ANNALS OF NATURAL HISTORY.

XXXVII.—*Florula Keelingensis. An Account of the Native Plants of the Keeling Islands.* By the Rev. J. S. Henslow, M.A., Professor of Botany in the University of Cambridge.

THE Keelings consist of small coral islands, ranging in a circle, and inclosing a lagoon or salt-water lake of nine and a half miles in its longest diameter. They lie in lat. 12° 5′ S., and long. 90° 55′ E., very nearly 600 geographical miles to the S.W. of Java Head or the Straits of Sunda. They stand apart from any other group or archipelago, and the naturalist is curious to learn the character of their productions. Mr. Darwin, who accompanied the Beagle in her late voyage round the world, visited these islands in 1836, and is about to give an account of their geological conditions, as well as of the scanty zoology which they furnish. As he obligingly presented me with the plants which he collected, together with his memoranda respecting them, I have thought that a list of the species, accompanied by a few remarks, might be of interest; and chiefly as serving to point out a set of plants whose seeds must be provided in a very eminent degree with the means of resisting the influence of sea water. For the satisfactory determination of the geographical distribution of species, it is necessary to be extremely careful in discriminating the species and even varieties which occur in different regions, and I have therefore generally added a few remarks on the state of the individual specimens in question, that every one may form a better estimate of the degree of probability of each having been correctly identified.

The largest of the islands is about five miles long and a quarter of a mile broad. Some sand hillocks on it are thirty feet in height, but the general level does not exceed six or eight feet. The foundation of all of them is a solid coral reef, which receives continued additions from fragments of coral and sand brought by the waves and wind. The soil is entirely

composed of broken corals and shells, sometimes in the form of calcareous sand; and the quantity of vegetable mould is extremely small. Twenty-three of the islands bear trees; and there are many others of small dimensions, scarcely elevated above the surface of the ocean, which produce none. When first seen, nothing can be observed but a belt of cocoa-nut trees encircling the lagoon. The abundance in which these occur has tempted a respectable Englishman named Ross to bring his family and settle here. He has with him a party of about eighty Malays, who are employed in manufacturing cocoa-nut oil; and the nuts also are exported to Mauritius and Singapore. Thrown as these men are so completely upon their own resources, they have accurately investigated the natural productions of the islands, and readily pointed out to Mr. Darwin the different species of plants, and assured him that he had seen them all except one, of which there was only a single tree, bearing a large square and very hard nut, growing on one of the islands which he did not visit. Excepting the cocoa-nut, and one other tree which was not in flower, and which attains a diameter of five or six feet, with particularly soft wood, Mr. Darwin brought away specimens of all the species he saw, amounting to twenty-one.

From the character of the soil and the condition of the islands we might expect *à priori* to meet with a purely littoral flora, and with none but extensively sporadic species. Mr. Darwin heard of the trunks of trees, of many seeds, and of old cocoa-nuts being washed on shore from time to time, and probably all the species which have thus been introduced are to be found in the East Indian Archipelago, or on the neighbouring continent, though they have not all been noticed there. Two at least of the species appear to be hitherto undescribed, and one or two others possess an interest from their rarity, and the little information we possess concerning them; but all the rest have an extensive range throughout the intratropical regions.

Of the few imported plants the banana does not thrive well; the sugar cane has in some parts run wild, but has lost greatly in flavour, as also has the tobacco. Besides these a little maize and a few vegetables are cultivated. Three species

of grass had been introduced, (*Panicum . . . . . , Eleusine indica,* and *Poa plumosa,*) as was stated, from Java, under an impression that goats would not eat the rank herbage of the island; but the settlers were surprised to find that one of these animals left on the islands by Capt. Fitzroy preferred the native to the imported species.

As the flora of the island of Timor, which lies nearly due west of the Keelings without any intervening land, has lately been described by Mons. Decaisne, I have placed a (T) in the following list opposite those species which he has recorded in his very excellent 'Herbarium Timorense.'

List of the Plants Indigenous to the Keelings.

MALVACEÆ.
1. Paritium tiliaceum, *St. Hil.* T.

TILIACEÆ.
2. Triumfetta procumbens, *Forst.*

LYTHRACEÆ.
3. Pemphis acidula, *Forst.* T.

PORTULACACEÆ.
4. Portulaca oleracea.

LEGUMINOSÆ.
5. Guilandina Bonduc, *Hort. Kew.* T.
6. Acacia (Farnesiana?) *Linn.* T.

URTICACEÆ.
7. Urera Gaudichaudiana, *n. s.*

AMARANTHACEÆ.
8. Achyranthes argentea (var.?) *Lam.* T.

NYCTAGINACEÆ.
9. Boerhavia diffusa, *Willd.* T.
var. β.?
var. γ.?

SCÆVOLACEÆ.
10. Scævola Kœnigii, *Vahl.* T.

CINCHONACEÆ.
11. Guettarda speciosa, *Linn.* T.

CORDIACEÆ.
12. Cordia orientalis, *R. Brown.* T.

BORAGINACEÆ?
13. Tournefortia argentea, *Linn.* T.

ACANTHACEÆ.
14. Dicliptera Burmanni, (var.?) *Nees.*

APOCYNACEÆ.
15. Ochrosia parviflora.

GRAMINEÆ.
16. Panicum sanguinale, (var.?) *Linn.* T.
17. Stenotaphrum lepturoide, *n. s.*
18. Lepturus repens, *Forst.*

PALMÆ.
19. Cocos nucifera, *Linn.* T.

MUSCI.
20. Hypnum rufescens, *Hooker.*

FUNGI.
21. Polyporus lucidus.
22. } Two trees of which no spe-
23. } cimens were procured.

1. *Paritium tiliaceum.*—Leaves large, and the linear pore upon one to five of the nerves on the under side.

"Common on one of the islands. It is exceedingly useful throughout the Pacific; and in Otaheite particularly, the bark is employed in the manufacture of cordage, whilst the light wood is used by the fishermen for floats. The natives readily procure fire from the wood by friction."—*C. Darwin.*

2. *Triumfetta procumbens.* Forster, Prod. n. 204.—This species is placed by De Candolle among those "non satis notæ." By Mr. Brown's kindness I have satisfactorily iden-

tified it, by comparison with Forster's original specimens in the British Museum. As much uncertainty prevails respecting the number of species in the genus, I shall add a detailed description of the present specimens. Messrs. Wight and Arnott have observed, at page 74 of their Prod. Floræ Indiæ: "In this genus it may be right to caution the student to place no reliance on the shape of the leaves or their pubescence, or suppression of the parts of the flower." To this we would add further, that neither can much reliance be placed upon the character of the inflorescence, since the differences between the peduncles being axillary or opposite, seem chiefly to depend upon different degrees of luxuriance.

Speciminum Keelingensium caules ramosi, ramis tomentosis, pubescentiâ stellatâ. Folia longè petiolata, subrotunda vel latè-ovata, cordata, indivisa vel trilobata, inæqualiter serrato-crenata: suprà nudiuscula, subtus petiolisque incano-tomentosa, marginibus nudis subglandulosis. Stipulæ lanceolatæ. Pedunculi inferiores axillares, sub-abortivi; superiores oppositifolii, foliorumque superiorum abortione sub-corymbosi, horumque stipulis bracteas emulantibus; pedicellis 3—5 sub-umbellatim dispositis. Calyx, sepalis 5 linearibus, sub apice acuminatis, extus pubescentibus, æstivatione valvatis. Corolla, petalis 5, sepalis parum minoribus, obovatis, unguibus basi villosis. Stamina 25, petalorum longitudine. Pistillum ovario ovali, hispido; stylo lineari, hirto, tricuspidato. Capsula junior globosa uncinato-hispida.

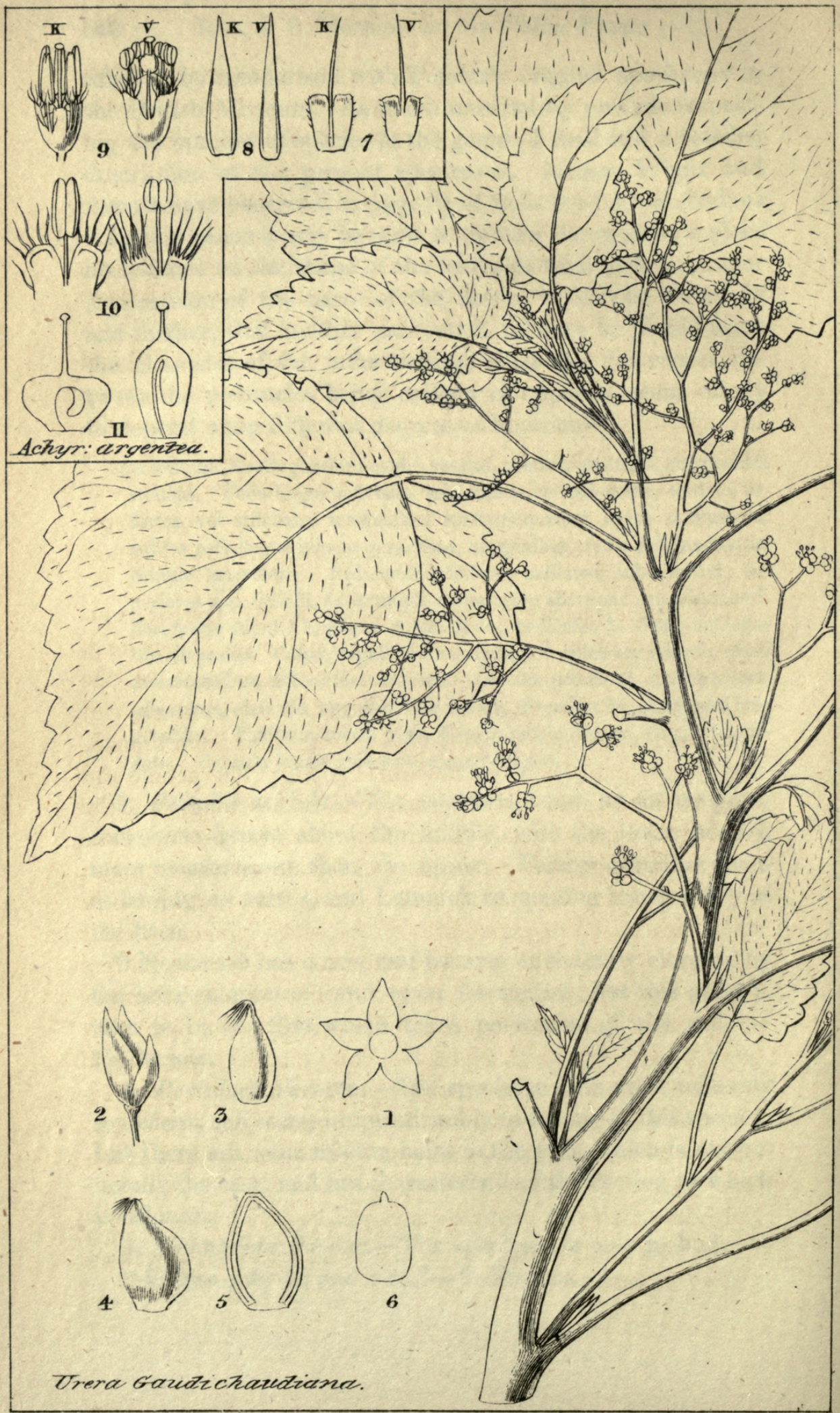
3. *Pemphis acidula.*—The capsules burst by an irregular transverse fissure about the middle, with the lower portion more membranous than the upper. Forster describes them as having six valves, and Lamarck as opening transversely at the base.

"No sooner has a new reef become sufficiently elevated by the accumulation of sand upon its surface, but this plant is sure to be the first which takes possession of the soil."—*C. Darwin.*

4. *Portulaca oleracea.*—The specimen is in seed, tolerably luxuriant, and seems unquestionably to belong to this species; but there are some minute hairs in the axils, which is not generally the case, and not characteristic of the section to which it belongs.

5. *Guilandina Bonduc.*—The specimen is only in bud.

"Grows only on one islet."—*C. Darwin.*



Urera Gaudichaudiana.

6. *Acacia* (*Farnesiana* ?)—The specimen has no signs of inflorescence, but the herbage closely resembles that of *Farnesiana*; and as that species grows in Timor, it is probably the same.

"On the same islet with the last."—*C. Darwin.*

7. *Urera Gaudichaudiana.* Plate XI.

Caule herbaceo; foliis longè petiolatis, latè cordatis, sub-acuminatis, grossè serratis, undique pilis brevibus conspersis, subtus pallidioribus; cymis axillaribus divaricato-dichotomis petiolis subæqualibus.

I have named this species in honour of Mons. Gaudichaud the founder of the genus *Urera*, who has attempted to group the species of this much-neglected order in the volume devoted to the botany of the 'Voyage de l'Uranie.' The only described species to which it seems to approach is the *Urtica ruderalis* of Forster, but a comparison with his original specimen in the British Museum has shown me that it is perfectly distinct.

The single specimen brought home by Mr. Darwin consists of part of an herbaceous stem about seven inches long, belonging apparently to a perennial. From each of the axils of the two lowermost leaves proceeds a short branch, and from each of seven or eight others spring divaricate branching cymose panicles about four inches long. The petiole and limb of the largest leaf are each four inches long, and the latter is $2\frac{1}{2}$ inches broad. The inferior panicles produce male flowers on their lower branches and female on their upper; but the superior bear female only. Male flowers crowded in small heads at the extremities of the short branches, their calyx deeply 5-partite (fig. 1.); stamens 5. Female flowers smaller than the males, their calyx of three sepals, or rather of two sepals and an external bract (fig. 2.); the pistil solitary, ovary ovate and slightly oblique (fig. 3.); the stigma crowned with a ferruginous tuft of hair inclining to one side. The ripe pericarp obliquely-ovate or gibbous (fig. 4.) containing one erect sessile exalbuminous seed (fig. 5.) with the embryo inverted (fig. 6).

8. *Achyranthes argentea* (var.? *villosior*.)

Foliis breviter pedicillatis, oblongis, basi sub-attenuatis, superne villosis, subtus incano-sericeis.

There are two specimens of this, each about a foot long, with the terminal spike on one of them six inches, on the other not two. Largest leaves three inches. It is difficult to decide whether this ought to be considered a new species or only a variety of *argentea*.

Decaisne considers *argentea* and *aspera* to be identical. The very variable character of the herbage prevents our laying any great stress upon the shape of the leaf, length of the spike, or degree of pubescence. In these respects our plant comes within the character of *argentea* given by Decaisne in the 'Flora Timorensis.'

On comparing the several parts of the flower with those of another specimen of *argentea*, brought by Mr. Darwin from the Cape-de-Verd Islands, I find several remarkable differences, which I may here describe.

Comparison of the parts of the flower in specimens of Achyranthes argentea *from the Keelings and Cape-de-Verd. Plate XI. where K. means Keeling, and V. Cape-de-Verd Islands.*

	Keeling.	Cape-de-Verd.
Fig. 7.	*Bract.* Auricles at base, about half the length of the bract.	About one third the length.
8.	*Sepal.*	
9.	*Stamens and pistil.*	
10.	*Stamen, with part of connecting membrane.*	
	Anther. Elliptic-oblong, equal to free portion of filament.	Subrotund and much shorter.
	Fringed lobes (from abortive stamens?) with few and regular incisions.	Incisions numerous and very irregular.
11.	*Pistil.* Ovary ob-ovato-globose, depressed, with the style three times as long.	Ob-ovato-cylindrical, with the style half as long.

The position and form of the ovule is also marked on the figures.

9. *Boerhavia diffusa.*—After an attentive examination of Mr. Darwin's specimens, I cannot detect sufficient differences to class them under more than one species, though he had himself concluded, from certain peculiarities in their habit whilst growing, that they must belong to three. These three forms, which I consider to be varieties of the *diffusa* of Decaisne's Herb. Timor., have each long, weak, straggling, terete branches, clothed with close scattered pubescence, except on the older parts, which are glabrous. The leaves are stalked

and fleshy, modifications of ovate and repand. The flowers in small heads, which themselves are arranged in dense umbels, with long axillary peduncles alternately disposed among the uppermost parts of the branches.

Var. α. Stoutest in habit, and with the largest leaves, the lowermost of which have their limb an inch long, with peduncles of half an inch; all are pedunculate, ovato-rotund, often slightly sub-cordate, much paler beneath. Stamens 2—3; young fruit ob-clavato-fusiform.

Var. β. Branches more than three feet long. Leaves rather smaller and darker on each side, generally more acute, the uppermost nearly or quite sessile. Seems to be *B. diandra* of Bur. Fl. Ind., tab. 1. fig. 1. Stamens 2—4, alternate with the segments of the calyx; anther with two globose cells, which, with the filaments, are pilose. Ovary oval, but in the young fruit becomes fusiform and angular, with glandular hairs. Stigma peltate. A toothed annulus round the calyx was noticed in one specimen. Three or four bracts.

"Grows upright and untidy, and is the commonest weed, growing everywhere."—*C. Darwin.*

Var. γ. Branches a foot and a half long. More stunted, with fewer, smaller, and more fleshy leaves. Stamens 2—3.

"Grows close to the ground, and is abundant on one spot within ten or twelve yards of the sea, where it was pointed out to me as possessing an esculent root, and considered to be quite distinct from var. *β.*"—*C. Darwin.*

A specimen of the root was preserved, and consists of long wiry branches, which do not appear to have been ever very succulent.

10. *Scævola Kœnigii.*—The leaves are seven inches long and three broad, quite glabrous; the apex slightly retuse and the margin somewhat repand. Segments of the calyx subulate and glabrous. Corolla with the base of the tube slightly villose within, the segments of the limb lanceolate and glabrous. Cupula of the stigma very pilose within. This specimen appears to be more glabrous than usual, whilst *S. sericea* (of which I have specimens from Macao in China) differs from the more usual state of *S. Kœnigii* chiefly in being more decidedly pubescent.

11. *Guettarda speciosa.*—Largest leaves eleven inches long and nine broad. Corolla with seven or eight segments. Stamens 7—8. Ovary seven cells with a pendulous ovary in each. Stigma eight rays. Pollen intermixed with numerous fibres (pollen tubes?).

"The flowers possess a delightful perfume."—*C. Darwin.*

12. *Cordia orientalis.*—"The settlers have named this Keeling-teak, because it furnishes them with excellent timber. They have built themselves a vessel with it. A large tree, abounding in some of the islands, very leafy, with scarlet flowers; but only a few blossoms were expanded at the time, and they easily fell off."—*C. Darwin.*

13. *Tournefortia argentea.*—Cyme ten inches long, bearing both flower and fruit. Leaves oblong and obovate-oblong, attenuated below.

"A moderate sized tree, with small white flowers, very common."—*C. Darwin.*

14. *Dicliptera Burmanni*, var.?—Some of Nees von Esenbeck's species (in Wallich's Pl. As. Rar. vol. iii. pp. 111, 112,) run so closely together, that it is difficult to say whether he would have referred these specimens to *Burmanni* or not. I will here subjoin a full description of them, and it may serve future observers in either extending the character of *Burmanni*, or of reuniting with it some of the other forms now considered to be distinct species, but formerly combined under the name of *Justicia chinensis.*

Radix annua ramosa. Caulis obsoletè tetragonus. Folia inferiora 4 pollices longa, 2½ lata, petiolo unciali, subglabra strigosave, subtùs pallidiora, cum caule lineolata; foliorum margines pilis minutis appressis tectæ, et basim versus aliquando piloso-ciliatæ. Axillæ plerumque floriferæ. Pedunculi 4—6 in quâve axillâ seriatim dispositi, 1—2 lineares, majores interiores. Capitula 1—2-flora. Bracteæ primariæ (sive umbellarum) plerumque subulato-cuspidatæ, pungentes, 6-lineares; aliquando inter umbellas inferiores eâdem secundariarum formâ, sed majores et foliaceæ. Bracteæ secundariæ (sive capitulorum) vel subspathulatæ vel obovatæ vel lanceolatæ vel lato-ovatæ, basi pallidiori attenuato, nervo medio valido, in apicem cuspidato-mucronatum excurrente, hirsutæ, pilis longis articulatis glandulisque interjectis ciliatæ. Bracteæ tertiariæ (sive florum bracteolæ) binæ setaceæ, calyce sublongiores. Calyx subsessilis minutus 5-partitus, laciniis subsetaceis, bracteolisque hirsutæ et ciliatæ. Corolla 7-linearis, tubo pallido, limbo roseo bila-

biato, labio superiore breviter 3-dentato, inferiore obsoletissime 2-dentato, externe pubescens. Capsula orbicularis, tomentosa, compressa ungue brevi dorsaliter compresso. Semina duo, orbicularia, compressa, muricata, primum pallide denique autem saturatissime brunnea.

15. *Ochrosia parviflora.*—This is unquestionably the *Cerbera parviflora* of Forster Prod. n. 121., as Mr. Brown showed me by comparison with the original specimens in the British Museum; but Dr. Hooker's *C. parviflora*, in Beechy's Voyage, p. 90, is certainly a distinct species, as I have ascertained by an examination of his specimens, kindly forwarded to me for comparison with Mr. Darwin's. Dryander, in the Linn. Trans., vol. ii. p. 227, asserts that he had compared Forster's specimens of *C. parviflora* with Commerson's of *Ochrosia borbonica*, and found them to be the same species. This has been since disputed. I have specimens of *Och. undulata* from Mauritius, labelled by Bojer as the "*Bois jaune*" of that island, which appears to identify that species with Jussieu's *Och. borbonica*. There is some obscurity in the descriptions hitherto given of the fruits of *Cerbera*, *Ochrosia* and *Tanghinia*, and I had hoped to have been able to have inserted here my own observations on them, but I must defer them until I have time to clear up one or two points about which I am doubtful. I should feel much obliged in the mean time to any botanist who can furnish me with specimens of the fruit of these, or any allied genera, for dissection. Mr. Darwin's specimens were accompanied by the following note: "Forms straight handsome trees, with smooth bark, which are commonly dispersed two or three together. The fruit is bright green, like that of the walnut." Two specimens of this fruit were brought home, and though Mr. Darwin feels confident that he *gathered* them, and, as he believes, from the same tree which bore flowers at the time, yet it has been supposed that they must belong to a species of *Cerbera*, and not to an *Ochrosia* which this plant seems to be; and I shall therefore defer their description for the present, merely intimating that I believe them to be identical with the *Cerbera platysperma* of Gærtner. The following is a detailed description of the flowering specimens from Keeling.

Folia subternata (quorum longiora cùm petiolo sesquipedalia, limboque decem pollices longo sex lato), oblonga vel obovato-oblonga, subacumi-