

4. *Cycas macrocarpa*, Griff., Pl. CCCLXII. Fig. II.

Petiolus crassus basi sub 4-angulatus, angulis lateralibus dentibus subulatis spinosis suboppositis horizontalibus vel leviter recurvis armat.

The upper part between the pinnulæ of either side is dark green, nearly the colour of the pinnulæ, and has stomatose spots. The under $\frac{1}{2}$ ditto is of the colour of the under half of the leaves, yellow green, and without stomata, although these organs only exist on the under surface of the pinnulæ.

Pinnulæ subopposite, vertical quoad petiol. margine infero subdecurrent. lineares subfalcatim curvatæ basi attenuatæ apici gradatim acuminatæ in subulam subpungent. costa

utrinque prominula, subtus albida, ochroleuci margines recurvæ,

Length of the leaves altogether, some 8 feet, that of the Pinnulæ 1-foot 4 inches,

Breadth of ditto 5-6 lines.

The whole length of the fruit, *leaf* and all is between a span and a foot. The leaf, is covered with dense brown tomentum. The part above the fruits which are bifarious and so crowded as to touch each other, very short, triangular cuneate divided along edges into subulate subspinous teeth, of which the centre one is much the longest. The fruits are sessile & rounded at the base by a sort of annulus, which is not covered, with tomentum, elliptic, and the size of a duck's egg, viz. 2½ inches long, 1 inch 10 lines broad, so that the whole is heavy; colour green, subsequently yellow, at the centre of the subdepressed apex there is a brown mammillate point.

Insertion by a broad base, nearly the size of the annulus.

1. Outer tegument of short ochroleucous colour and disagreeable fleshy smell, 3 lines thick.
2. Then brown drupaceous coat of fusiform cellular fibres, in the middle it is harder both on outer and inner surface.
3. Then a thinish papery, vascular brownish coat.
4. The Embryonary coat but separating with the preceding (except at the apex where it is very thin membranous and shining, subapiculate and sphaclate at the apex).

The albumen is furrowed, and slightly furfaraceous outside, as also combined in 3 and 4; the inner face is of elliptic form, rather compressed, with a 4-angular depression at the apex, angles at the base presenting a foveola or slit, from each of which a shrivelled subelastica strap hangs, till they all conflux into one, no embryo formed, nor did I hear of any male flowers being known.

HAB. Crew between Ayer Punnus and Tabong: only on one spot and that near a Kuramut or Musulman tomb, so that it may have been introduced.

For my knowledge of this I am indebted to Mr. Wester-

hout, who tells me the trunk is 10-12 feet high, distinctly ringed and with short stout branches at the apex.

The upper part of each origin of the funicle is a closed cellular bag occupying a niche immediately under the foveola or slit above mentioned; on the apex of this are two roundish detachable brownish cells?

The funicles only occasionally adhere, they are 4 or as many as there are bags, they have a marked resemblance to those of the young embryo of *Loranthus*, they have no vessels, the large one contains longitudinal opaque air-bubbles. The flesh is divided by yellow tissue into two equal parts, the inner of them has the cells at right angles with the drupe, and they are longer.

Malayan name *Pakoo Galowe*: September, 1842.

SP. CHAR. Petiola sub 4-gono in parte nuda lateraliter spinoso. Pinnulis suboppositis linearibus in subulam gradatim attenuatis, margine recurvis, folio fructifero dense ferrugineo-tomentoso, apice breve triangularis cuneato-pinnatifida in subulas glabras, quarum centrale multo majore, fructibus dense congestis basi annulatis (magnis) ellipticis subcompressis

HAB. Malacca at crew between Ayer Punnus and Tabong, near the Mahomedan tomb, specimens received from Mr. Westerhout.

The same *Cycas macrocarpa*.

Trunk 10-12 feet high, with distinct rings, and with stout short branches at the apex, (Mr. Westerhout). Leaves about 8 feet long.

The upper part between the Pinnæ is dark-green, like the upper surface of the pinnæ, and has stomata, the under corresponding part is yellow-green, like the under surface of the pinnæ, and has no stomata, although these organs only exist on the lower surface of the pinnæ.

Petiole stout, sub 4-angular at the base, the lateral angles armed with subopposite thorny straight or slightly recurved teeth. Pinnæ very numerous subopposite, linear subfalcate,

10-16 inches long, half an inch broad, alternate at the base where the lower edge is subdecurent, gradually acuminate towards the apex into a sub pungent subulate point, margins recurved.

Cone of male flowers about 13-14 inches long; the short stalk surrounded by subulate pungent-pointed abortive leaves, covered with rust-colored wool-scales cuneate, excluding the apiculus about 9 lines long, 6 lines across in the broadest part, upper margin thickened cartilaginous-looking, from its centre arises a subulate acumen retrofractedly ascending, $3\frac{1}{2}$ -4 lines long. Pollen cells in groups of 3-5 opening longitudinally along inner face.

Fruits crowded together into a terminal mass, intermixed with abortive leaves like those surrounding the male cone. Carpel leaves nodding 6-10 inches long, bearing the seeds about 4-5 inches from the base or abortive ovula, (these are sometimes as many as 8) beyond these expanded into a short triangular cuneate lamina, with pectinate edges, the central pectea being much the largest: where the seeds are attached expanded into sort of smooth annulus.* Seeds yellow elliptic (very large) 2-3 lines long, 17 lines across the short diameter, $18\frac{1}{2}$ across the longer. In the centre of the subdepressed apex is a brown mammillate point, the foramen. Hilum nearly as large as the annulus.

Outer tegument 3 lines thick composed of short ochroleucous flesh with a disagreeable smell. Drupaceous coat brown, composed of fusiform cellular fibres.

Inner tegument thinnish brown, papery, vascular. Third tegument separating with this except at the apex, where it is apiculate sphaclated, thin membranous and shining.

Albumen with a quadrangular depression at the apex, angles, with a foveola or slit at the fundus. From each of these hangs a subelastic strap which all becomes confluent and gives attachment to the embryo.

* N. B. The left hand figures (Pl. CCCLX.) not numbered or named on the original drawing perhaps refer to this species. Ed.