1. MACROCLADUS SYLVICOLA.

TABS. CCXXXIX. A.B.

This is a handsome palm, about forty feet in height, with somewhat the habit of *Cocos nucifera*. *Crown* subhemispherical, dense.

Leaves pinnate, ample, twelve to fifteen feet long, spreading in every direction.

Petiole with the margins of the hardened leathery half stem-clasping base, lacerate-fibrous, the lower naked part about five feet long. *Lamina* subobovate in outline.

Pinnules sub-linear, 2½ to 3 feet long, two inches broad, oblique at the points where they are irregularly toothed or lobed, underneath whitish-scurfy: above one-keeled, underneath with five small keels.

Spathes two, the outer one very small, incomplete, two-edged, perforated at the apex, and leathery; the inner one complete, almost woody, before dehiscence fuciform-clavate with a subulate cuspis, striate or sulcate, ferruginously scurfy, roughish, opening longitudinally, the margins becoming reflexed.

Spadix paniculately branched, spreading, nodding towards the point, here and there ferruginously scurfy; *branches* sub-secund, the primary ones suffulted by a broad short greenish *bract*; the secondary *fapikes*) nodding, slender, gradually attenuated to the apex, the lower ones bearing female flowers towards the base, the upper male flowers throughout.

Flowers distichous, white.

MALE. *Flowers* one on either side of the female without a female or in pairs, oblong, sub-angular. *Calyx* small, tripartite to the middle; divisions tooth-shaped, erect, fleshy, membranous. *Petals* three, oblong, coriaceous, boat-shaped, valvate. *Stamens* six, shorter than the petals; *filaments* stout, subulate; *angers* linear-oblong, adnate, extrose attached near the base. *Pollen* lanceolate, one-plicate, whitish, *Rudiment* of the *Pistillum* simple, conical.

FEMALE. *Flowers* shorter and broader than the male. *Calyx* as in the male. *Petals* broadly ovate, obtuse, spreading, valvate. *Rudimentary stamens* six; those opposite the petals quite abortive and falling off with the petals. *Ovarium* obtusely trigonal, longitudinally three-lobed, to each lobe there is one-cell, with one appense pendulous *ovulum*. *Style* none; *stigmata* three, papillose, recurved, channelled down the centre.

Fruit-spadix with the branches more nodding, and without spathes. *Fruit* surrounded at the base by the perianth, nearly dry, globose, about the size of a small lime, oblique, bi-gibbous at the base (from the two abortive cells of the ovarium near which the stigmata will be found), one-seeded, with a smooth cartilaginous aspect; *epicarp* rather thick fleshy cellular with fibres intermixed: *endocarp* crustaceous moderately thick, hardened, rather brittle. *Seed* large, globose; *tegument* cellular coriaceous, brown, adhering to the endocarp. *Albumen* opaque, white, cartilaginous and solid. *Embryo* large, conical, situated about half way between the middle and base of the albumen.

HAB.—Malacca, in forests at Ching, Malayan name, *Ebool*.

O_BS.—In another specimen subsequently examined the fruit is globose, subturbinate towards the base, subdrupaceous, very oblique, with the remains of the style near the base, where there are also two gibbosities.

FEMALE flowers distichous, on stout sub-compressed spikes, on either side is a scar of a fallen «ale; petals very thick, leathery, ovate obtuse ovarium obtusely trigonal, almost three-lobed, rather shorter than the petals.



B

A

Macroccladus sylvicola Spuff

(179)

Sepals, minute broad-cordate, acute much smaller than the petals, fleshy, and the lower half united with the torus.

MALE flower on the lower part of the spikes, oblong, angular. Calyx short, cup-shaped, three-toothed. Petals three or four times longer, linear oblong, stamens inserted on a torus occupying the fundus of the calyx, free, about opposite the base of the teeth, filaments short, anthers linear extrorse emarginate, attached near the base. No rudimentary Pistill.

SUPPLEMENT.

Cocos FLEXUOSA. Spadix. Tab. CCXLT.

PTYCHOSPERMA APPENDICULATA. BI. Tabs. CGXLII. A.B.

GENERAL INDEX.

OF

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P. /rrj flavosa



Psychosperma affinis L. Bl.



Psychosperma

APPENDIX.

PALMIDI.

DIAGNOSIS.—*Truncus* lignosus, cylindricus, saepissime simplex. *Folia* venfatione plicata, coriacea, flabelliformia vel pinnata. *Flores* monoid, dioici, vel polygami, rarius hennaphroditi. *Perianthium* duplex, utrumque tiiphyllum. *Stamina* hypogyna, saepius six, rarius indefinita, rarissime tria. *Ovarium* unicum, liberum, triloculare (raro 1-2-loculare), aut tria unilocularia. *Ovula* saepissime solitaria, erecta, anatropa. *Fructus* solitarius vel triplex, baccatus vel drupaceus saepius monospermus. *Albumen* comeum vel cartilagineum, solidum vel centra cavum aequabile vel plus minus ruminatum. *Embryo* monocotyledoneus, teres vel trochlearis, in foveola peripherica situs, plus minus vagus.

DESCRIPTIO.—PWw monoici vel dioici, vel polygamo-monoici dioicive, rarius hennaphroditi.

Perianthium plus minus coriaceum, glumaceum, rarius coloratum, persistens. *Calyx* trisepalus, sepalis distinctis vel plus minus coalitis. *Corolla* tripetala, petala sepalis subsimilia, distincta vel plus minus coalita, aestivatione saepius valvata.

Stamina hypogyna, vel ob cohaesionem cum corolla quasi perigyna, saepissime six, quorum tria sepalis, tria petalis opposita, rarissime tria et tune sepalis opposita, in paucis indefinita, floris feminei saepius rudimentaria. *Stamamenta* saepe basi monadelpha. *Anthera* introrsae, biloculares, longitudinaliter dehiscentes. *Pollen* ellipticum v. ellipsoideo-sphaericum, longitudinaliter rimatum, interdum echinulatum.

Pistillum liberum, saepissime tricarpellare: carpella plus minus coalita, floris masculi rudimentaria. *Ovarium* unicum et saepissime triloculare, aut tria unilocularia. *Ovula* saepissime solitaria, anatropa, ascendencia. *Styli* tot quot carpella, (interdum deficientes), plus minus coaliti. *Stigmata* simplicia.

Fructus baccatus vel fibroso-drupaceus, interdum trilobus, solitarius, et saepissime unilocularis, vel carpellis tribus fecundatis tematus vel triplex, in tribu una squamis retrorsis loricatus, in altera putamine triporoso pneditus. Semen sseplus solitarium, erectum.

Albumen copiosum, cartilagineum vel corneum, ruminatum vel superficie foveolatum vel excavatum, solidum vel centro cavum.

Embryo in lectulo proprio albuminis inclusus, saepius ab umbilico remotus dorsalis et pappilla indicatus, teres v. trochlearis. *Plumula* inclusa aegre conspicua, extremitate cotyledonea germinatione aucta et cavitatem, praeeistentem vel liquefactione medii albuminis formatam, replente.

Plantae lignescentes, perennes, haud raro monocarpica?, gemma terminali crescentes.

Radix palaris, mox evanida: radicae plurimae cylindricae, simplices v. ramosae, fibrillosae, in molem conicam saepe ex parte hypogaeam dense compactas?.

Truncus arboreus, simplex, rarissime dichotomus, saepe scandens, nudus et annulatus, vel basi dilatatis semivaginantibus petiolorum earumve vaginarum cicatricibus scaber: in Nipa rhizoma. *Folia* saepius in coronam terminalem conferta, in scandentibus distantia; *vaginae* saepe in reticulum quasi solute, cum petiolo saepe armatae; *petioli* in quibusdam apice inflagello producti; *laminae* maxime, flabelliformes vel pinnatae, venatione placti, demum secundum venas secundarias longitudinaliter fissae, venis interdum filorum specie persistentibus; pinnae longitudinaliter venosae, coriaceae, indumento plerumque pannoso-tomentoso, aut lepidoto, rariusve simpliciter piloso aut nudo. *Inflorescentia* terminalis vel axillaris, varia, saepius spadicea. *Spadix* saepius ramosus, sine spatha una completa inclusus, nunc pluribus incompletis imbricatim plus minus tectus, nunc apice in flagellum extensus, vel abortivus flagelliformis. *Flores* parvi inconspicui, saepius glutinaceo-coriacei, solitarii vel binati (ambo masculis) vel ternati, (foemineo nempe inter duos masculos), vel aggregati, in quibusdam in foveolis spadiceis sub-immersi, in speciebus monoids foeminei versus bases ramificationum, masculi versus apices siti. *Fructus* quandoque maximus.*

SUB-FAMILIA-CALAMINIE.

Ovarium squamosum vel strigosum. *Fructus* squamis retrorsis loricatus.

Frutescentes et saepius scandentes, vel arboreae. Foliorum vaginae petiolique spinis plano-subulatis vel aculeis saepissime armati; laminae pinnatae (generis unid orbis novi flabelliformes), pinnis saepissime linearibus, margine et superficie saepius setigeris. Spathe rCeratolobo excepto plures incompletae. Inflorescentia spicato vel racemoso-paniculata. Flores polygamo-monoici vel dioici, utriusque sexus vedvati, tribracteati, soUtarii, vel binati, ambo masculis, vel altero foemineo, altero neutro, vel masculo? Perianthium striato-venosum. Corolla indurata, saepe cuspidata. Stamina 6, raro 12, unius indefinite Ovarium triloculare. Ovula solitaria. Fructus solitarius 1-3 spermus, squamis cornels loricatus, saepius eximicus. Albumen ruminatum, excavatum, vel aequabile. Embryo dorsalis vel prope basin seminis.

Sub-familia e maxima parte gerontogea, perpaucis Americanis typi aberrantis hucusque detectis. Vita plerumque perennis, Sagi monocarpica. Limes borealis specierum Indicarum 29' 30'.

Urns.—Trunci paucarum arborescentium farina, Sagum dicta, locupletissimi: frutescentium graciliorum aliquarum praebent bacula, scandentium plurium viminibus et funibus sunt quam maxime idonei. Foliis preparatis (Atup editis) tecta domorum struuntur. Fructus nonnullorum ob saporem acium quasi sunt.

* The characters are chiefly taken from the writings of Mr. Brown, and MM. Martius and Endlicher.

FOLIA PIMATA.

1. ZALACCA* —Inflorescentia spicato-paniculata. Spicae amentiformes; bracteolae villosopaleaceae. Flores binati.

e m, W« teamentum baccatum. Albumen vertice excavatum. Palmae perennes, subcaules. Flagelli 0.

2. SALSOLA* —Inflorescentia spicato-paniculata. Spicae amentiformes; bracteolae villosopaleaceae. Flores binati. Albumen ruminatum. Vdmx arboreae, monocarpicae. Flagelli 0.

3. CALAMOSAGUS.—A^{TIO} Inflorescentia spicato-paniculata. Spicae amentiformes; bracteolae villosopaleaceae. Flores

Vitarii? Albumen ruminatum et vertice excavatum. Palm® perennes, scandentes. Pinnae cuneiformes, supra medium orosae. Ugula maxima, sursum scaphoidea. Petioli flagelliferi.

4. CALAMUS.—Inflorescentia spicato-v. racemoso-paniculata. Spicae (interdum racemi) filiformes, masculae compositae, distichae. Flores solitarii. Bracteolae imberbes, floris masculi in cupulam coaliti. Albumen superficie excavatum. Palmse perennes, saepius scandentes, et saepius, vel spadice vel petiolo extenso, flagelliferae.

5. PLECTOCOMIA.—Inflorescentia racemoso-paniculata, ramis caudiformibus. Spathae distichae, imbricatae persistentes. Spicae filiformes. Flores solitarii. Fructus ramentaceo-hispidi. Albumen aequabue. Palms perennes denses. Petioli flagelliferi.

5. EUGLISS.—Inflorescentia punkuhta. Flores solitarii, terminales, bracteolis pluribus imbricantibus stipati. Albumen solidum, extus sulcis sex exaratum. Palma perennis, subcaulis. Flagelli 0. Stamina indefinita.

ZALACCA.

GEN. —Spicae amentiformes. Flores in gremio bracteolarum 2 viUoso-paleacearum, masculi binati, neutro hinc adjecto binati. Stamina 6. Ovarium squamosum vel strigosissimum binatum. Albumen apice excavatum. Embryo basilaris.

Fructus amg a u a b t t efiagelWerce, caespitosae. Foliorum vagina petioUque spinis serial horridae,

faciculatae, directive varke, apice nutantes, in «na stinctae et ordine regulan alternant*. Spathae imbricatae, sessiles, spatheae TZellaiiae exsertae. Bracteolae in cupulam coalitae, vel parte ditrupta septiformi inter^ interpositae. Flores dM * po%o«^ monoici. Fructus ^m s^mmm longis retrofractis hispidi.

Genus proximum, discrepans habitU ^ Conferta qUada DtenUS eXCCPtal SemiMbaCCatoiet ^ m b e v e r - tice excavato c«terum equabU. Ad Calamum variis modis a c ^ t.

* Spicae —Inflorescentia spicato-paniculata (distichae). Spicae compositae, distichae. Bracteolae imberbes. Flores solitarii. Calamus

* Calamosagus.—Inflorescentia racemoso-paniculata. Spicae filiformes, masculae compositae, distichae. Flores solitarii. Fructus ramentaceo-hispidi.

mosa, flagellifer*. f oLU FLABELLIFORMIS. Mauritia.- • Char: eMartio.

In sectiones 2 (artificiales) commode dividi potest; haec polygamo-monoica vel dioica? Flori foemineo flos neuter hinc adjectus; ilia dioica flore foemineo solitario.

Characteres auctorum citatorum ad Z. edulem et Blumeanam tantum spectant.

SAGUS.

CHAR. GEN.—*Spicae* teretes, amentiformes. *Flores* hermaphroditi, masculi, vel polygami, binati, bracteola villosa-paleacea utrinque stipati. *Stamina* 6. *Ovarium* squamis obtectum. *Stylus* (saepius) l'ónico-triangularis, tridentatus. *Fructus* exsuccus, squamis loricatus, 1-spermus. *Albumen* ruminatum. *Embryo* dorsalis.

HABITUS.—Palm® *Archipelagico-Asiaticae, monocarpicae, trunco robusto saepius elato, corona ampla terminali. Folia pinnata: vaginae et petioli spinis rectis saepius armati; pinnae lineari-ensiformes, Inflorescentia terminalis, plerumque pyramedalis, Spathae plures, incompletae, inermes vel spinis rectis obsitae. Flores plerumque rubescentes. Ovaria (monente Jack) uniusfere distincta, aliarum coadunata.*

A Zalacca, cui proxima, differt habitu, semine exsucco et albumine ruminato.

CALAMOSAGUS.

CHAR. GEN.—*Spicae* teretes, amentiformes. *Flores* hermaphroditi, solitarii, villis semi-immersi. *Stamina* 6. *Ovarium* squamis obtectum, triloculare. *Stylus* subulatus, tridentatus. *Fructus* exsuccus, squamis loricatus, *Semen* vértice excavatum. *Albumen* ruminatum. *Embryo* vagus.

Palmae scandentes perennes incolae Peninsulae Malay anae. Folia pinnata; vaginae ^petiolique aculeis conicis rectis armati: ligula maxima, pari modo aculeata, sursum ventricoso-scaphoidea et vaginam contiguam semi-amplectens; pinna alternae, cuneatae, inaequilatae, a medio supra vel margine terminali erosae, subtu glaucae. Inflorescentia Sagi vel Zalaccae. Spathae plures incompletae inermes. Bracteol© in villos fere omnino solutae.

Genus foliis Caryot® vel Wallichiee, habitu quodammodo Calami, inflorescentia et semine Sagi et Zalaccse, insigne forma et evolutione ligulae.

Character (posthac emendandus) haustus est, quoad flores, e C. lancinosa, quoad organa vegetationis e C. hariniBfolia. Hue verisimiliter referendus Calamus caryotoides, A. Cunningham. Martius, *Palmae*. p. 212, et forsán Calamus rhomboideus, Blume. *Syst. Veget.* ed. Schltes, 7. pt. 2. p. 1332.

CALAMUS.

CHA16 GEN.—*Spicae* (interdum racemi) filiformes (paniculate). *Flores* mono-dioici, (seepissime) solitarii, masculi bractea et cupula (bracteolis duabus coalitis) suffulti, faeminei tribracteati. *Stamina* 6. *Ovarium* squamis plus minus tectum. *Fructus* subexsuccus, squamis retrorsis loricatus, mono-raro dispersus. *Albumen* ruminatum vel superficie foveolatum. *Embryo* hilo approximates.

HABITUS.—*Palmae perennes, caespitosae, frutescentes, vel arbusculoideae, erectae vel saepius scandentes. Caulis {saltern partis follüifera} vaginis obtectus. Foliorum vaginae varie armata spinis saepissime seriatis, fin unaverticilla-*

tisj, plano-subulatis, colonsaepe variegatis, interdum longissimis; petioli spinis supradictis vel aculeis vario modo armati, saepe apice extensi inflagellis subtus aculeis palmatis undnatis prehensilibus; pinna alternantes regulari ordine, velfasciculatae, lineares, vel lineari-lanceolata oblongaeve, in paucissimis cuneato-lanceolata, inpaucis directione variae, saepius subulato-acuquinatae, saepius hispidae setis subpungentibus seatis margines et venas dispositis. Spadices axillares, plerumque diffusi, pedunculo saepius cum dorso vaginae contiguae cohaerente ideoque pseudo-extra-axillari, saepius armati, saepe apice in flagello isto petiolorum simili extensi, vel abortientes omnino flagelliformes. Spathae extimae spinis, aculeis, vel setis varie armatae, vel plures dedduae infima persistente, vel omnes per anthesin persistentes planae vel cymbiformes, vel tubulosae cum fructibus permanentes. Spiciffi masculae saepe scorpioideae, compressae. Flores

parvi inconspicui, masculi distichi. Styli rami plerumque revoluti.

SECT. I.—(Coleospathae). *Scandentes vel erecta. Spadices diffusi. Spathas omnes persistentes, tubulose limbis parvis vel obsoletis.*

* *Erectae. Flagelli 0.*

Species 1-4.

** *Saepius scandentes. Flagelliferae, vel spadice abortivo, velfertili apice extenso.*

Species 5-19.

_ *Scandentes. Petioli flagelliferi.*

Species 20-21.

SECT. II.—(Piptospathae). *Scandentes. Petioli saepius flagelliferi. Spadices mutici, diffusi. Spatha 1, (rarius 2), infima tantum per anthesin presistens spathis ramorum omnino deciduis.*

Species 22-26.

SECT. III.—(Platyspathae). *Scandentes. Petiole flagelliferi (Ian semper ?). Spadices diffusi. Spathae omnes per anthesin persistentes, planae, vaginis. parvis vel obsoletis.*

• Species 27-30.

SECT. IV.—(Cymbospathae). *Scandentes vel erectae. Petiole saepius flagelliferi. Spadices contracti. Spathae cymbiformes, rostratae, diut persistentes, duae externae alias involventes, vaginis obsoletis.*

Species 31-38.

Daemonorops. *Blume, Martius.*

SEC. V. ?—Ceratolobus. *Blume.*

Genus intricatum, imperfecte cognitum, characteribus auctorum plerumque inextricabilibus, forma partium fructificationis, Cymbospathis forsitan exceptis, potius quam vegetationis meo sensu dividendum.

Limites ambigui: Sago appropinquat tribus viis per Calamosagum, Raphiam, et Zalaccam; Plectocomse per Cymbospathas ?

Calamus secundiflorus, Pal. Beauv, Fl. d'Owar. Benin, habitu, foliis Desmonci, floribus hermaphroditis, et* statione geographica differt.

PLECTOCOMIA.

CHAR. GEN.—*Spicae* (vel racemi) filiformes (paniculate). *Flores dioici* > masculi bractea et bracteolis duabus (interdum obsoletis setiformibus) suffulti. *Stamina* 6. *Ovarium* squamis obtectum. *Fructus* exsuccus, 1-3-spermus, squamis retrorsis loriatum. *Albumen* sequabile. *Embryo* basilaris.

HABITUS—Palmae perennes, scandentes, habitu omnino Calami. Petioli in flagellos extensi. Pedunculus spadicis spathis imbricantibus omnino vestitus; rami floriferi caudiformes subfastigiati, secundi, penduli, spathis subdistichis persistentibus arete imbricati. Spicae in sinibus spatharum abscondite. Ovarium squamis fimbriatis apice laciniatisj tectum. Stylus tripartitus, ramis subulatis. Fructus globosi.

Genus a Calamo inflorescentia praesertim distinguendum. Discrepat etiam bracteis bracteolisque setaceis squamis fimbriatis apice productis, (qua nota ad Zaiaccas quasdam accedit), et albumine omnino aequabili.

EUGEISSONA.

CHAR. GEN.—Inflorescentia terminalis, paniculata. Flores dioici, terminales, (solitarii). Stamina indefinita. Ovarium squamis obtectum. Fructus exsuccus, 1—spermus. Albumen cartilagineo-corneum, sulcis sex exaratum. Embryo basilaris.

HAB.—Palma caespitosa, sub-acaulis. Folia pinnata; vaginae, & petiole infra pinnas spinis plano-suhulatis armati; pinnas lineares, vena centrali cujusque paginae setigera. Paniculae & Q-pedales, erectae, aspectu triste hrunnescentes, spathis arctis undique imbricatae. Spathae primariae dorso spinosae apice in flagellum rostrumve attenuatae; secundariae muticae secus carinam dorsalem parce spinosae; tertiariae inermes. Flores bracteis pluribus arete imbricantibus semi-immersi, maximi. Calyx membranaceo-chartaceus, trifidus. Corolla tripetala, petals sublinearibuslongis spinoso-cuspidatis, floris foeminci infra medium carinam (stamina abortiva) apice pennicillatavi exhibentibus. Antherae linear es, adnatae. Styli tres, intus stigmatosi. Ovula solitaria, anatropa. Fructus ovatus, rostrato-mammillatus, ovi gallini magnitudine, brunneus. Semen erectum exsiccum.

SUB-FAMILIA.-CORYPHINÆ. Mart. Palm. p. 231.

* Flores hermaphroditi, rarius polygami, rarius dioici. Ovaria 3, discreta aut partim coherentia. Fructus drupaceus vel baccatus, monospermus, ovario unico plerumque tantum maturato. Albumen corneum, sequabile vel centro-cavum, vel processu tegumentorum intrante excavatum vel exaratum. Embryo saepius dorsalis, rarissime subbasilaris.

Palmae perennantes vel monocarpicae, frutescentes vel arboreae. Folia saepissime flabelliformia, raro pinnata. Inflorescentia axillaris, raro terminalis. Spathae plures incompletae, vaginantes, rarius una completa; secundaries plerumque deficientes.

SECT. L-FOLIA FLABELLIFORMIA.

CORYPHA.—Monocarpicae, arboreae, terminiflorae. Folia palmatim partita, flabelliformia. Spathae secundariae et tertiariae tot quot rami spadicis. Flores hermaphroditi, glomerulati. Corolla tripetala. Bacca sub-exsucca. • Albumen centro-cavum vel solidum. Embryo verticalis.

LIVISTONA.—Perennes, arboreae, axilliflorae. Folia palmatim partita, flabelliformia. Flores hermaphroditi, glomerulati. Corolla tripartita. Drupa. Albumen processu intrante excavatum. Embryo dorsalis.

LICUALA.—Perennes, frutescentes, axiliiflora. *folia pinnatim flabelliformia*. Flores hermaphroditi, solitarii, binati velternati? tribracteati. Corolla tripartita. *Filamenta in annulum faucinum saepissime coalita*. Drupa, etc. praecedentis.

CHAMIEROPS.—Perennes, frutescentes vel arboreae axiliiflorae. Folia palmatim-partita, flabelliformia. *Flores polygami*. Corolla tripetala. Bacca. *Semen longitudinaliter sulcatum*. Embryo dorsalis.

SECT. II.-FOLIA PIMATA.

PHCENIX.

SECT. I.

Folia flabelliformia. Flores hermaphroditi, rarius polygami. *Spathae plures incomplete*. Corolla valvata. *Stamina 6*, saepius perigyna. *Styli connati*. *Drupe rarius bacca*. *Semen* superficie laeviusculum, vel (in Chanuero-pide) verticaliter sulcatum. *Albumen* centro-cavum, vel processu intrante excavatum, vel (in Chamaeropide) exaratum, interdum sub-ruminatum.

Palmse frutescentes vel arborea, perennantes vel monocarpica, in umbrosis humidisque vigentes. Folia palmatim vel (in Licuala) pinnatim flabelliformia, interdum maxima, plicata, lacinis ut plurimum bifidis: petioli inermes vel sapius secus margines aculeati. *Spadices perennantium axillares, monocarpicarum terminates, maximae*. *Spathae plures, incomplete, vaginantes*. Flores sessiles, solitarii vel saepe glomerulati, saepe obscure l-bracteati. *Stamina in tripetalis libera, hypogyna, in reliquis perigyna, filamentis saepe in annulo faucinum coalitis*. *Antherae versatiles*. *Ovarium saepius vertice exsculptum*. *Baccae drupaeve olivaceae, rubrae vel cyanae*.

Incolae Americae tropicae, Australia[^] et Asiae praesertim ultragangeticae et archipelagicae. Species una Meditej^{*} ranea, altera Affghanensis. Limes borealis specierum indicarum 30-31 grad. alt. supra mare 1,000—1,500 pedum.

Usus.—Foliorum/pianis exsiccatis inscribere solent indigenae.

CORYPHA.

CHAR. GEN.—Flores hermaphroditi. *Calyx tridentatus*. Corolla tripetala. *Stamina 6*, hypogyna, filamentis basi distinctis. *Ovaria 3, coh[^]erentia*. *Styli connati*. *Fructus* (unicus saepius maturescens) baccatus, monospermus. *Albumen* corneum, centro-cavum (unius solidum). *Embryo* versus apicem albuminis.

HABITUS.—Palmae asiaticae arboreae, procerae, monocarpicae. *Truncus annulatus vel spiraliter sulcatus*. Corona maxima, ampla. *Petiolorum margines aculeati*. Rete 0. *Lamina palmatim multipartita, laciniis apice bilobus*. *Inflorescentia terminalis, amplissima*. *Spathae primariae et secundariae plurimae*. Flores glomerulati, breve pedicel^o fiavescentes. *Fructus olivacei seuflavescentes*.

Affinitas proxima cum Livistona (confer R. Br. Prod. p. 123, adnot.) Discrimina majora constant in vita monocarpica, inflorescentia terminali et spathis secundariis.

LIVISTONA.

CHAR. GEN.—Flores hermaphroditi. *Perianthium* utrumque tripartitum. *Stamina 6*, filamentis \$ corolla liberifac-tis distinctis, (basi dilatatis). *Ovaria 3*, apice coherentia. *Styli connati*. *Stigma* subsimplex. *Drupa* (unica ma-turescens) monosperma. *Albumen* cavitate ventrali. *Embryo* dorsalis.

HABITUS.—Palmae Asiae orientalis et australis, saepius arboreae, perermantes. Foliorum petioli saepius armati; laminae segmenta profunde bipartita, interdum acuminatissima pendula, lateralia longiora. Rete copiosum. Spadices axillares, paniculatim ramosi; pedunculis spathis vaginantibus obtectis. Flores minuti, albicli, glomerulati. Drupae saepius inaequilaterales, glaucescenti-azureae,

Discrimina vera inter Licualam et hoc genus ponuntur tantum in foliis palmatim flabelliformibus, filamentis in anulum liberum vix coalitis et baccis azureis. Fructus structura in utroque eadem.

CHAMJEROPS.

CHAR. GEN.—Flores polygamo-mono-dioici. Calyx tripartite. Corolla tripetala v. tripartite. Stamina 6-9, filamentis basi coalitis. Ovaria tria. Styli 0. Baccae 1-3, monospermse. Semen in facie ventrali sulcatum, aequabile vel ruminato-variegatum. Embryo dorsalis.

HABITUS.—Palms perennantes, frutescentes vel arboreae, nanae vel procerae. Rete saepius amplum. Petioli margine denticulati, vel spinosi, vel sublaeves. Lamina palmatim multipartita; laciniae induplicatae, apice saepissime bilobae, filis intermediis saepius nullis. Spadices simpliciter aut composito-ramosi. Spathae coriaceae, tubulosae, rameae paucae vel deficientes. Flores flavescens, bracteati. Filamenta basi connata. Baccae came spissa parca, olivaeformes vel subrotundae.

^a Numerus partium haud raro auctus; loco ternarii quaternarius, quinarius vel senarius."

Affinitate proxima Livistonse. Prabet transitum ad Phenicem per flores polygamos, staminum numerum auctum, baccas et structura seminis.

SECT. II

Folia pinnata. Spatha una completa. Flores dioici. Corolla fl. faeminei convoluto-imbricata. Stamina 6-9, raro, 3, hypogyna. Pistilla 3, discreta. Bacca. Semen longitudinaliter exaratum.

Palmse perennantes, nanae et subcaules, frutescentes vel arboreae, saepius gregariae et Ucos aridos amantes. Truncus petiolorum cicatricibus vel basibus asper, rarius annulatus. Petioli inferne planiusculi depressi, superne compressissimi. Rete panniforme, copiosum. Pinnae saepius fasciculatae, plurifariae, Hgidae, glaucescentes, conduplicatae vel conduplicato-canaliculatae, venis diaphanis parallelo-striatae, rarius solitariae, bifariaeyflacddae, planiusculae; infimae in spinis degenerantes. Inflorescentia axillaris. Spatha completa, coriacea, bicarinata, primum antice aperiens, demum dextrorsum et sinistrorsum bivalvis, postremum decidua. Spadix saepius exsertus, racemi in modum ramosus, pedunculo compresso. Spicse fasciculatae, subfastigate saepius simplices. Flores masculis, angulati. Calyx urceolatus, tridentatus. Corolla tripetala. Stamina hypogyna, saepius 6. Antherae adnatae. Pistillum rudimentarium (an semper 9) Flores faeminei convoluto-clausi. Calyx maris. Petala 3, rotundata, carnoso coriacta, convoluta. Stamina sterilia 6. Ovaria distincta. Styli distincti, recurvi. Stigmata subsimplicia. Bacca saepius oblonga, rubra vel demum nigrescens. Albumen aliquando ruminatum. Embryo centralis vel prope basin.

Incote Africe occidentalis et borealis, et praesertim Asiae tropicae orientalis. limes borealis specierum indicarum 30° grad; australis 5° grad.

Praebent farinam (Sago speciem), succum vinosum (Taree) et prae alia Saccharum. Fructus (Phaeniqis dactyliferce) edules, Arabis et Persicis aestimatissimi. Folia unius tegetibus apta, et petioli corbulis.

SUB-FAMILIA.—ARECINÆ.

SECT. I.

Spathse 1 vel 2, sapissime completæ. Perianthium faemineum convoluto-imbricatum. Fructus sape obliquus. Folia pinnatim fissa vel pinnata.

ARECA.—Spathæ 1-2, completæ. Flores monoid in eodem spadice. Stamina 3-00, Ovarium 1-3-loculare, 1-ovulatum. Drupa, rarius bacca obliqua. Folia pinnatim fissa vel pinnata.

BENTINCKIA.—Spathæ 2, interior completa. Flores monoid in distinctis spadibus, basi infoveolis immersi. Stamina 6. Ovarium triloculare, 1-ovulatum. Bacca? obliquissima. Folia pinnata.

SLACKIA.—Spathæ 2, incomptæ, vaginantes. Flores monoid in eodem spadice, basi infoveolis immersi. Stamina 6, filamentis basi coalitis. Ovarium triloculare. Drupa obliquissima. Albumen ruminatum. Folia pinnatim fissa.

SECT. II.

Folia pinnata vel bipinnata, pinnis vel pinnulis erosis. Inflorescentia centrifuga. Spathse plures incomptæ. Corolla faeminea valvata. Stamina saepius indefinita.

* Flores, vix, noid in eodem spadice.

CARYOTA.—Folia bipinnata. Stamina 00. Ovarium 1-2-loculare. Bacca 1, raro 2-sperma. Albumen ruminatum.

** Flores monoid in diversis spadibus vel dioici.

ARENKA.—Folia pinnata, pinnis linearibus, basi 1-2 auriculatis. Stamina 00. Ovarium triloculare. Bacca vertice depresso trigona, trisperma. Albumen aequabile.

HARINA.—Folia pinnata, pinnis cuneatis. Flores interdum dioici. Stamina in quibusdam 6. Ovarium biloculare. Bacca disperma. Albumen aequabile.

SECT. I.

Spatha 1-2 complete, rarius incomplete, rarissime nullæ, Flores mono-dioici vel polygami. Perianthium faemineum convoluto-imbricatum. Stamina 3-00, saepius 6. Ovarium 1-3-loculare, saepius 1-ovulatum. Fructus sub-drupaceus sequilateralis, vel subbaccatus iuaequilateralis. Semen 1. Albumen ruminatum, interdum aequabile. Embryo saepius basilaris.

Palmae elegantes, frutescentes vel arborea, saepius grates, saepe arundinaceae, in umbrosis vigentes. Corona saepius aequalis. Folia pinnatim fissa (imo aliquando bifurca vel pinnata, pinnis reduplicatis, saepius oblique acuminatis. Inflorescentia universalis centripeta, partialis centrifuga. Spadix axillaris, paniculatim vel racemosim divisus, raro indivisus, saepe refractus interdum coloratus. Flores; faemineus saepius inter duos masculos, (superiores saepe tantum masculi), binati, distichi, interdum suaveolentes. Stigma plerumque trilobum.

Incoke prasertim Asiae archipelagicae et oceanicae; una cultissima prope mare, plures sylvicolae, paucæ maritimae. Limes borealis sp. indicarum 27-28. grad,

Usus.—Albumen astringens narcotica, inebrians Arecarum plurium Asiaticis cum calce et folio Piperis Betel manducatur. A. Catechu hanc ob causam prae palmas alias indicas (Cocos nucifera excepta) abunde colitur. Vaginae foliorum (A. Catechu) consutae haustorum in usu adhibentur. Trunci A. tigillarum asseres stabiliores praebeant.

Euterpe. Gaertn. op. dt. 1. p. 29, t. 9.

Pinanga. Rumph. Hb. Amt. I. t. 4.

Caunga. Rheede Hort. Mai 1. t. 5—8.

ARECA.

CHAR. GEN.—*Bpathae* 1 vel 2, complete. *Flares* monoici in eodem spadice, femineus inter duos masculos. *Stamina* 3-00. *Ovarium* 1-3 locale. *Ovulum* 1. *Fructus* drupaceus vel sub-baccatus monospermus, interdum obliquus. *Albumen* ruminatum. *Embryo* basilaris.

HABITUS.—*Palmse arboreae vel frutescentes, stepius inermes. Truncus annulatus. Folia pinnatim fissa, rarius bipartita vel pinnata; vaginae coriaceae, striatae. Spadices axillares, paniculatim vel racemosim divisae, rarius simplices, saepe refracti. Flores saepe distichi, plerumque evolutione centrifugi. Antherae lineares. Drupae ovatae, saepius aurantiaceae, baccae globosae, coerulescentes.*

SECT. I.—(PINANGA). *Spatha* 2-completae, rarius 1. *Spadices* erecti, paniculatim ramosi. *Flores* inferiores 1 faemineus inter duos masculos, superiores masculi binati. *Stamina* 3-12, saepius 6. *Drupa*.

Frutices inermes, interdum soboliferce, vel saepius arbores. Folia pinnatim fissa, rarius pinnata. Spadicis rami dorso deficientes Fl. fem. perianthii foliola interiora longiora.*

SECT. II.—(ANACLASMUS). *Spatha* 1, completa. *Spadices* refracti, racemosim 2-5-divisi, interdum simplices. *Flores*; 1 femineus inter duos masculos* *Stigma* discoideum, saepe lobatum. *Drupa*.

Inermes, frutescentes. Folia pinnate. FL fem. perianthii foliola 3 interiora breviora.

Seaforthia. Martius. (vix Brown). Pinanga. Blume. Endl. Gen. p. 1370. No. 1727-1. ?

SECT. III.—(EUOPLUS). *Spathae* 2, complete. *Spadices* racemosim divisi, ramis 00, fastigiatis, caudoseformibus pendulis. *Flores*; saepius 1 faemineus inter duos masculos. *Fructus* sub-baccatus, obliquus, coerulescens.

Arboreae vel arborescentes, soboliferae, armatae. Folia pinnata.

Oncosperma. Blume. Endl. Gen. p. 1371, No. 1727-3. ?

Genus imperfecte cognitum, verisimiliter in posterum in plura dividendum.

Seaforthia, Br. differt habitu Caryotideo et floribus faemineis inter duos hermaphrodito-masculos; horumque, stylo longo.

BENTINCKIA.

CHAR. GEN.—*Spathae* 2, vel plures, intima completa. *Flores* monoici in distinctis spadicibus, aut rarius polygami, e foveis tandem emergentes, masculi alternatim distichi, faeminei solitarii. *Masc. Stamina* 6. *Faem. Ovarium* trilocale. *Ovulum* 1. *Bacca* obliquissima (stigmatibus basilaribus). *Semen* sulcatum. *Albumen* solidum. *Embryo* basilaris.

HABITUS.—*Truncus tenuis, arundinaceus, annulatus. Frondes pinnatae. Spadix infra folia urumpens, paniculatim ramosus, rubescens. Flores parvuli, compage subglumacea, rubentes. Baccae purpurascens, parvulae.*

SLACKIA-

CHAR. GEN.—*Spatha* 2, incompletae, vaginantes. *Flores* monoici in eodem spadice, e foveis tandem emergentes; faeminei inferiores, solitarii vel masculo adjecto, masculi superiores, binati. *Stamina* 6, filamentis basi coalitis, (fl. fem. castrata). *Ovarium* gibbum, 3-locale, 1-ovulatum. *Stigmata* 3. *Drupa* obliquissima (stigmatibus basilaribus). *Albumen* corneum, simpliciter ruminatum. *Embryo* basilaris.

HABITUS.—*Palma malayana, arecaeformis, fruticosa* Folia pinnatim JUsa: rete 0. Spadices axillares,*

nutantès, ramis (spicis) simpliibus, saepius 2, ab'quando pluribus. Flores subglumacei, albid. Drupae nigrescenti-purpureae, obovato-oblongae.

Genus Bentinckiae proximum, discrepans spathis et albumine ruminato. Folia etiam pinnatim fissa. Habitus Geonomae, quod genus differt filamentis in columnam connatis, antherarum loculis divaricatis, stylo (ovarîi virginei) basilari et albumine aequabili.

Dicatum beato Henrico Slack, botanico magni spei, setate iniente infelici casu abrepto.

SECT. II.

Spathae plures, incompletae. Flores monoici (vel interdum polygami)? in uno vel distinctis spadibus, vel dioici; masculi binati, cum vel absque feemineo interjecto. Corolla feminea valvata. Stamina saepissime indefinita. Ovarium 2-3-triloculare, 2-3-ovulatum. Bacca 1-3-sperma. Albumen aequabile vel (in caryota) ruminatum. Embryo dorsalis.

Palmae mono car pica e, interdum ope sobolum perennantes, frutescentes vel saepius arboreae. Folia pinnata vel bipinnata: rete fibrosum: pinnae vel pinnulae varie erosae, lineares vel saepius cuneatae, saepius fasciculatae, subtus saepius albae. Spathae imbricatae, pedunculum vestientes. Spadices axillares et terminales, (in speciebus monoids saltern) evolutione inversi, spicis saepius pendulis, fastigiatis. Sepala 3, imbricata. Petala totidem (vel corolla tripartita). Antherae lineares, adnatae. Ovula solitaria. Succus acris, urens.

Palmae monticolae sylvicolaeque, incolae e maxima parte oibis veteris et praesertim Archipelagi orientalis. Limes borealis specierum indicarum 27°-28° grad., altit. supra mare 4,000 pedum,

Usus.—Trunci integri pro asseribus, excavati pro aquaeduciabus, fissi pro telis utuntur. E tela trunci centrali laxiori, farina, *Sagum* edita, paratur. Retis fibre *fejoj* in funes in aquam diutius stabiles torquentur. Succus recens (*Toddy*, coctus *Saccharum CCabong*) praebet et albumen immaturum cum saccharo conservatum condimenta. Denique tomentum vaginarum igniario est idoneum.

ARENGA.

CHAR. GEN.—*Flores monoici in diversis spadibus (vix semper). Stamina indefinita. Ovarium triloculare. Bacca vertice depresso-trigona, sub-triloba, trisperma. Albumen aequabile. Embryo dorsalis.*

HABITUS.—*Palmae spectabiles, arboreae, monocarpicae, raro soboliferae. Truncus annulatus, apicem versus petiolorum basibus saepius quasi squamatus. Folia pinnata; rete copiosum fibris rigidis nigris intermixtum: petiolus interdum aculeatus; pinnae lineares, fasciculate et plurifariae, vel solitariae bifariae, subtus albae, basi uno vel utroque latere lobato-auriculatae, apice eroso-dentatae truncatae vel dentatae, vel bilobae. Spadices nutanti-pendulae; spicis pendulis, saepius fastigiatis caudae equinae in modum dispositis. Flores majusculi Antherae mucronato-opiculatae. Baccae viridescentes, rotundatae, majuscula. Semen (endocarpio cohaerente)? saepius baccaium, saepius evenium. Succus acris.*

CARYOTA.

CHAR. GEN.—*Flores monoici, faemineus inter duos masculos. Stamina indefinita. Bacca sub-exsucca, saepius monosperma. Albumen ruminatum. Embryo dorsalis.*

HABITUS.—*Palmae elegantes, saepius procerae, monti-sylvicolae, monocarpicae, interdum ope sobolum perennantes. Truncus concinne annulatus. Folia bipinnata, amplissima; rete tenue fibillosum; pinnulae cuneatae, oblique*

praemorsae, erosae, pagina ntraque concolori. Spadices nutanti-penduli. Spies pedulae, saepius fastigiatae, caudae equinae in modo dispositae. Fl. fcem. stamina rudimentaria tria. Baccse subglobosae, rubescentes. Succus acerrimus.

Specierum octo tres tantum satis bene cognitae; aliae recognoscendae, turn fusius turn accuratius definiendae.

HARINA.

CHAR. GEN.—*Flores mono-dioici. Masculi binati. Stamina 6 vel indefinita. Faeminei solitarii vel masculo utrinque stipati. Bacca sub-exsucca, 1-2-sperma. Albumen sequabile. Embryo dorsalis.*

HABITUS.—*Palmae caspitosae, humiles, frutescentes, soboliferae (an semper)? aliquando arundinaceae-truncis monocarpicis. Folia pinnata; rete fibrosum; pinnae infimae saepius fasciculatae, superiores solitariae, e basi cuneata integerrima varie labatae dentataeve (lobis dentibusque spinuloso-erosis), striato-veniae, subtus albidae et nigropunctulatae. Flores mono-dioici, velpolygami in diversis spadicebus, vel monoid in eodem spadice] Spadices masculi, vel axillares inversa ordine evoluti, nutanti-penduli, ramosissimi spicisfastigiatis e maxima parte spathis inclusis; vel (Oraniae) terminates, parce ramosi, spicis exsertis. Flores inferiores per paria dispositi mm vel obsque faeminei rudimento; superiores solitarii. Spadices faeminei terminates, ramis paucis exsertis, interdum simplices. Spicae apice attenuatae, polygamy? Flores solitarii, bi-tribracteolati. Fructus oblongi, interdum obliqui, rubri vel albi. Succus causticus.*

MACROCIJLDTJS.

CHAR. GEN.—*F/om monoici, feminei utrinque masculo stipati. Spatha duplex, interior completa, fclavato-fusiformis, lignosa. Corolla* valvate. Stamina 6. Ovarinm triloculare, loculis 1-ovulatis. Fructus subsiccus. Albumen cartilagineum, aequabile. Embryo lateralis.*

HABITUS. *Palma malayana, spectabilis, inermis. Corona haemisphaerica, densa. Folia pinnata, pinnis linearibus, apice irregulariter dentatis vel lobatis, subtus albidis. Spadix axillaris, paniculatim ramosus. Flores albi, minuti. Fructus, globosus, albidus.*

Folia et flores feminei quodammodo Arengae, spathse Cocos, fructus Coryphae.

Locus naturalis mihi ignotus: ad calcem Arecinarum interim posui. Affinis Euterpe montanae, Graham, Bot. Mag. t. 3874, quae cum caractere generico citato saltern quoad spathas minime convenit.

FINIS.

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