

BOTANIC GARDENS JAM

JAMAICA.

GUIDE TO
CASTLETON
GARDENS.



G U I D E

TO THE

BOTANIC GARDENS

CASTLETON, JAMAICA.

BY

WILLIAM FAWCETT. B.Sc., F.L.S.

Director of Public Gardens and Plantations.

With a Plan and Illustrations.

PRICE—ONE SHILLING.



KINGSTON, JAMAICA
HOPE GARDENS.

1904



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CASTLETON GARDENS.

In 1859 the Legislature purchased Castleton, but the formation of the Gardens was not commenced till 1862. Up to 1869 there had been no general importation of plants because of doubts about maintaining the Gardens on account of their distance from Kingston,—19 miles, but a large number of plants having been established, whilst the position, except in respect of its distance from the capital, was considered unexceptional, the Government then decided to treat the Gardens as a fixture. As soon as this determination had been arrived at, over 400 species of new and valuable plants were sent out from the Royal Gardens, Kew, among which were the Mangosteen, Brazil-nut, Tonquin Bean, Teak, New Zealand Flax, Bhel Fruit, Carob Bean, *Monstera deliciosa*, Cocoa, and thirty-two species of palms. In the same year two cases of grafted Mangoes arrived from India via Kew. Even at this early period of the existence of the Gardens the Nutmeg trees began to fruit, and the Clove trees were six feet high. In the following year upwards of 200 species were introduced including many valuable fruit and economic plants.

The work of introducing, propagating and distributing plants, especially those of an economic nature, was steadily and vigorously carried on till 1897, when it was decided to develop the Hope nurseries, being more conveniently situated, and form a Garden there. Hope, however, can never quite take the place of Castleton, as in the humid climate of the latter, many species luxuriate that are a complete failure on the dry Liguanea plain.

The elevation of Castleton is 496 feet above sea-level. The annual mean temperature is 75°.9 Fah., and the average annual rainfall is 115.02 inches.

A WALK ROUND THE GARDENS.*

It is not intended that the route sketched herein, or any other particular route, should be necessarily taken by the visitor, but in a single visit of short duration it is the best that can be followed, as it will enable the visitor to see the majority of the trees, &c., of special interest without going over the same ground a second, or perhaps a third time.

The figures in brackets after certain names indicate the pages in the Alphabetical List where fuller descriptions of such species may be found.

At the main entrance will be noticed two fine specimens of the Cohune-nut Palm (18). On entering the Gardens, the first tree to attract attention, especially if in flower, is the beautiful *Amherstia nobilis* (13). On either side of this splendid tree are good specimens of a very handsome native tree fern, (*Cyathea arborea*), and there are many other specimens of the same species in various parts of the Gardens. The visitor should turn to the left on entering. Beyond the *Amherstia* will be noticed a fine mass of *Sanchezia nobilis*, a handsome shrub from Ecuador with red bracts and yellow flowers; in the same border are many other ornamental plants such as *Codiaeums* (Crotons), *Ixoras*, *Cordylines*, *Panax*, the splendid *Cyanophyllum magnificum*, *Monstera deliciosa*, (45). *Hibiscus* in variety, &c. In the border on the left is a small tree of *Podocarpus elongata* (52), over which is growing a plant of the Purple Wreath (*Petrea volubilis*), a beautiful climber from tropical South America, which produces copious masses of flowers, the violet-like corolla set in the calyx of a lighter shade of purple. On the fence notice a large-leaved climber; this is *Bauhinia Vahlii*, an enormous climber, doing in this way damage to forest trees in India, but it is very useful, as the strong fibre of the bark is made into ropes. Near the path is a tree of *Liquidambar* (40), and near the end is a fine *Pandanus* with orange-scarlet fruits, (49) and a tree of *Fagraea obovata*. This border, like the one on the right, is filled up with a varied assortment of ornamental plants.

Passing under the old Mango tree, over which is growing a strong plant of the handsome *Norantea Guianensis* (48), the visitor should follow the path leading to the Arboretum. On the rising ground to the right is a large clump of *Dracæna Draco* (31), and in front of this, near the path, is a small specimen of Mahogany (58). Below the Mahogany is a tree of the Rambutan (48), and further up the slope will be noticed *Carapa guianensis*.

* I am indebted for this itinerary to Mr. W. Harris, F.L.S., Resident Superintendent of this Garden for 6 years, and also for much valuable help in the preparation of the Guide.

The visitor should turn sharp to the left here, taking the path skirting the Arboretum. Dotted about are many specimens of *Cyathea arborea*, on the left hand is a tree of *Casuarina stricta*, then a tree of *Pachira aquatica* (49). On the right will be noticed a fine tree of *Parkia Roxburghii* (50), over which is growing *Landolphia Heudelotii*, one of the African rubber vines. On the left again, the visitor will notice a bushy tree, with large handsome leaves, and beautiful pale golden yellow flowers, this is *Wormia Burbidgei*, and next to it is a tree of *Pachira Barrigon* (49). On the right, the visitor will observe two healthy trees of lemon-scented Pimento (51), and above and behind them are two trees of *Garcinia indica* (35), and large trees of *Ficus Benjamina* (34), and *F. rhododendrifolia*. Near the path is an Australian *Acacia*, the trunk and branches of which are clothed with *Polypodium lycopodioides*, and *Cereus grandiflorus*.

On the left again, behind a young tree of *Podocarpus elongata* (52), is a fine specimen of *Barringtonia speciosa* (19), and immediately behind it is a tree of *Ficus religiosa*, the Peepul (34). Near the walk will be noticed a Teak tree (58), so valuable for its timber, and back near the fence is another fine plant of *Norantea Guianensis* (48). The climbing plants along the fence are *Bignonia magnifica*, with its magenta-purple flowers (21), and *Landolphia florida*, another of the African rubber vines (39). Near the *Norantea* just mentioned is a tree of *Semecarpus Anacardium*, the marking nut of India (56). On the right-hand side the visitor will notice *Apeiba Tibourbou* (14), *Cordia alba*, a species with beautiful white flowers, and whitish, almost transparent fruits, and *Pterospermum acerifolium* (53). Behind this latter tree is a specimen of *Dipteryx odorata*, the Tonquin Bean (30). On the opposite side of the path notice a tree of *Hevea Spruceana*, one of the species that yield Para rubber (37), and a little further along, and further back is *Sterculia alata* (57). The visitor will now notice two fine trees, *Ficus Benjamina* (34) on the left, and *F. indica* (34) on the right. At this point a bend of the Wag Water river comes into view. The flat land on the left bank of the river is planted with the Ippi-appa plant to enable the Gardens to supply roots of the plant when required. Following the course of the path, the visitor will notice a tree of *Stereospermum chelonoides* (57) near the fence; this tree is being rapidly covered with *Bignonia magnifica* (21) and *Landolphia Heudelotii*. In the corner, near the small gate of the Ho el Cottages is a tree of the handsome *Lagerstræmia Flos-reginæ* (39). The visitor should follow the main path here, and below the Cottages will be noticed fine clumps of the Chinese dwarf Bamboo (*Bambusa nana*), and *Pandanus Candelabrum*, the Candelabrum or Chandelier tree from tropical Africa. Observe the numerous large

aërial roots, which look like stems, and secure the trees in position. On the right is a tree of *Brexia madagascariensis* (22), a young tree of *Ficus lucida*, and behind this a specimen of the Looking-glass tree (37).

On the slope on the left the visitor will observe trees of *Mimusops Elengi* (45), *Eugenia malaccensis* (33), *Bombax malabaricum* (21), *Cordia alba*, *Ficus religiosa* (34), *Ficus indica*, *Baphia nitida* (19), *Cinnamomum* *Cassia* (25), &c., whilst amongst those on the right-hand are *Trachylobium verrucosum* (59), *Pterospermum lanceæfolium* (53), the Camphor (24), and the Marking-nut tree of India (56).

Follow the path below the Superintendent's house, and on the left, at the bottom of the slope, observe a tall specimen of the curious "Cucumber tree," *Rigelia pinnata* (39); on the opposite side of the path is a large bushy shrub with white flowers, *Tabernæmontana longiflora* (58). A little further on, and standing further back, is a fine specimen of *Phyllanthus Emblica* (50), and behind this is a tree of *Mammea americana*, the mammee apple (40). Below the curve in the path is a tree of the celebrated Mangosteen (35), and opposite the curve is a large, healthy tree of *Ficus Vogelii* (34), an African species. Beyond this, on the right, is a fine specimen of the Ceylon Cinnamon (25), also trees of *Cordia Myxa* and the Soap-berry (56). On the left, at the corner, will be noticed an *Araucaria*, the Bunya-bunya Pine of Queensland (14). The visitor should now turn up towards the Superintendent's Office, and follow the path leading down to the Palmetum. On the slopes near here will be noticed a low-growing palm, *Sabal Adansoni* (55), and further along the slope to the right are *Spathodea* (57), and the Sierra Leone Peach (56). On the top of the bank behind the Office, beside the Chinese dwarf Bamboo, is a healthy tree of the beautiful Akee (21). The path now runs down the steep slope in a series of zigzags, to ensure an easy grade. On the bank above the first turn is a splendid clump of *Monstera deliciosa*, always flowering and fruiting (45), and an equally fine clump of the Ground Rattan Palm (55). On the steep slopes here are many fine Cycads, low-growing Palms, *Alpinia nutans*, a very handsome species from India, with drooping racemes of sweetly-scented pink-and-yellow flowers. Above the second turn in the walk are handsome clumps of *Dracæna Draco* (31) and *Arenga Wightii* (16). At the bottom of the sloping ground the path branches off in three directions, but the better course will be to follow the branch going straight on through the Palmetum, at which the visitor has now arrived.

There is here a splendid collection of Palms, Cycads and Screw Pines from all parts of the tropics in which these plants are found.

It will not be possible to do more than draw attention to some of the more prominent specimens near the paths. Those who are specially interested in these handsome trees and plants must go through the collections and examine the numerous species individually.

At the bottom of the slope, on the right, is a grand specimen of *Oreodoxa regia*, the Royal Palm (49), and underneath it is a fine example of *Stevensonia grandifolia* (57). On the left, notice *Diplothemium caudescens* (30), and near it is a specimen of a native species, *Sabal umbraculifera*. Behind this, and further up the slope is a fine tree of *Raphia tædigera* (54) also *Raphia Ruffia* (53), *Geonoma (Calyptrogyne) Swartzii* (36), and *Oreodoxa oleracea*, the native Cabbage Palm. The visitor then passes in succession, *Caryota furfuracea* from Java, *Phoenix acaulis* from India, *Cocos flexuosa* from Brazil, *Livistona australis* from Eastern Australia, *Livistona rotundifolia* from the Malay Isles, &c. On the lawn on the right are two fine Araucarias, *A. excelsa* and *A. Cunninghamii*, the Norfolk Island Pine and Moreton Bay Pine respectively (14 & 15).

The path now branches again, but the visitor should take the branch to the right. Notice on the slope on the left, a fine plant of *Stevensonia grandifolia*, and behind it *Corypha elata*, from India, a noble palm with immense leaves. On the same slope are a native *Thrinax*, the handsome *Phœnix rupicola* (50), and *Hyophorbe Verschaffeltii* (39). On the right is a handsome and well-grown species from Ceylon, *Oncosperma fasciculatum* (48), also *Hyophorbe amaricaulis* (39) with its swollen trunk, and *Verschaffeltia splendida* from the Seychelles (59).

The visitor should now turn in towards the Water-lily Tank. Here will usually be found in flower *Nymphæas*, *Eichhornia*, and other aquatics. The *Victoria regia* (59) is also grown and may be seen in flower early in the mornings, or late in the afternoons during the summer months.

Round the tank are tree ferns, (*Cyathea arborea*), and on one side are many clumps of *Carludovica jamaicensis*, the Ippi-appa plant. On the sloping ground above the tank are many fine Palms, *Dypsis pinnatifrons*, *Areca Alicia* (15), &c.

The visitor should now resume his walk round the Palmetum. Near the Lily Tank will be noticed on the left three immense clumps, each consisting of many stems. The first is *Chrysalidocarpus lutescens*, a handsome palm from Madagascar, the second is *Ravenala madagascariensis*, the Traveller's Tree (54), and the third is *Dendrocalamus strictus*, (29).

On the right are some handsome palms, *Areca Alicia* (15), *Euterpe edulis* (33), *Raphia tædigera* (54), *Oreodoxa regia* (49),

Elæis guineensis, the African Oil Palm (31), *Phytelephas microcarpa*, the Ivory-nut palm (50), *Arenga Wightii* (16), *Dictyosperma rubrum* (29), and many others.

The visitor will now have arrived at the end of the straight path, and will notice a fine Pandanus, on the left. Turn to the right here. On the left side of the path is a fine clump of *Heliconia Bihai*, a handsome native species; along the same, border will be noticed a number of tall Palms, the Betel-nut of the East (15). Notice the beautiful *Selaginella Willdenovii* growing in the greatest luxuriance and covering everthing that comes in its way. This fine species is a native of Cochin China. On the right hand are many Palms already noticed. At the corner of the lawn the visitor should turn up to the right. A clump of the spiny *Astrocaryum flare* is near the path and behind this is a tree of the equally spiny *A. vulgare*. Further back observe the graceful *Cocos plumosa* and near the path the low *Cocos australis* is noticeable. Above the Cocos are two fine clumps of the Indian *Wallichia caryotoides*. A slender-stemmed, graceful palm will also be noticed here, it is *Ptychosperma gracilis* from New Ireland. In the border on the left are two fine trees of the native Gru-Gru Palm, *Acrocomia lasiospatha* (15) and near them will be noticed the elegant, low-growing *Pandanus graminifolius* from Tenasserim, and the large *Pandanus odoratissimus* from tropical Asia

On the right are several fine specimens of *Pandanus utilis* (49), *Cycas revoluta* (28), *Cycas circinalis* (29), one with a trunk 20 feet high; the native *Zamia integrifolia* (60), and others. Other Palms in this part of the lawn are a splendid clump of *Arenga Wightii* (16), *Areca Aliciae* (15), *Dictyosperma album*, the Madagascar Piassava Palm, *Livistona chinensis* (40), *Heterospatha elata* (37), &c. On the left, near the large *Oreodoxa regia* previously mentioned, is the largest clump in the Gardens of *Chrysalidocarpus lutescens* (24). This clump consists of nearly 200 bamboo-like stems, each with a crown of graceful, yellowish leaves. The visitor will now have returned to the starting point in his walk round the lower portion of the Palmetum. The upper portion is on a rather steep hillside, and it contains many fine trees, the majority, however, are duplicates of those growing in the lower portion. Now take the branch of the path that turns down to the left between two borders, one planted mainly with *Codiaeums* (Crotons) and *Hibiscus* in variety, the other with *Roses*, *Ixoras*, &c. At the end of the border on the right is an old tree of Camphor (24), and further down is a fine plant of *Medinilla magnifica* which produces in abundance its beautiful rosy-pink flowers, which are borne in large, terminal, pendulous racemes. This beautiful plant is a native of Manila.

A tree of *Cynometra americana* (29) will be noticed on the left, and over it is growing a strong plant of the handsome-flowered *Beaumontia grandiflora* of India. Lower down on the right, is a good specimen of *Mesua ferrea*, the Naghas tree of the Hindoos (44), and beyond this, in the shade, are some healthy young trees of the magnificent Palm, *Licuala grandis*, a native of New Britain. Next to these, is a tree of *Hydnocarpus venenata*, (*H. inebrians*), (38).

On the opposite side of the path will be noticed the interesting *Napoleona imperialis* (47), and behind it will be seen *Oncoba spinosa* (48), and a curious shrub from Brazil, *Stiffia chrysantha*, with terminal heads of orange-coloured flowers, resembling a bottle-brush. On the right again will be noticed the Indian Rose-wood, *Pterocarpus indicus* (53), *Brezia madagascariensis* (22), the Sissoo, *Dalbergia Sissoo*, an East Indian timber tree, and *Samadera indica* (55).

In the borders here are many ornamental shrubs, such as *Acalyphas*, *Aralias*, *Panax*, *Ixoras*, *Allamandas*, many varieties of *Hibiscus*, various *Melastomaceous* plants, *Sanchezia nobilis*, &c.

The visitor has now returned to the Norantea-covered Mango previously noticed, and should turn up to the left, to what is known as the Circle,—the centre of the Gardens. Shrubs of an ornamental character grow on either side of the path. The Circle is divided by paths into four large beds, somewhat triangular in outline, but not uniform in shape or size, the obtuse apices converging towards a circular path and bed in the centre. A pathway and large borders, in which are many interesting trees and shrubs, surround the whole. On entering this circular space the visitor should again turn to the left. Shrubs such as *Azaleas*, *Camellias*, *Ixoras*, *Allamandas*, *Mussaendas*, *Acalyphas*, *Codiaeums*, &c., meet the eye everywhere in the surrounding borders, whilst the beds in the centre are planted chiefly with *Roses*, and at the apex of each bed are one or two ornamental wire arches over which climbers of various kinds are trained. Observe in some of the Rose beds fine plants of the beautiful climbing lily, *Gloriosa superba* (36). Notice also, in the shrub border on the left, the handsome *Brownea Rosa-de-monte* (22), and behind it is a tree of Para rubber, *Hevea brasiliensis* (37)

In the second border, still on the left as the visitor walks round the Circle, is an old tree of the handsome *Colvillea racemosa* (27). Near it is *Pinus Massoniana* (51), and towards the end of the bed, *Posoqueria longiflora* (2) and the Wild Olive, *Bontia daphnoides*, are noteworthy trees.

In the third border, the Balsam of Tolu (47), the Jujube tree (61), *Fagraea obovata* and *Flacourtia Ramontchi* may be observed, whilst in the fourth border, some of the principal trees are

the beautiful *Jacaranda filicifolia* (39), *Cassia nodosa* (23), *Michelia Champaca* (45), the *Amherstia* which faces the entrance gate, and *Colvillea racemosa* (27).

In the angle formed by two of the centre Rose beds, will be observed a bush of *Cerbera fruticosa*, native of Burma. The name *Cerbera* is intended to imply that the plants to which it belongs are as dangerous as Cerberus, and some of them are indeed very poisonous.

The visitor should now retrace his steps a few yards, and turn down the path to the right. On the right of this, near the *Jacaranda* just mentioned, is an interesting bush, native of Madagascar, &c., *Phyllarthron comorense* (50) Observe a tall specimen of *Tristania conferta*, a fine shade tree which grows to a height of 150 feet. It is a native of New South Wales and Queensland.

On the left of the path is a fine Mangosteen (35), which regularly bears a crop of its delicious fruits. Next to the Mangosteen is a fine clump of Ippi-appa, and near this is a small tree of *Dipteryx odorata*, the Tonquin Bean (30). The visitor will now have arrived at the main path from the entrance gate, and he may observe the following trees in the border facing him, viz.—*Averrhoa Carambola*, the Caramba (19), *Dracæna Draco*, the Dragon's Blood tree (31), and *Cynometra americana* (29). Turn to the left here, and on the right observe an old Olive, *Olea europæa* (48). The Olive has never fruited in Jamaica. Beyond the Olive is a fine bush of *Medinilla magnifica* previously noticed. In the shrubbery on the left of the path may be seen an old tree of the poisonous Manchioneal, *Hippomane Mancinella* (38), and further along is a fine young Naghas tree, *Mesua ferrea*. The visitor should now turn down the small path to the right, and through the small gate to the site of the old nursery. On the left, observe a handsome tree with thick, dark-green leaves, and a reddish fruit about the size of an apple. This is one of the true Ebony trees, *Diospyros discolor*, the fruit of which is known as Mabola (29). Behind the Mabola tree is a large specimen of the Bois Immortel, *Erythrina micropteryx* (32), and beyond this, inside the enclosure, are about a dozen handsome tree ferns, *Cyathea arborea*. Notice the woody climber with large, roundish, dark-green leaves behind the tree ferns; this is *Anamirta paniculata*, (14), a native of the East Indies, Burma, Ceylon, &c. Near this is a tree with light green leathery leaves, and round fruits about an inch in diameter. It is *Noronhia emarginata*, a native of Madagascar.

The visitor will not fail to notice the beautiful *Selaginella Willdenovii* here. The place where it grows so luxuriantly, is really a natural rockery, made up of large boulders embedded in the soil, numbers of large stones, and debris. It is on sloping

ground and is over sixty yards in length, and from twelve to fifteen yards in width. Several trees were originally planted in the spaces between the boulders, and many other trees and shrubs have grown up from seeds dropped by birds or rats. The *Selaginella* completely covers the whole space. Every rock and stone is hidden, the majority of the shrubs are covered, and the limbs of some of the trees, to a height of over twenty feet, are festooned with this handsome species. In the early morning, when dripping with dew, or in certain lights, the peacock-blue foliage of this graceful plant is wonderfully beautiful.

Of the trees growing amongst this mass of *Selaginella*, the visitor may observe a fine specimen of *Raphia Ruffia*, the *Raphia Palm* (53), *Grias cauliflora*, the Anchovy Pear of Jamaica, with several stems, each with a crown of magnificent foliage, *Baphia nitida*, the Cam Wood (19) and several others. Notice the fine Aroids which clothe the trunks and limbs of several of the trees. The one with the dark-green pinnatisect leaves is *Epipremnum mirabile*, the Tonga plant from the Malayan Archipelago. It is specially interesting for the manner in which the plant changes its appearance as it develops from its juvenile state with small entire leaves, to its adult, flowering stage with large pinnatisect leaves. The plant is said to be a specific for neuralgia. The other plant has large heart-shaped, ovate, thick leaves of a dark-green, boldly and irregularly marked by bands or fantastic shaped blotches of creamy-yellow, here and there suffused with pale yellowish-green. It is *Pothos aurea*, and is a native of the Solomon Islands.

Among the trees on the right of this enclosed space, are an Almond, *Terminalia Catappa*, *Eugenia malaccensis*, the Otaheite or Malay Apple (33), *E. javanica*, the Wax-Jambo, from the Malay Islands, some fruiting Nutmeg trees (46), and several old Mangoes, &c. The Mangoes are of special interest as they are the original trees imported by Governor, Sir John Peter Grant, from India in 1869. They were grafted plants of the best named varieties, and included the following:—*Dalhogni*, *Madame*, *Khyroapatty*, *Bhadoorea*, *Bangalore*, *Madras*, *Goa*, *Langeria*, *Soon-derehaw*, *D' Cruze's Favourite*, *Agabey*, *Bombay*. Mangoes rarely fruit in the wet district of Castleton, but young plants have been established at the Hope Gardens.

Observe the *Vanilla* (59) growing on the trunks of various trees. It luxuriates in this warm, moist climate.

The plant sheds contain collections of Orchids, Ferns, Begonias, *Alocasias*, and other tender ornamental plants requiring special treatment and shelter from heavy rains.

On some of the Mangoes near the plant sheds, *Piper nigrum*, the Black Pepper plant may be observed. The visitor should now

cross the small stream and turn to the right towards the public road. The sloping ground on the left of the path is planted with Nutmegs, many of which bear heavy crops annually. Cross the public road and enter the small gate on the opposite side. The visitor has now arrived at the part of the Gardens which may be described as the Experimental Grounds. Here will be found various kinds of Coffee, Cocoa, Rubber and other economic plants.

On either side of the path observe a row of plants of the "Pine Palm" of Japan (29). At the end of these, the path branches to the right, but the visitor should follow the course of the path round the oval Rose bed in the grass.

On the left, near the bank of the stream, is a specimen of the Jac-fruit (17). In the corner on the left are a Gru-Gru Palm (13), and two young trees of Coco-de-Mer (40). At the end of the oval bed, in the grass on the left of the path, notice a healthy tree of Trincomali Wood (20). A branch of the path runs to the bank of the river from this point, but the visitor should turn to the right, taking the other side of the oval, back to the rows of Pine Palm, and then turn to the left. At the corner here, on the left, observe a tree of the Sea-side Grape (25), and next to it is a small tree of the Baobab (13). Above the latter, in the corner, are several healthy bushes of Sierra Leone Coffee.

The path now turns to the left, and the visitor should follow this. The first tree on the right, a handsome, spreading tree, is the Lakoocha of India and Ceylon (17), beyond which is a tree of *Guango Pithecolobium Saman*, on the trunk of which the Vanilla flourishes.

A plantation of low, dark-green bushes will now be noticed; these are Liberian Coffee (27). On either side of the path here are various rubber-producing trees,—Lagos Silk rubber (34), Para rubber, *Hevea Spruceana* (37), Ceará rubber, *Manihot Glaziovii* (41), and Castilloa rubber, *Castilloa elastica* (23). Other trees growing in this part of the grounds are Oranges, Pomegranate, Pimento (51), Croton Tiglium (28), Durian (31), Jac Fruit, *Dillenia indica* (29), &c. At the end of the Liberian Coffee plantation are some old Cocoa trees (8), and a fine tree of Sapucaia-nut (39). On the left of the path, near the large trees of Castilloa, are two good trees of Sapucaia-nut, a very tall tree of Ilang-ilang (22) and further on, near the path, is a fine tree of the Ceylon Cinnamon (25). The path turns up to the right here, but the visitor should first take the branch leading to the river.

On the right of the path is a plantation of Cocoa (58), with Bananas (46) for shade. Below this the path turns to the left towards three splendid clumps of Bamboo, under the arching stems of which benches and small tables are fixed for the convenience of visitors. No more delightful spot than this could be

selected in the Gardens for a rest, or a picnic, —under the dense shade of the well trained Bamboos and within a few yards of the river.

The visitor should now retrace his steps to the tree of Ceylon Cinnamon recently noticed, and take the path turning up to the left. On the right is a tree of *Bauhinia variegata* (20), and close to the path may be seen a most interesting specimen, the Cannon Ball tree (28).

On the left is a small, slender tree of the Cedron (56). The visitor should take the short path to the left here. On either side of the path observe fair sized trees of the Brazil Nut (20). On the right may be seen trees of the Mahwa (19), Cocum, or Kokam Butter (35), several handsome Palms, and some Nutmeg trees (46), also beds of Turmeric, *Curcuma longa*, which is extensively cultivated all over India for its rhizomes. Turmeric is employed as a condiment, and is a constituent of the well known Curry Powder, and of many other articles of Indian cookery; Arrowroot (42), Cardamom and Ginger. Beyond these is the Cocoa and Banana plantation already noticed.

The visitor should now turn back to the main path, and in the corner on the right may be observed a Clove tree (33) and a Durian (31). At this point, instead of going out to the public road, the visitor should turn down to the right. In the border on the left observe a fine tree of *Bauhinia megalandra* (20). The vigorous-growing climber on the fence is *Faradaya splendida* (33), and near it is a good specimen of the native *Swartzia grandiflora*, a handsome leguminous tree with clear yellow flowers. On the right observe a tree of Bois Immortel with Vanilla growing freely on its trunk. On the left of the path again the visitor may notice a specimen of the beautiful flowering tree, Rhodoleia (55), and next to it is a large specimen of the Asoka (56), and trees of the beautiful golden-yellow flowered Tabebuia. The next tree is *Zizyphus rugosa* (61), and behind this, near the fence is a fine tree *Pterocarpus Draco*, the West Indian Dragon's Blood. In the centre of the path here is a specimen of *Morinda citrifolia*, the Indian Mulberry, a small tree or bush, native of the East Indies, but widely distributed in the tropics either as a naturalized, or a cultivated plant. It is a variable plant, the roots of the different forms of which are used in India for dyeing red. Most of the red cotton turbans worn in Madras are coloured with it. Observe the Vanilla growing on the stems of the Morinda.

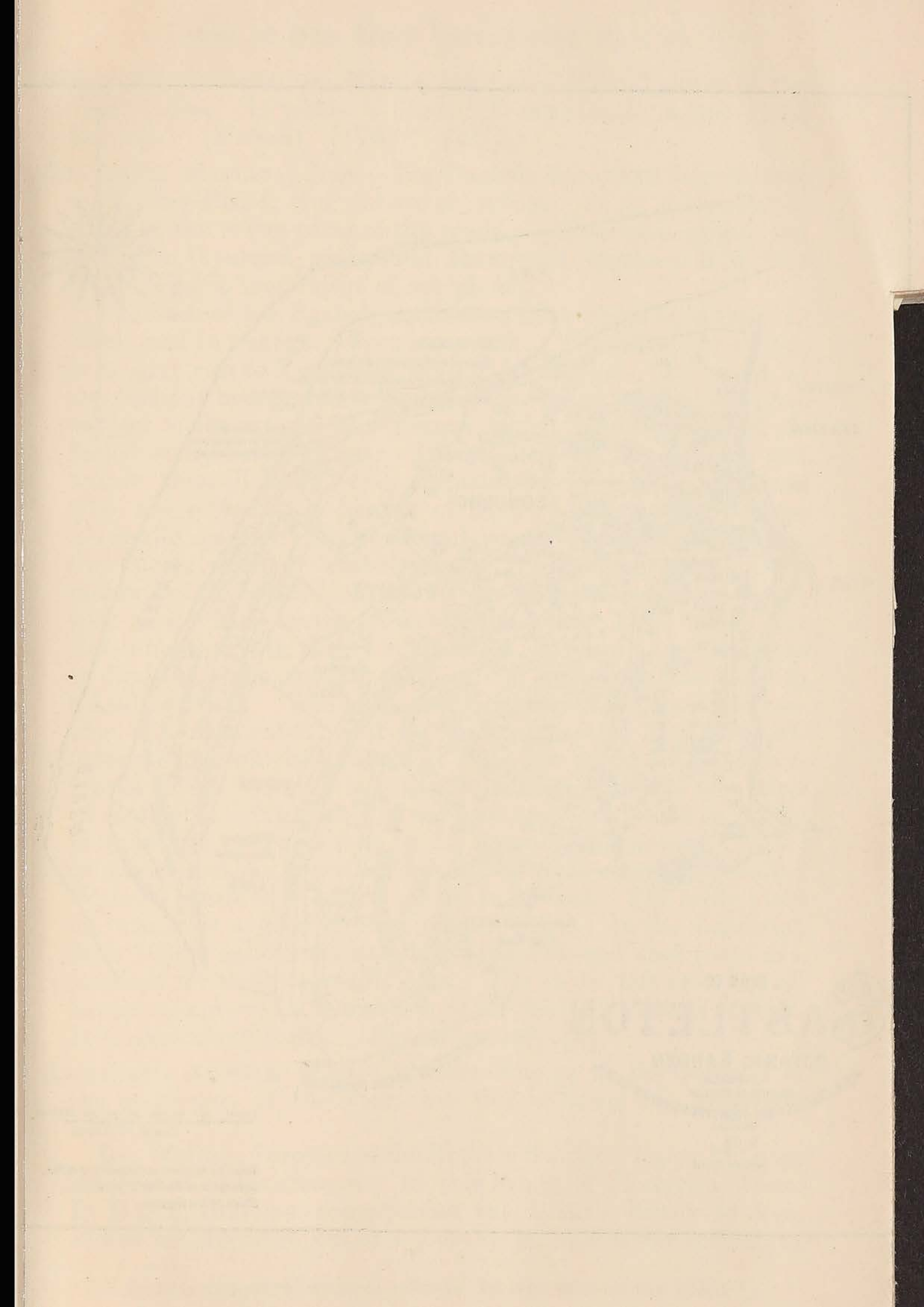
The trees on the right are *Eriobotrya japonica*, the Loquat, or Japanese Medlar, which is cultivated as an edible fruit in the East, and behind these are the Liberian Coffee bushes already noticed. On the left are trees of Ebony, *Diospyros Ebenum* and *D. montana* (30), and a large bush of *Tabernæmontana crassa*

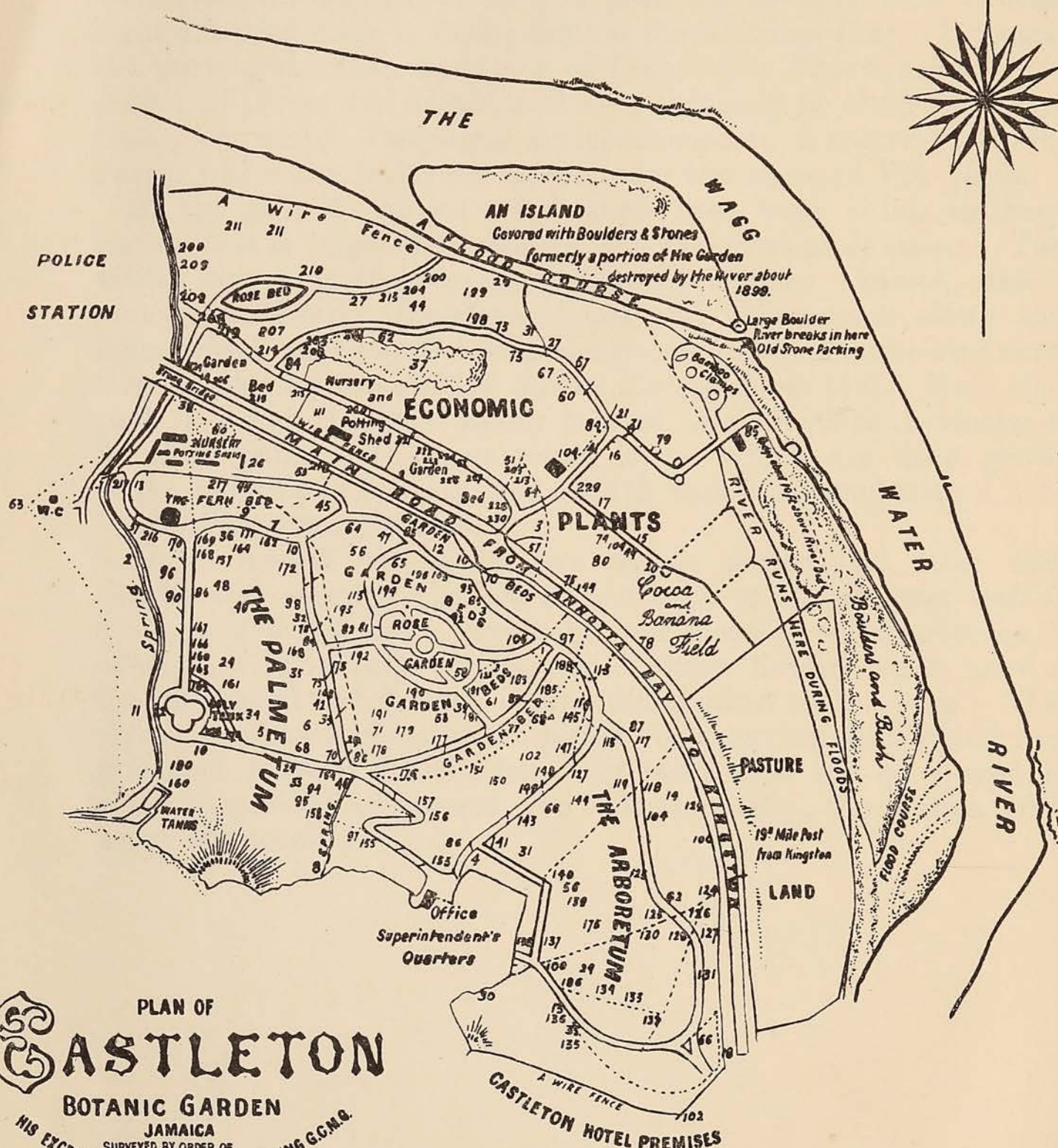
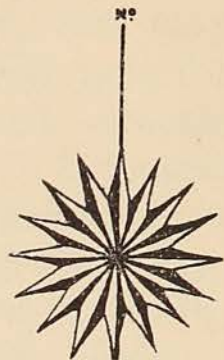
from tropical Africa. Observe the long stems of *Calamus Rotang* the Rattan Cane (22), a native of India, Burma and Ceylon, climbing up amongst the limbs of the Guango tree near the fence. The tree near the path here is the Indian Tulip (59).

The visitor has now arrived at the small Nursery, and may notice a miscellaneous collection of plants in bamboo pots for distribution. The tree near the path on the left, with smooth, light-coloured bark, is *Pithecolobium Berterianum* (52). Opposite the potting shed is a specimen of *Podocarpus Nageia variegata*, a native of China and Japan, and near this may be observed a specimen or two of *Vangueria madagascariensis*, a native of Madagascar where the fruits are eaten under the name of Voa-vanea.

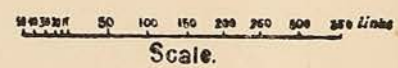
At the side of the path is a small tree with thick, leathery leaves, this is *Omphalea triandra*, the Cob Nut of Jamaica. The visitor may here observe grand trees of *Attalea Cohune*, *Astrocaryum mexicanum*, *Livistonas*, *Cocos*, and other palms along the fence which runs parallel with the public road. Notice two very large spreading trees of the native *Enterolobium* (32). Near the path is a nice healthy young tree of *Acanthorhiza aculeata*, a Mexican palm, with large round leaves which are deep green above and silvery beneath, and a trunk that is covered with a network of branching spines.

In the end of the border are various ornamental trees and shrubs, and amongst the latter, is a bush of *Randia macrantha*, a native of Brazil and a very handsome plant when covered, as it often is, with its large white or pale yellow flowers which have a funnel-shaped corolla and a tube about nine inches long. The visitor has now arrived at the public road, having been round the principal parts of the Gardens. If more time can be spared, a closer inspection of some of the collections, e.g., the Palms, will repay the trouble.





PLAN OF
CASTLETON
BOTANIC GARDEN
 JAMAICA
 SURVEYED BY ORDER OF
 HIS EXCELLENCY SIR AUGUSTUS HEMMING G.C.M.G.
 JUNE 1902
 COLIN LISDALL
 Surveyor General



Note: The numbers on the plan refer to the
 Description of the Plants in the
 Guide to the Garden.

ACROCOMIA LASIOSPATHA, *Mart* —“Gru-Gru Palm,” native of the West Indies. It yields a fibre “of remarkable softness and fineness.” (*Palmæ*) [173]* (Pl. 5)

ADANSONIA DIGITATA, *Linn.*—The Baobab, Ethiopian Sour Gourd, or Monkey-Bread, is a native of Africa. It is cultivated in many of the warm parts of the world. It has been called ‘the tree of a thousand years,’ and Humboldt speaks of it as ‘the oldest organic monument of our planet.’

The bark of the Baobab furnishes a fibre which is made into ropes, and in Senegal woven into cloth. The fibre is so strong as to give rise to a common saying in Bengal: ‘As secure as an elephant bound with a Baobab rope.’ The wood is soft, and subject to the attacks of a fungus which renders the part affected easily hollowed out. This is done by the negroes, and within these hollows ‘they suspend the dead bodies of those who are refused the honour of burial. There they become mummies, perfectly dry and well preserved, without any further preparation or embalmment.’ Livingstone speaks of a hollow trunk, within which 20 to 30 men could lie down with ease. The leaves pounded constitute *Lalo*, which the Africans mix with their soups, sauces, &c., not as a relish, but to diminish the excessive perspiration, and keep the blood in a healthy state. ‘The pulp of the fruit is slightly acid, agreeable, and often eaten; and the juice expressed from it constitutes a drink which is valued as a specific in putrid and pentalgic fevers. Owing to this circumstance it forms an article of commerce.’ The ashes of the fruit and bark boiled in rancid palm oil are used as a soap by the negroes. (*Malvaceæ*) [219.]

ALEURITES TRILOBA, *Forst.*—The Candle-nut, sometimes called Walnut, grows to a height of 30 to 40 feet. The seeds yield oil, which is a good drying oil for paint. In the Sandwich Isles 10,000 gallons are annually produced, and used there as a mordant for their vegetable dyes. The cakes left after the oil has been expressed, are used as food for cattle and also as manure. It thrives along roads. (*Euphorbiaceæ*) [2]

AMHERSTIA NOBILIS, *Wall.*—Visitors who go to the Gardens in the early part of the year, will find in flower the *Amherstia nobilis*.

Dr. Wallich, Director of the Botanic Gardens, Calcutta, gives an account of his discovery of this Prince of Flowering-Trees. In March, 1827, he accompanied the British Envoy to Ava, and in his official report of a journey on the River Saluen, in

* The figures in square brackets refer to the numbers on the Plan.

order to examine the site and capabilities of the Teak-forests in that direction, thus writes: "In about an hour I came to a decayed Kioum (a sort of monastery), distant about 27 miles from the town of Martaban. There were two of these trees here; the largest, about 40 feet high, with a girth at 3 feet above the base, of 6 feet, stood close to the cave; the other was smaller. They were profusely ornamented with pendulous racemes of large vermilion-coloured blossoms, forming superb objects, unequalled in the flora of the East Indies, and, I presume, not surpassed in magnificence and elegance in any part of the world. The ground was strewed, even at a distance, with its blossoms, which are carried daily as offerings to the images of Buddha in the adjoining caves. Round the spot were, also, numerous individuals of *Saraca indica* in full bloom, inferior in beauty only to those trees."

This tree, which when in full blossom is the most strikingly "superb object that can possibly be imagined," Dr. Wallich named in compliment to Lady Amherst.

The Duke of Devonshire sent a collector to Burma on purpose to procure a plant, and in 1839 the first living specimen was successfully brought to Chatsworth. However, a plant presented by the Governor-General, Lord Hardinge, to Mrs. Lawrence, in 1847, was the first to flower in England in 1849, when it was only 11 feet high.

For its perfect development, this tree requires a hot damp atmosphere. (*Leguminosæ*) [3]

ANAMIRTA PANICULATA, *Colebr.*—A woody climber with large roundish, dark green leaves. A native of the East Indies. The dried fruits, known as "Cocculus Indicus," are exported from India and are used medicinally, and it is said also for adulterating beer and ale. For the latter purpose they are said to be employed to impart a bitter taste to malt liquors, and to increase their intoxicating effects.

APEIBA TIBOURBOU, *Aubl.*—Native of Guiana and Brazil. The wood being light and soft, is used in Brazil for making the raft boats called *jangadas*. (*Tiliaceæ*) [123]

ARAUCARIA BIDWILLII, *Hook.*—The Bunyan-bunya Pine of Queensland has a large edible seed. It is the loftiest of the Araucarias, reaching a height of 250 feet. The timber is suitable for furniture, being beautifully streaked; it is hard, close-grained and durable. (*Coniferæ*) [4]

ARAUCARIA CUNNINGHAMII, *Sweet*—The Moreton Bay Pine forms forests in eastern Australia and New Guinea. It grows from 100 to 130 feet high. The timber takes a high polish, and compares favourably with satin-wood and birds-eye-maple. (*Coniferæ.*) [5] (Pl. 3, 16.)

ARAUCARIA EXCELSA, *R. Br.*—The Norfolk Island Pine is a lofty tree of symmetrical growth, with the branches arranged in regular horizontal tiers. Some of the trees in Norfolk Island on the coast of Australia are 220 feet high. The timber is used for building and other purposes. (*Coniferæ*) [6] (Pl. 3, 16.)

ARCHONTOPHŒNIX CUNNINGHAMII, *H. Wendl. & Drude.*—A fine Palm, native of Queensland and New South Wales. (*Palmæ.*) [180] (Pl. 1.)

ARECA ALICIÆ, *W. Hill.*—An elegant Palm from tropical Australia. (*Palmæ.*) [160]

ARECA CATECHU, *Linn.*—The Areca or Betel-nut Palm has a lofty, straight and very slender stem,—the Hindoo poets speak of it as “an arrow shot from Heaven”

Low, in his ‘History of Borneo,’ says:—“The flowers are deliciously fragrant; they are in request for all festive occasions, and are also considered a necessary ingredient in the medicines and charms employed for healing the sick; their delightful perfume together with the graceful feathery foliage, borne on a slender and elegantly tapered stem, renders this tree the universal favourite among the Palm tribe.”

The fruit is about the size of a small hen’s-egg, of an orange colour, and hangs in long bunches below the dark green leaves. The outer part of the fruit is hard and fibrous, then comes the shell, enclosing the kernel of Betel-nut.

It is for this nut, that the palm is so extensively cultivated in the Malay Archipelago, and the practice of chewing it is universal amongst the natives. The nut is cut into narrow strips, and rolled up with a little lime in the leaves of the Betel Pepper. The pellet, though acrid to the taste, is aromatic and astringent, and the mastication is considered wholesome. The natives would rather forego meat and drink than their favourite Areca Nut. The commerce in the nut is enormous. (*Palmæ*) [7]

ARECA GLANDIFORMIS, *Lam.*—A handsome Palm from the Moluccas. (*Palmæ*) [181]

ARENCA SACCHARIFERA, *Labill.*—The Sugar Palm is most abundant in shady forests on the banks of streams in Burma and the Malay Archipelago. It is so useful, that it is extensively cultivated, especially in hilly districts. It grows to a height of 30 or 40 feet.

At the base of the leaf-stalks is produced a fibrous material like coarse black horse hair which makes an excellent and durable cordage, resisting the action of water. Used as thatch, the roof never requires renewal. The coarse parts are used by

the natives as pens. The gossamer-like substance underneath the fibre is exported to China for tinder.

But this palm is grown chiefly for the production of sugar and palm-wine. Wallace gives the following account:—

“The sap which pours out of the cut flower-stalk of several species of palm when slightly fermented, forms palm-wine or toddy, a very agreeable drink; and when mixed with various bitter herbs or roots which check fermentation, a fair imitation of beer is produced. If the same fluid is at once boiled and evaporated, it produces a quantity of excellent sugar. The sugar-palm of the Malay countries, is perhaps the most productive of sugar. A single tree will continue to pour out several quarts of sap daily for weeks together, and where the trees are abundant this forms the chief drink and most esteemed luxury of the natives.”

The juice of the fleshy covering of the fruit is so corrosive that it causes inflammation of the skin. When the natives of the Moluccas were defending their forts against the attacks of the Dutch, they employed a liquor prepared by steeping the fruit in water, and so powerful was its effects, that the Dutch gave it the appropriate name of “hell-water.”

The young kernels of the fruit are made with syrup into preserves.

When the last flower-stalk has appeared and the tree dies, the stem is found to be almost hollow; it is particularly well adapted for troughs for water, and is very durable. All the central part of the stem is of a pithy nature, containing large quantities of starch.

If the tree is cut down before flowering, the starchy material is made into a wholesome meal, somewhat like sago. But if left to flower, the starch undergoes a natural change into sugar to build up the substance of flower and fruit. One tree yields about 150lbs. of meal. (*Palmae*) [8]

ARENCA WIGHTII, *Griff.*—A handsome palm from Malabar. (*Palmae*) [157]

ARTOCARPUS INCISA, *Linn.*—The Breadfruit tree of the South Sea Islands is a moderate sized tree, whose young branches are marked with ring-like scars indicating the spot where the large convolute stipules have been placed. The leaves are large, rough, dark-green, divided into lobes, something like those of a fig tree. The fruit is roundish, of the size of a melon rough on the exterior, marked with hexagonal knobs, or in some of the varieties smooth and of a green colour. The pulp in the interior is whitish or yellow and of the consistence of new bread. It is roasted or boiled before it is eaten, but has little flavour. The best varieties contain no seeds, the tree be-

ing propagated by shoots that spring from the roots. The tree contains a viscid milky juice, containing caoutchouc, which is used by the South Sea Islanders instead of glue, and for caulking canoes. They make use also of the timber of the tree, which is soft, and is said to attain a mahogany colour by exposure. The bark of the young tree is also fabricated into a coarse cloth. In the South Sea Islands, the breadfruit constitutes the principal article of diet, which is prepared by baking it in an oven heated by hot stones. The plant is now cultivated in the West Indies, but does not equal the plantain as an article of food. The history of its introduction into these Islands is associated with the well-known incidents of the mutiny of the crew of the 'Bounty,' which had been sent out under the command of Lieut. Bligh to procure breadfruit trees, at the earnest request of Capt. Cook, and the naturalists who accompanied him in his voyages. The first attempt was frustrated by the mutiny of the crew after the plants had been procured, and all promised well. A second attempt proved successful, and in 1793, Capt. Bligh landed several hundred breadfruit and other valuable plants in the Botanic Gardens, Jamaica.

(*Urticaceæ*) [209] (Pl. 5.)

ARTOCARPUS INTEGRIFOLIA, *Linn. f.*—Jac Fruit. East Indies and Polynesia. A tree with milky sap and large fruit. The bark yields gum, used as cement and bird-lime; and also as fibre. The juice is applied externally to glandular swellings to promote suppuration. The wood yields on boiling a yellow dye. The timber is used for carpentry, cabinet work, &c. "Yellow, hard, takes an excellent polish, is beautifully marked and is one of the handsomest furniture woods." Weight 40lbs. per cubic foot. (*Urticaceæ*) [200] (Pl. 5.)

ARTOCARPUS LAKOOCHA, *Roxb.*—A large tree nearly allied to the Breadfruit and Jac-fruit, met with in the outer hills of Kumaon, Sikkim, Eastern Burma and in the evergreen forests of the Western Ghâts and Ceylon. The fruit is acid, of an irregular roundish shape, 3-4 inches in diameter, velvety yellow when ripe.

A caoutchouc is derived from this plant.

The root yields a yellow dye. The wood is used in dyeing cloth yellow. A fibre is prepared from the bark, used for cordage. The fruit is eaten in curries in Kanàra (Bombay).

The sapwood is large, white, soft, perishable; heartwood yellow, hard. It seasons well and takes a good polish. Weight 30 to 50 lbs. per cubic foot. Used for furniture and canoes.

(*Urticaceæ*) [202]

ASTROCARYUM MEXICANUM, *Liebm.*—A handsome spiny Palm: native of Mexico. (*Palmæ*) [179]

ASTROCARYUM VULGARE, *Mart.*.—The Tucum Palm of Brazil is somewhat similar to our native Gru-gru (*Acrocomia spp.*) and like it, is covered with sharp spines.

It is of so much importance to the natives that where it does not already grow wild, it is carefully cultivated amongst their fruit trees and in their fields of cassava.

Cordage of exceeding fineness, and great strength and durability is prepared from the outer skin of the unexpanded leaves which is stripped off and twisted into thread, by rolling with the hand on the breast or thigh. It is chiefly used for bow strings and fishing nets on account of its special adaptation to such purposes. "The Brazilians of the Rio Negro and Upper Amazon make very beautiful hammocks of fine 'tucum' thread, knitted by hand into a compact web of so fine a texture as to occupy two persons three or four months in their completion. They then sell at about £3 each, and when ornamented with the leather-work borders at double that sum."—A. R. Wallace. (*Palmae*) [9]

ATTALEA COHUNE, *Mart.*.—The Cohune Palm is a native of Central America. Mr. R. Temple, when Chief Justice of British Honduras, called attention to this palm in the Journal of the Society of Arts. "The Cohune resembles in appearance the Coco-nut palm, but it is not nearly so high as that tree, and the trunk is considerably thicker. The order and regularity in which it grows is surprising. I have seen rows of it presenting the appearance of having been planted with the greatest care, long avenues which closely resembled naves and aisles of a cathedral, the arched leaves meeting overhead, and producing an exact imitation of the vaulted roof; if the sun was declining, the horizontal rays, shining at intervals through one side of the avenue, created the splendid effulgence of the most richly painted window.

"The Cohune bears a fruit about the size of a large hen's egg, which grows in clusters, each cluster resembling a bunch of grapes. The kernel tastes somewhat like that of the coco-nut, but is far more oleaginous, and the oil extracted from it is infinitely superior."

Notwithstanding the attempts made to introduce this oil into England, they have not been successful. Perhaps one reason is that the shell surrounding the kernel is hard and dense. (*Palmae*) [10]

AVERRHOA BILIMBI, *Linn.*.—The Bilimbi, has a somewhat similar fruit to the Carambola. The fruits grow on the trunk, and are used in pickles and curries. The flowers are made into preserves. (*Geraniaceae*) [11]

AVERRHOA CARAMBOLA, *Linn.*—The Carambola of the East Indies is a small tree with leaflets which are slightly sensitive. It produces an abundance of prettily shaped five-angled yellow fruits. The fruits are acid, but make an agreeable preserve, and are also used for making pickles and curries; the juice removes iron-mould from linen. The dried fruit is given in fevers, and is also an antiscorbutic. (*Geraniaceæ*) [12]

BAPHIA NITIDA, *Afz.*—Cam Wood has grown here to a height of 24 feet, measuring 30 inches in circumference at the base. It has papilionaceous flowers, white, with a small orange-yellow blotch near the base of the standard. Some hundred tons of the wood are imported into Great Britain annually from the west coast of Africa, but it is said not to be so easily obtainable at the present time. The logs are about 4 ft. long and a foot in diameter. It is a dyewood yielding a brilliant deep red colour, and is used for the same purposes as Brazil wood. The mordant employed is sulphate of iron; common English Bandana handkerchiefs are dyed with this material. In Africa the natives colour their bodies with the pounded wood and make use of the wood also in Fetish ceremonies. (*Leguminosæ*) [13]

Bar Wood is sometimes confused with Cam Wood, but it is a different tree, viz., *Pterocarpus erinaceus*, Poir.

BARRINGTONIA SPECIOSA, *Forst.*, has a remarkable four-angled fruit. From the seeds an oil is expressed, used for lamps. They are also mixed with bait to stupify fish. The fruits are employed as fishing-floats (*Myrtaceæ*) [14]

BASSIA LATIFOLIA, *Roxb.*—Brandis in his 'Indian Forest Flora' says of the Mahwa tree: "It attains 40 to 50 feet in height with a short trunk, 6 to 7 feet in girth, and numerous spreading branches, forming a close shady rounded crown."

Mr. Lockwood, magistrate and collector in Monghyr, 250 miles north-west of Calcutta, has published a most interesting and instructive account of this tree. He says: "This tree may be called a fountain yielding food, wine and oil to the inhabitants of the country where it grows." In appearance it might be mistaken for a mango tree. "But, unlike that of mango trees, which are uncertain in their yield, the Mahwa crop never fails; for the part eaten is the succulent corolla, which falls in great profusion from the tree in March and April. This season is a great feasting time for the humbler members of creation. Birds, squirrels, and tree-shrews feast among the branches by day, whilst the poor villagers collect the corollas which fall on the ground on all sides. Nor does the feasting end with the day. At sunset peacocks and jungle-fowl steal out from the surrounding jungle to share the Mahwa with deer and bears, many of which fall victims to the

bullets or arrows of the hunters, who sit concealed in the branches overhead. It grows on poor, stony soil, ill-suited to most other trees, or for the plough."

During the season of scarcity which prevailed at Behar during 1873-74, the Mahwa crop, which was unusually abundant, kept thousands of poor people from starving. The residue of the Mahwa which is not eaten is taken to the distilleries, and then with the aid of rude pot-stills is converted into a strong-smelling spirit, which bears considerable resemblance to whisky. When the essential oil, which gives a peculiar smell, is removed, the spirit comes very near good brandy. In the island of Caranja, opposite to Bombay, the government duty on the spirits distilled (chiefly from this flower) amounts to at least £60,000 per annum.

The fruit which follows after the corollas have fallen, yields seeds from which a greenish yellow oil is produced. This is used to adulterate *ghi* or clarified butter. This substance has some commercial importance, inasmuch as it is worth £35 a ton for soap-making. (*Sapotaceæ*) [15] (Pl. 6.)

BAUHINIA MEGALANDRA, *Griseb.*—A white flowered species, native of the West Indies. The branches are used as wood-hoops. (*Leguminosæ*) [228]

BAUHINIA VARIEGATA, *Linn.*—A small shrubby tree with deciduous leaves and very ornamental large flowers, which vary greatly in colour from white variegated with yellowish green, to rose variegated with crimson, cream-colour and purple.

It is native of India and China, but is common in Jamaica.

The bark is described by Watt as "alterative, tonic and astringent, useful in scrofula, skin diseases and ulcers." It is also used in dyeing and tanning. "The root in decoction is given in dyspepsia and flatulency; the flowers with sugar as a gentle laxative." (*Leguminosæ*) [16]

BERRIA AMMONILLA, *Roxb.*—The Trincomali Wood. A large tree found in South India, Burma and Ceylon. Heartwood dark red, very hard, close-grained, but apt to split; it has, even when old, a smooth, rather damp feel. The wood is very durable. It is used for carts, agricultural implements, and spear-handles, and in Madras for masula boats, and is much esteemed for toughness and flexibility. In Ceylon "the wood of this fine tree is very valuable for building and other purposes." (*Tiliaceæ*) [210]

BERTHOLLETIA EXCELSA, *Humb. and Bonpl.*—This tree, which yields "Brazil Nuts," grows to a height of from 100 to 150 feet, forming large forests on the banks of the Amazon and Rio Negro. The seed-vessel is a hard woody globular shell,

6 inches through, containing about 20 nuts beautifully fitting together in it. When they are ripe, they fall from the trees, and the Indians go in great numbers to collect them. They break the shell with an axe, and send boat loads of the nuts down the river to Para. (*Myrtaceæ*) [17]

BIGNONIA MAGNIFICA, *Bull*, has large flowers 2 inches across, varying in colour from delicate mauve to rich purplish-crimson, with a light primrose-colour throat. It is a native of Colombia, and was first introduced into English hot-houses in 1879. (*Bignoniaceæ*) [18]

BLIGHIA SAPIDA, *Kon.*—The Akee tree is a native of tropical western Africa, naturalized in Jamaica. A handsome tree, 30 feet high. leaves pinnate, light green, flowers small, white, fruit red, splitting on the tree into 3 valves, displaying the 3 black seeds half enclosed with a yellowish white fleshy covering.

The husk of the fruit can be used as a natural soap, making a lather. The white fleshy substance round the seeds, which is called "akee" is of the consistence of beef fat, and when cooked is somewhat like marrow; it is an excellent vegetable, and quite wholesome, when ripe and fresh. It yields an oil which might compete with palm oil in soap manufacture, or might be useful in pharmacy when a bland oil of a certain consistence is required. (*Sapindaceæ*) [212]

BEHMERIA NIVEA, *Gaudich*—This plant is known variously as Ramie, Rhea and China Grass. The fibre extracted from the young shoots is the strongest known, and also one of the most beautiful, looking much like silk. But the resinous matter of the stalk makes it very difficult to extract the fibre cheaply. The Government of India many years ago offered a prize of £5,000 for a good extracting machine for it, but none has yet been invented that gives satisfactory results. It is a native of Malaya. (*Urticaceæ*) [20]

BOMBAX MALABARICUM, *D.C.*—Red Silk Cotton Tree or Simal Tree.—This tree is a native of India, Java and Sumatra. The trunk and branches are covered with large corky prickles. In the winter months the leaves fall, and before they appear again, the end of the branches are covered with the handsome red flowers. The seed-vessel contains silk-cotton, "simal," which is of the same character as the white silk cotton, "kapok", of our native tree, (*Eriodendron anfractuosum*). Both kinds of silk-cotton are very useful for stuffing cushions, and in upholstery, but the fibre is too short and too soft to be spun. The kapok fetches a higher price than the simal. (*Malvaceæ*) [136]

BONTIA DAPHNOIDES, Linn.—The Wild Olive is a shrub or small tree 10 to 30 feet high. The leaves are in shape like the olive, but they are not opposite. The flower is about an inch long, with a tubular, two-lipped corolla of a yellowish-red colour, and 4 stamens.

A decoction of the flowers is recommended for ophthalmia. The fruit is yellowish, nearly half an inch long, and when quite ripe contains an oil of a yellowish colour, which is employed in colic and other irritations of the intestines.

This tree is a native of the West Indies. (*Myoporineæ*) [192]

BREXIA MADAGASCARIENSIS, Thou.—Is a small tree, a native of Madagascar. (*Saxifragaceæ*) [132]

BROWNEA ROSA-DE-MONTE, Berg.—The Rosa del Monte of South America. The genus *Brownea* was named after Patrick Browne, M.D., author of a Natural History of Jamaica. Very handsome evergreen trees or shrubs allied to *Amherstia*. The species under notice has beautiful scarlet flowers in dense heads. (*Leguminosæ*) [189]

CALAMUS ROTANG, Linn.—The Rattan Cane, a native of India, Burma, and Ceylon. The long stems of various species of *Calamus* furnish the canes or rattans so largely used for the seats of chairs, couches, sides of carriages, and similar purposes. In countries where these Palms abound, the inhabitants make use of them for a great variety of purposes, baskets of all kinds, mats, hats, and other useful articles being commonly made of them. Their most important use, however, is for the manufacture of the ropes and cables usually employed by junks and other coasting vessels. They are also used in the construction of suspension bridges across rivers. (*Palmæ.*)

CANANGA ODORATA, Hook. f. & Thoms.—The Cananga is a native of Burma, Java and the Philippines, but it is cultivated as an ornamental tree throughout India and the tropics. It is a tall tree, with straight trunk and smooth ashy bark. The flowers are drooping, of a greenish-yellow colour, fragrant, and about three inches in length. It belongs to the same family as the Sweet Sop, but the fruit is not edible. It is the “Ilang-ilang” of European perfumers.

A tree planted in Hope Gardens attained in 6 years a height of 46 feet, with a girth of 38 inches at 3 feet above the ground. (*Anonaceæ*) [21]

CARAPA GUIANENSIS, Aubl. The Carapa tree of Guiana grows to a height of 60 to 80 feet. The timber is light, having a specific gravity of 0.603, but it takes a good polish, and is used

for making furniture ; also employed for shingles, and for masts and spars of ships. The bark is astringent, is used for tanning, and medicinally as a febrifuge. The large, round fruit contains several oily seeds, from which is obtained a lamp oil. It also grows in Brazil and some of the West Indian Islands. —(*Meliaceæ*) [147]

CARYOTA URENS, *Linn.*—The Wine Palm or Kitool Palm attains a height of 50 or 60 feet, and is remarkable for the peculiar form of the leaflets, which have been compared to those of our common maiden hair fern. The leaves themselves are from 18 to 20 feet long. It is a native of Ceylon and India, growing in forests in the hilly districts, where teak and the wild mango abound.

The Kitool fibre of commerce is prepared from the sheathing leaf-stalk ; it is used as a substitute for bristles for making brushes, baskets, etc. The value is from 3d. to 11d. per lb. It is said that in Ceylon ropes made from the fibre are used for tying elephants. Roxburgh says it is highly valuable to the natives of the countries where it grows. "It yields 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 24 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 the people, and during a famine they suffered little while the trees lasted. I have reason to believe this substance to be highly nutritious."

The Wine Palm ends its existence by flowering. The first flower stalk appears at the top of the tree ; as soon as that has done flowering, another appears lower down, and so on, till the last one blossoms at the foot of the trunk, proclaiming that the death of the tree is near at hand. These flower-spikes hang down in large bunches, producing quantities of round, reddish berries. The wood is strong and durable, used for agricultural purposes, water conduits and buckets. (*Palmæ*) [24] (Pl. 5. 7.)

CASSIA NODOSA, *Buch.*—A beautiful flowering tree common in the Eastern Himàlaya, Manipur, and Burma. (*Leguminosæ*) [195]

CASSIA SIAMEA, *Lam.*—grows to a height of 80 feet at Castleton. It has large, showy, yellow flowers. It is native of India and Malaya. (*Leguminosæ*) [26]

CASTILLOA ELASTICA, *Cerv.*—The Castilloa Rubber tree has been described by Sir D. Morris, who saw it growing in British Honduras on most of the Cohune ridges, along the banks of rivers, and in the valleys. "It grows to a height of about 40

to 50 feet; has a thick clean stem, about two feet in diameter at the base, and in habit of growth much resembles a bread-fruit tree, to which it is closely allied. The leaves are large, oblong in shape, and clothed, especially in the young state, with a dense coat of hairs. The flowers appear in February or March." The tree is fit to be tapped when it is from 7 to 10 years old. The proper season is after the autumn rains, which occur some months after the trees have ripened their fruit, and before they put forth buds for the next season.

Belt, in his charming book, the "Naturalist in Nicaragua," thus describes the process of obtaining the rubber. "When the collectors find an untapped tree in the forest, they first make a ladder out of the lianas that hang from every tree; this they do by tying short pieces of wood across them with small lianas, many of which are as tough as cord. They then proceed to score the bark with cuts which extend nearly round the tree like the letter V, the point being downward. A cut like this is made about every 3 feet all the way up the trunk. The milk will all run out of a tree in about an hour after it is cut, and is collected into a large tin bottle made flat on one side and furnished with straps to fix on a man's back. A decoction is made from another liana (the moon flower, *Ipomœa Bona-nox*), and this on being added to the milk, in the proportion of one pint to a gallon, coagulates it to rubber, which is made into round flat cakes. A large tree, 5 feet in diameter, will yield when first cut about 20 gallons of milk, each gallon of milk makes 2½ lbs. of rubber."

The *Castilloa* tree is a deep feeder, preferring soil which is a deep loam. It may be grown along river-banks to give them stability. It grows rapidly, and in its native forests gives a return in rubber in 8 or 10 years.

The name *Castilloa* is derived from the small town of Castillo on the river San Juan in Nicaragua, one of the centres of the rubber trade. "It was near Castillo that Nelson lost his eye. He took the fort by landing about half a mile lower down the river, and dragging his guns round to a hill behind it by which it was commanded." (*Urticaceæ*)

CHRYSALIDOCARPUS LUTESCENS, *Wendl.*—The "Ostrich Feather Palm" or "Bamboo Palm" is a singular palm from Madagascar, with several stems growing from the same root. (*Palmæ*) (Pl. 4. 8.)

CINNAMOMUM CAMPHORA, *Nees & Eberm.*—The Camphor Laurel is a native of China and Japan; and in Formosa it covers the whole line of mountains from north to south up to an elevation of 2,000 feet above the level of the sea. The stem yields excellent timber, which is much prized on account of its odour.

After the tree is felled the wood is cut into chips, which are placed in the rude boiler or still. This is provided with a false bottom, through which the steam rises, and as it passes through the wood it carries with it the camphor. The vapour is then conducted by the pipe to a condenser containing several partitions filled with cold water; in the sides of these partitions are apertures opening alternately, so that the vapour takes a circuitous route, and in the passage the camphor is deposited in crystals upon the bamboo screens. From these screens the crystals can be readily removed, and they provide an efficient means for draining off the oil. The process is an ancient one, but it is so firmly adhered to by the natives and it suits the purpose so well that there appears to be a long future for it.
—(*Laurineæ*) [29]

CINNAMOMUM CASSIA, *Bl.*—The Cassia tree is a handsome tree, much like the Cinnamon tree, with somewhat similar, small, yellowish flowers, and leaves with three strongly marked nerves. It is a native of Cochin China

Cassia Bark is similar to Cinnamon, but thicker. It has a stronger flavour, but less delicate. It is preferred, however, in Germany and Russia by chocolate makers. (*Laurineæ*) [30]

CINNAMOMUM ZEYLANICUM, *Nees.*—The Cinnamon tree, though small, is singularly beautiful, being one mass of shining foliage. It is a native of Ceylon, where one variety grows in the forests even up to an elevation of 8,000 feet.

Under cultivation the Cinnamon tree is cut low down and only 4 or 5 shoots allowed to spring up. When these are about 2 years old and begin to turn brown, they are cut and the peel carefully separated into "quills." The outer bark is scraped off; and the quills, placed one inside the other, form the Cinnamon of commerce. (*Laurineæ*) [31]

COCOLOBA UVIFERA, *Jacq.*—Native of the seashore of the West Indies and tropical America. A tree, with roundish, cordate leaves; flowers without petals, and hanging bunches of dark-blue berries, which are very astringent. Wood hard and takes a fine polish, used for fancy work.

In Jamaica this species does not grow into a very large tree as it does in Honduras. (*Polygonaceæ*) [208.]

COCOS AUSTRALIS, *Mart.*—is a native of south Brazil. The fruit has a sweet edible pulp. (*Palmæ*) [32.]

COCOS BOTRYOPHORA, *Mart.*—is a native of Brazil; growing along the banks of rivers in the forest. (*Palmæ*) [32a.] (Pl. 3.)

COCOS FLEXUOSA, *Mart.*—a native of Brazil, is a slender decorative palm, which can be planted in dry parts of the Island, like the *Liguanea* plain, as it withstands drought (*Palmæ*) [33.]

COCOS NUCIFERA, *Linn.*—The Coco-nut Palm. “Toddy” is obtained from the flower spathe just before it opens by slicing off the top, and collecting the sap in a vessel, It has a pleasant, sweetish taste, and in large doses is aperient: fermented it is intoxicating. It can also be boiled down into a coarse sugar called “jaggery” which is refined or fermented and distilled into spirits.

The young Coco-nut contains a sweet refreshing water, and jelly. The nut is generally harvested before it is perfectly mature. If the outer skin dries on the tree the fibre of the husk becomes coarse and dark in colour, if too young it is weak. Coco-nut cream is made by grating the kernel and squeezing the fluid from the finely divided material through muslin. The shell is carved and used for many purposes. The dried kernel is known as “kopra,” and is used for the preparation of oil, by expression or boiling. The solid fat is employed in making candles, and the oil for cooking, for lamps, as a substitute for cod liver oil, &c. The cake which is left, or “poonac” is a good food for cattle and is also used as a manure.

The husk of the fruit yields coir-fibre. Aged and unfruitful trees are cut down and the wood is turned to a variety of useful purposes; it is hard, handsome and durable, known under the name of Porcupine Wood: it is used for veneering. The hard stem is converted into drums, gutters, water-pipes, small boats, frames, furniture, rafters for houses, spear shafts, shingles, walking sticks, ladies’ work boxes, &c. The root stem takes a high polish so as to resemble agate. A cubic foot weighs 70 pounds, and the wood is supposed to last 50 years. (Dr. J. Shortt).

The manufacture of butter from the Coco-nut is of considerable importance, inasmuch as it is cheap, wholesome and perfectly digestible. Coco-nut butter does not afford a nutrient material for micro-organisms, and being a vegetable fat, there is no risk of infection. This manufactured butter is free from fatty acids, and even if left exposed to air for more than a week does not turn rancid except in the top layer. Owing to its high saponification degree, all adulteration is impossible. It was proved in the German Hospitals that food, even pastry, prepared with this fat was eaten without any inconvenience.

Coco-nut butter therefore meets all hygienic requirements. It is far superior to animal fat and butter, as well as to any of their other substitutes, and further, on account of its perfect digestibility, it is well adapted for the use of patients suffering from impaired digestion. (*Palmeæ*) [34]

COCOS PLUMOSA, *Hook.*—a native of South Brazil, is, according to Von Mueller, one of the hardiest of all palms. It is quick of

growth, and particularly handsome in stature. The somewhat slender stem attains a height of 60 feet. This would be a good decorative palm for the hills. (*Palmae*) [35]

COFFEA LIBERICA, *Hiern.*—Liberian Coffee is a native of the west coast of Africa on lands near the sea, and the low-lying hills stretching inland, whereas common or Arabian Coffee comes originally from the highlands of Abyssinia. It is a very robust plant growing from 20 to 40 feet, and has larger flowers and berries than ordinary coffee. (*Rubiaceæ*) [37]

COFFEA STENOPHYLLA, *G. Don*—The Highland Coffee of Sierra Leone is an interesting plant, as being one of the two indigenous West African species which in point of commercial value, it was once thought, might prove a rival of the Arabian coffee.

The plant is an evergreen shrub or small tree up to 20 feet high; the youngest leaf-shoots are pink. Flowers large, white, one to one-and-a-half inches across the corolla lobes. Berry half-an-inch in diameter, globose. (*Rubiaceæ*) [207]

COLA VERA, *Schm.*—The Kola-nut or Bissy is a native of western tropical Africa. It is tree from 30 to 60 feet high, flourishing best in moist lands from sea level up to 1,000 feet.

From the country between Sierra Leone and the Congo they are carried to Gambia, where the merchants trading with the interior, purchase and dry them. It is said that by the time the nuts reach the tribes who live farthest from where they grow, they are worth their weight in gold.

The nuts are reputed to clarify and render healthy the most foul water, and to render tainted meat edible, and when chewed either fresh or as a dry powder and the saliva swallowed, to be a sure preventive against dysentery. They are also said to be good for the liver and to possess the property of enabling persons eating them to undergo prolonged exertion without fatigue. What enhances the value of kola-nuts is the fact that citrate of caffeine—a medicine now much employed for the relief of sea-sickness, megrims, and other nervous complaints—can be readily obtained from them, for the reason that the nuts contain more caffeine than coffee berries, and in the kola-nut the caffeine is in the free or uncombined state. (*Sterculiaceæ*) [38]

COLVILLEA RACEMOSA, *Boj.*—is a near relation of *Poinciana regia*, and like it, is a native of Madagascar. It is a beautiful tree attaining a height of 40 or 50 feet. The leaves are about 3 feet long, deeply divided like a fern. The flowers are scarlet and the pods 6 inches long. This tree bears the name of Sir Charles Colville, Governor of Mauritius when Bojer discovered it in Madagascar. (*Leguminosæ*) [39]

COPERNICIA CERIFERA, *Mart.*—The Wax Palm of Brazil belongs to a genus of palms named after the celebrated astronomer Copernicus.

The stem is 20 to 40 feet high, adorned with the bases of the fallen leaf-stalks, arranged in beautiful spirals, and crowned by a perfect ball of fan-shaped leaves.

The leaves are coated with a glaucous bloom of wax, which is obtained by shaking the young leaves. The wax falls off in the form of a whitish scaly powder to the amount of about 50 grains from each leaf. It is exported to be made into wax candles, which retain the peculiar lemon-coloured tint of the natural product.

This palm forms immense forests, and is of great use to the Brazilians. The trunk is very durable, and is employed for the framework of houses, for cattle enclosures, and for other purposes where strength and lasting power are needed. A kind of meal is prepared from the inside of the upper portion of the stem.

The leaves are used for thatch, pack-saddles, etc., and the young leaves are given to cattle as fodder in times of scarcity.

The yellowish fruits are bitter to the taste, but are eaten, either raw or boiled, by the Indians. (*Palmae.*) [40]

COUROUPITA GUIANENSIS, *Aubl.*, the Cannon Ball tree, so-called from the size and shape of the fruit. The pulp is of a pleasant flavour, and the hard, wooden shells are used as drinking vessels, etc. The flowers are large, whitish or rose coloured, forming clusters on the trunk and branches. The stamens are remarkable; they cover a ring round the centre of the flower; this ring is expanded on one side, the expansion is as broad as the ring, flat, and gradually turns over the centre, forming there a semi-globular hood, concealing the ovary, and covered on its inner surface also with stamens, which alone are fertile.—(*Myrtaceæ*) [41]

CROTON TIGLIUM, *Linn.*—The Croton Oil shrub 15 to 20 feet high, is met with under cultivation throughout the greater part of India.

The nuts yield an oil which is orange-yellow or sherry-coloured, of the consistence of Coco-nut oil, has a slight odour resembling that of jalap, and an acrid flavour. This is a valuable medicinal oil, which is used as a drastic purgative, especially when it is desired to act speedily and powerfully, and when only a small volume of medicine can be administered.—

(*Euphorbiaceæ*) [204]

CYCAS CIRCINALIS, *Linn.*—This singular looking plant is one of the so-called Sago Palms, but they are not Palms, and do not yield true Sago.

The stem is encased in a kind of armour, formed of the hard persistent bases of the leaves. There are no flowers in the ordinary sense of the word, but the seeds are borne on altered leaves which alternate in rings round the stems with the ordinary foliage leaves. These rings are clearly marked on this plant.

An inferior kind of flour is made by the forest tribes of India from the seeds by drying them in the sun, and then beating in a mortar. A gummy substance which exudes from the stem is used to promote suppuration. (*Cycadaeæ*) [42] (Pl. 2, 3, 9.)

CYCAS REVOLUTA, *Thunb.*—The Pine Palm of Japan grows slowly and never reaches a greater height than 6 feet. The stem is rich in starch, which can be made into a kind of Sago, highly esteemed in Japan, and at one time it was contrary to the laws to take the plant out of the country. (*Cycadaceæ*) [33] (Pl. 2, 9.)

CYNOMETRA AMERICANA, *Vog.*—(*Leguminosæ*) [177]

DENDROCALAMUS STRICTUS, *Nees.*—The solid or “male” Bamboo is common throughout India, ascending to 3,000 feet altitude. The stems which attain a great height, are strong, elastic, and nearly solid. In the Central Provinces they are used as a substitute for timber, for rafters and battens, spear and lance shafts, walking sticks, ploughman’s driving sticks and spade handles, for the construction of strong fencing to resist wild animals, and a variety of other purposes. (*Gramineæ*)

DICTYOSPERMA RUBRUM, *H. Wendl. & Drude*—A handsome palm from the Mauritius. (*Palmæ*) [167]

DILLENIA INDICA, *Linn.*, is a round-headed, handsome tree, 60 feet high, with hard rough leaves 8 to 10 inches long, and large showy flowers 6 inches across with white petals, and a mass of yellow stamens in the centre. The true fruit which is about 3 inches in diameter, is composed of 20 cells, arranged round an axis, each one with several seeds enveloped in a jelly-like pulp, the whole is covered round with the calyx-leaves which have become thick and fleshy, forming a large heavy fruit 6 inches in diameter. Both fruit and leaves are used in India for making curries and jellies. The acid juice of the fruit, mixed with sugar and water, forms an excellent cooling drink in fevers, and is also useful for cough mixture. The rough leaves are employed in the same way as sand-paper for polishing. Both bark and leaves are astringent and are used medicinally. The timber is hard and durable, especially under water. (*Dilleniaceæ*) [44]

DIOSPYROS DISCOLOR, *Willd.*—The name “Ebony” is applied to a black wood, which is hard and heavy. Wood of a high specific gravity, close-grained and black, is called Ebony, whatever the

tree may be which produces it. Ebony is however, yielded principally by species of *Diospyros*, natives of the East Indies and tropical Africa. Amongst these species is one, *Diosypros discolor*, a native of the Philippine Islands. This tree grows to about 40 feet high. The wood is at first of a dark flesh colour becoming in time of an exceedingly deep dark colour, very hard and compact. The reddish fruit known as Mabola, is edible, after removing the skin. The Ebony of Jamaica and Cuba, (*Brya ebenus*), which is so common in the Liguanea Plains, in Clarendon, &c., is known in commerce as "Coccus Wood". (*Ebenaceæ*) [45]

DIOSPYROS EBENUM, Koen.—Ebony. A large tree native of India, Ceylon, and Malaya. The wood is grey, with irregularly-shaped masses of jet black ebony near the centre, frequently with lighter coloured streaks. It is in great demand for ornamental turnery, for inlaying in fancy articles, cabinet work, and for the keys in pianos, &c. This species yields the best kind of ebony, generally jet-black, but sometimes slightly streaked with yellow or brown; it is very heavy, close, and even-grained, and stands a high polish; unseasoned it weighs 90-100 lbs. the cubic foot, and 81 lbs. when seasoned, and has a sp. gr. 1.296. (*Ebenaceæ*) [222]

DIOSPYROS MONTANA, Roxb.—A tree often spinose, met with in India and Ceylon. It has a very hard strong wood, but except for cart poles, is not much used. The centre or heartwood, which is very small, is ebony of an inferior kind. (*Ebenaceæ*) [223]

DIPLOTHEMIUM CAUDESCENS, Mart.—is one of the palms which inhabit the burning sandy sea-shores of Brazil. The fruit hangs in yellow bunches, just below the silvery under-surfaces of the leaves, and the natives can easily refresh themselves with its sweet pulp, as the trunk does not attain any great height. (*Palmæ*) [46]

DIPTERYX ODORATA, Willd.—is the tree which produces the Tonquin or Tonka Bean. Although this tree belongs to the same family as the common bean, the fruit is almond-like with only one seed, and is produced by a forest tree, 60 to 80 feet high, growing in the steamy atmosphere of the woods of Cayenne. When the leaves are fresh, they are fragrant with the perfume of new-mown hay. When snuff was used, a bean was commonly carried in the snuff-box for the sake of the agreeable fragrance it imparted. No great commercial importance attaches to the Tonquin Bean, only a few hundred weights being imported for the extraction of the principle *coumarine*, used by perfumers as an ingredient in some fluid extracts; or they are

ground for use in sachet powders. The beans are also used for placing in drawers with linen. (*Leguminosæ*) [47]

DRACÆNA DRACO, *Linn.*—Dragon's Blood tree of Teneriffe. This tree derives its common name from a resinous exudation known in commerce as dragon's-blood. The resin has been found in the sepulchral caves of the Guanches, and has hence been supposed to have been used by them in embalming their dead. It appears at one time to have formed a considerable branch of export from the Canaries, and has never wholly fallen into disuse. (*Liliaceae*) [156]

DURIO ZIBETHINUS.—A large forest tree producing the celebrated Durian fruit of the Indian Archipelago. The fruit is either globular or oval, and measures as much as 10 inches in length; it has a thick, hard rind, entirely covered with very strong, sharp prickles, and is divided into five cells, each of which contains from one to four seeds rather larger than pigeon's eggs, and completely enveloped in a firm luscious-looking cream-coloured pulp, which is the edible portion of the fruit.

This tree is very commonly cultivated throughout the Malayan Peninsula and Islands, where its fruit, during the period it is in season, forms the greatest part of the food of the natives.

The flavour of the Durian is said to be perfectly unique; and it is also quite certain that no other fruit, either of tropical or temperate climes, combines in itself such a delicious flavour with such an abominably offensive odour—an odour commonly compared either with putrid animal matter, or with rotten onions. It might be supposed that a fruit possessing such an odour could never become a favourite; but it is said that when once the repugnance has been overcome, the Durian is sure to find favour, and that Europeans invariably become fond of it. (*Malvaceae*) [213]

DYPSIS MADAGASCARIENSIS, *Hort.*—A handsome palm from Madagascar. (*Palmae*) [171]

ELÆIS GUINEENSIS, *Jacq.*—The Oil Palm of western Africa does not attain any great height, not more than 20 or 30 feet. The trunks are thick and are covered with the remains of the stalks of dead leaves. Below the large tuft of prickly-stalked leaves, are to be seen the dense heads of vermilion or yellowish fruits.

The palm oil is obtained from the outer fleshy coating of the fruit, by boiling in water and skimming off the oil. It is of a bright orange-red colour, with the consistence of butter, and when quite fresh, has a pleasant odour like violets. It is exported in immense quantities for the manufacture of candles and soap. (*Palmae*) [48]

ELLETTARIA CARDAMOMUM, *Maton*.—The cardamom plant is somewhat like ginger, but the flower stalks grow out horizontally close to the ground. It grows abundantly, both wild and under cultivation, in the moist, shady mountain forests on the Malabar coast, at an elevation of 2,500 to 5,000 feet above the sea.

Cardamom seeds are an agreeable aromatic, often administered in conjunction with other medicines. As an ingredient in curry powder, they have also some use as a condiment. But the consumption in England is small in comparison with what it is in Russia, Sweden, Norway and parts of Germany, where they are constantly employed as a spice for the flavouring of cakes. (*Scitamineæ*) [49]

ENTADA SCANDENS, *Benth*.—The Cacaoon, has a thick, twisted stem, and branches which cover all the neighbouring trees. It is a native plant. It has a very large pod, often 3 feet long, and beans of corresponding size. The beans are sometimes picked up on the shores of the Orkney Islands, carried thither by the Gulf Stream. (*Leguminosæ*) [50]

ENTEROLOBIUM CYCLOCARPUM, *Griseb*.—*Enterolobium* is a genus closely allied to the Guango (*Pithecolobium*). They are natives of tropical America. The pod is broad, nearly circular, the stalk being situated in the centre of the circle, the position of the seeds being marked externally by regular undulations. (*Leguminosæ*) [215]

ERYTHRINA MICROPTERYX, *Pæpp*.—*Bois Immortel* is one of the trees that are generally used in Trinidad as shade for Cocoa. Charles Kingsley, in his enthusiastic way, thus speaks of it in his account of a Cocoa plantation:—

“Imagine an orchard of nut-trees, with very large, long leaves. Each tree is trained to a single stem. Among them, at some twenty yards apart, are the stems of a tree looking much like an ash, save that it is inclined to throw out broad spurs like a *Ceiba*. You look up, and see that they are *Bois Immortels*, fifty or sixty feet high, one blaze of vermilion against the blue sky. Those who have stood under a Lombardy poplar in early spring, and looked up at its buds and twigs, showing like pink coral against the blue sky, and have felt the beauty of the sight can imagine faintly—but only faintly—the beauty of these “*Madres de Cacao*,” *Cacao*-mothers, as they call them here, because their shade is supposed to shelter the *Cacao* trees, while the dew collected by their leaves keeps the ground below always damp. (*Leguminosæ*) [51]

ERYTHROXYLON COCA, *Lam*.—is the plant which yields the well-known Cocaine. Mr. Clements Markham states that the coca-leaf is the great source of comfort and enjoyment to the

Peruvian Indian; it is to him what betel is to the Hindu, kava to the South Sea Islander, and tobacco to the rest of mankind; but its use produces invigorating effects which are not possessed by the other stimulants.

The coca plant is cultivated between 5,000 and 6,000 feet above the level of the sea, in the warm valleys of the eastern slopes of the Andes, where almost the only variation of climate is from wet to dry, where frost is unknown, and where it rains more or less every month in the year. It is a shrub from four to six feet high, with lichens usually growing on the older trunks. (*Linaceæ*) [52]

EUCALYPTUS CITRIODORA, *Hook.*—Eucalyptus trees are valuable in districts where fever is prevalent. The roots to a great extent drain swampy land and their absorbent powers are assisted by the very abundant leaf surface which enables the tree to pass the water off into the atmosphere as healthy vapour.

There are numerous species of Eucalyptus in Australia (of which country it is a native) adapted to various conditions of climate, soil, elevation, &c. (*Myrtaceæ*) [53]

EUGENIA CARYOPHYLLATA, *Thunb.*—The Clove Tree is 30 or 40 feet high when full-grown. The cloves of commerce are the unexpanded flower-buds, of which great numbers are produced

At the end of the year the tree is covered with its lovely crimson buds shown off by the background of dark green leaves. The buds are picked by hand as soon as they turn crimson and before opening. They are then dried in the sun.

The form of the dried buds somewhat resembles a nail; the French call the spice *Clou*, the Spanish *Clavo*, whence the English name *Clove*. (*Myrtaceæ*) [54]

EUGENIA MALACCENSIS, *Linn.*—The Otaheite or Malay Apple is a very beautiful tree, especially when in flower—from May to September. The scarlet tassels of long stamens drop gradually as the flower expands, and carpet the ground with brilliant colouring. The fruit is the size of an apple, and is juicy though rather insipid; it is wholesome and is used principally for stews. (*Myrtaceæ*) [55]

EUTERPE EDULIS, *Mart.*—The “Assai Palm,” native of tropical America (*Palma*) [166]

FARADAYA SPLENDIDA, *F. Muell.*—A tall woody climber, with funnel-shaped or tubular, white, showy flowers which are very fragrant. Native of Queensland. (*Verbenaceæ*) [230]

FLACOURTIA RAMONTCHI, *L'Herit.*—A small tree, native of Madagascar and India, producing a dark violet or black fruit about the size and shape of a plum, and having a sharp but sweet taste. (*Bixineæ*) [193]

FICUS BENJAMINA, *Linn.*—The Willow Fig. A singularly fine shade tree with graceful drooping boughs. It is a native of India and Burma. (*Urticaceæ*) [127]

FICUS INDICA, *Linn.*—This tree is a native of Burma. It is often called the "Banyan", but the true Banyan is *F. Benghalensis*. (*Urticaceæ*) [128]

FICUS RELIGIOSA, *Linn.*—The Peepul tree is a large glabrous, usually epiphytic tree, found wild in India.

The bark yields a tenacious milky juice which hardens into a substance resembling Caoutchouc. The juice is used as bird-lime. Lac is produced on the tree in India. It is there largely planted as an avenue and road-side tree.

The peepul is believed to be inhabited by the sacred triad, Brahma, Vishnu, and Shiv. Vows are made to it, and it is worshipped. So sacred is it that none will destroy it, even when it grows on the crevices of walls and buildings, pulling down the strongest masonry. (*Urticaceæ*.) [129]

FICUS RHODODENDRIFOLIA, *Miq.*—A large spreading tree. A native of India. (*Urticaceæ*.) [121]

FICUS VOGELII, *Miq.*—This tree is stated to yield rubber in West Africa. The trees are tapped when about five years old by making slashes or incisions in the trunk, the juice is collected in vessels and the gum is separated from the sap by the use of acids; it is then made up into balls about the size of a large orange. The natives, in order to get as large a yield of juice as possible, pollard the trees at a height of 10 to 12 feet and cut back the branches to prevent the strength of the plant being used up in growth. This causes a free and regular flow of sap. The cuttings which are removed are easily propagated and will grow vigorously.

The tree will grow near the sea at an elevation of 50 to 60 feet above sea-level, but does not flourish well in marshy ground. (*Urticaceæ*) [140]

FUNTUMIA ELASTICA, *Stapf.*—Lagos Silk Rubber. This is one of the African Rubber trees widely distributed from Sierra Leone to the Gold Coast and beyond the mouths of the Niger to the Bight of Biafra. It is said to be one of the most beautiful trees in the forest, and from the ground it grows evenly in bulk and smoothly to the height of 60 to 70 feet.

In the rainy season when full of milk, a tree well tapped is capable of producing from 10 to 15 lbs. of rubber, which is 1s. per lb. on the spot if properly prepared, and 2s. to 2s. 4d. in English markets if made into biscuit.

This valuable rubber tree belongs to the same family as the Jamaican Milk Withe. (*Apocynaceæ*) [201]

GARCINIA INDICA. *Choisy.*—Cocum or Kokam Butter, Mangosteen oil, Brindonia Tallow. A slender tree with drooping branches found on the Ghats of Koukam and Kanara. It bears a conspicuous spherical purple fruit, the size of a small orange which ripens about April. The juice of the fruit has long been employed as a mordant in south western India. A valuable oil, “Kokum Butter” is obtained from the seeds of the fruit to the extent of about 60 per cent. The oil or butter as it is called, is, as a rule, extracted in the cool season, by one of three methods:—*1st, Boiling process*—The white kernel is pounded in a stone mortar. The pulp is put into a pan with water and boiled. After some time it is poured out and allowed to cool. The oil which rises to the surface on cooling becomes gradually solid, and is roughly moulded by hand into egg-shaped balls or concavo-convex cakes. *2nd, Churning process*—The kernel is pounded as described above, and the pulp with some water is kept in a large vessel and allowed to settle for the night. During the night the oil rises to the surface and forms a white layer which is removed in the morning. The mixture is then churned, and the oil, which, like butter, rises to the surface in a solid form, is removed by the hand. This process gives the best results and is most favourably performed in the cold season. *3rd, Pressing process*—In this process the kernels are pressed in an ordinary oil mill, like other oil seed, and the oil is extracted.”

In 1833 a writer in the Journal of the Asiatic Society of Bengal described its employment medicinally by the natives, and advocated its trial by Europeans. It was adopted as official during the compilation of the *Indian Pharmacopœia* in 1868, and is now generally recognised as a solid oil of considerable value. The fruit has been long employed in south western India as a semi-medicinal article of diet. It is acid, slightly astringent, and is considered by native physicians to be superior to tamarind for the preparation of acidulous drinks. (*Guttiferæ*) [144]

GARCINIA MANGOSTANA, *Linn.*—The celebrated Mangosteen. Firminger, states that “the cultivation of the Mangosteen in the open air, at least as high north as any part of Bengal, seems now pretty well decided to be impracticable. Plants have been repeatedly introduced into the gardens about Calcutta but have never been known to yield fruit.”

It is therefore very satisfactory that it has been successfully grown in Jamaica. The tree grows to a height of 30 or 40 feet, with simple elliptical pointed leaves, and dull-red flowers, about the size of a wild rose.

Dr. Abel, writing of the fruits of Batavia, says:—“First in

beauty and flavour was the celebrated Mangosteen. This which has been so often eulogised by travellers, certainly merits much of the praise that has been lavished upon it. It is of a spherical form, of the size of a small orange. . . . Its succulent rind is nearly the fourth of an inch in thickness. It contains a very powerful astringent juice, and in wet weather exudes a yellow gum, which is a variety of gamboge. On removing the rind its esculent substance appears in the form of a juicy pulp, having the whiteness and solubility of snow, and a refreshing delicate delicious flavour. To define it by more precise language is very difficult. We were all anxious to carry away with us some precise expression of its qualities but after satisfying ourselves that it partook of the compound taste of the pine-apple and peach, we were obliged to confess that it had many other equally good, but utterly inexpressible flavours" (*Guttiferæ*) [56]

GARCINIA MORELLA, *Desrouss* - The Gamboge tree grows most luxuriantly in dense jungles of Cambodia. After the rainy season is over, the gamboge-collectors start for the forest in search of the trees, which in some localities are plentiful. Having found one of the full size, they make a spiral incision in the bark round half the circumference of the trunk, and tie below the cut a joint of bamboo to receive the sap, which slowly exudes for some time. When it first issues from the tree it is a yellowish fluid, which after passing through a viscid state hardens into the gamboge of commerce. Each tree yields on an average in one season enough to fill 3 joints of bamboo $1\frac{1}{2}$ inches in diameter. The tree appears to suffer no injury provided the tapping is not more frequent than every other year. When the bamboo joints are full, after from 15 to 30 days, they are gradually rotated over a fire, until the gamboge is hard enough to allow of the bamboo being stripped off. In Europe, gamboge is chiefly used for water-colour drawings; in Burma it is employed to dye silks; and by Hindus in Mysore as a pigment in making caste marks on the forehead. It is used medicinally in India in combination with other purgatives. The timber is recommended for cabinet-work. (*Guttiferæ*) [57]

GELONIUM MULTIFLORUM, *A. Juss.* A native of India and Malay. (*Euphorbiaceæ*) [143]

GEONOMA (CALYPTROGYNE) SWARTZII, *Griseb.*—The long-thatch Palm of Jamaica. (*Palmeæ*) [158]

GLORIOSA SUPERBA, *Linn.*, is a very pretty climbing plant with strange looking flowers of a deep rich orange and red colour. It is a native of tropical Asia and Africa, and was introduced into England about 200 years ago. It belongs to the same

family as the Lily, but in outward habit and appearance, is very different. The recurved, erect petals were likened by Linnæus to flames. The leaves are remarkable in having their elongated tips modified into tendrils. (*Liliaceæ*) [58]

GRAS CAULIFLORA, *Linn.*—Anchovy Pear, a slender tall, unbranched tree of the Myrtle family attaining the height of 40 to 50 feet, terminated by a crown of smooth elliptical leaves, 2 to 3 feet in length. Its cream-white flowers are produced on the stem below the leaves, and are succeeded by a large fleshy fruit, of an elliptical ovate form, which in flavour much resembles the mango; while unripe it is made into a pickle. It is a native of Jamaica and South America. (*Myrtaceæ*) [217]

GYNOCARDIA ODORATA, *R. Br.*—This tree, a native of north-east India, yields the Chaulmugra Oil, which is expressed from the seeds. The oil has long been used by the natives of India for cutaneous diseases. During the past few years it has become of some importance as a drug in Europe, and is recommended as a remedy for leprosy, psoriasis, eczema, scrofula, phthisis, lupus, marasmas, chronic rheumatism, and gout. It is employed both internally and externally (*Bixineæ*) [60]

HERITIERA MACROPHYLLA, *Wall.*—A pyramidal tree with large handsome stalked entire alternate leaves of a silvery white underneath, this silvery appearance giving rise to the name of 'Looking-glass tree,' sometimes applied to it. (*Sterculiaceæ*) [133]

HETEROSPATHE ELATA, *Scheff.*—A very fine Palm, native of Amboyna. (*Palmæ*) [172]

HEVEA BRASILIENSIS, *Muell. Arg.*—The best rubber is obtained from these trees, and as the province of Para in Brazil is the chief source of it, the name applied to it in commerce is Para Rubber.

The trees are 60 feet high before rubber is collected from them. The mode of collecting is to make deep gashes into the bark, and stick cups of clay beneath the incisions to catch the milky juice. Coagulation of the rubber from the milk is effected by heating thin layers of it on a paddle-shaped mould over the hot smoke of a fire made of palm nuts. When a sufficient thickness has been obtained, the rubber is cut and taken off the mould. (*Euphorbiaceæ.*) [61]

HEVEA SPRUCEANA, *Muell. Arg.*—This is one of the trees that yield Para Rubber.

The scene presented by an encampment of caoutchouc collectors is described by Clements Markham as extremely picturesque. Their huts are lightly built among the trees, and round them tower the majestic *mosqueteiro* palms and the lofty

Bertholletia (yielding Brazilnuts), while in front is the gleaming river with its sunny sandbanks. From the huts narrow paths lead through the dense underground, cut by the axe of the *seringuerio* to the lonely caoutchouc trees. The collector makes small holes in the bark, to which the tubes of clay are fixed, which lead the milk into bamboo receptacles; going from tree to tree he collects these bamboos, and on his return to the hut the contents are poured into the carapace of a large tortoise. The milk is then subjected to the process of smoking without delay, for if left standing too long the resin separates. In this process the milk is subjected to the smoke of the *urucuy* or nuts of the *Attalea excelsa* palm. An iron pot without a bottom, and with a narrow neck like a bottle, is placed so as to form a chimney over a heap of these burning nuts, and the white steam rises in masses through the narrow opening. The *seringueiro* pours a small quantity of the white fluid, of the consistency of thick milk, from a calabash over a light wooden shovel, as evenly as possible, and then rapidly thrusts it into the white steam. The milk soon takes a greyish-yellow colour, and becomes firm. Then they add layer upon layer, until the caoutchouc on each side of the shovel is about 8 inches thick. The *plancha* or slab is then finished, taken off the shovel by cutting down one side, and hung up in the sun to dry, as there is a good deal of water between the layers. (*Euphorbiaceæ*) [62]

HIBISCUS ELATUS, Sw.—Mountain Mahoe, a native of Jamaica and Cuba, reaches a height of 50 to 60 feet. The timber is valuable, especially to cabinet-makers; it has the appearance of dark-green variegated marble. The fibres of the bark make good ropes. The lace-like inner bark was at one time known as Cuba bast, from its being used as the material for tying round bundles of Havana cigars. (*Malvaceæ*) [63]

HIPPOMANE MANCINELLA, Linn.—The Manchineel tree has acquired as bad a reputation as the Upas tree for its poisonous and hurtful properties. There is no doubt that its milky juice is very acrid, causing temporary blindness if it gets into the eyes, and some persons suffer great pain from incautiously touching it. (*Euphorbiaceæ*.) [64]

HYDNOCARPUS VENENATA, Gaertn. (*H. INEBRIANS*, Vahl) A large tree, native of Ceylon, and of the Malabar coast of India. Its fruit, which is very poisonous, is used by the natives for intoxicating fish, but the fish thus taken, are not fit for human food. An oil obtained from the seeds is used by the native doctors as a cure for leprosy and other cutaneous complaints. (*Bixineæ*)

HYDRIASTELE WENDLANDIANA, H. Wendl. & Drude.—A handsome Palm from tropical Australia. (*Palmeæ*) [168]

- HYOPHORBE AMARICAULIS, *Mart.*—A curious Palm from Round Island (Mauritius group.) (*Palmæ*) [162]
- HYOPHORBE VERSCHAFFELTIA, *H. Wendl.*—A Palm from Madagascar. (*Palmæ*) [165] (Pl. 10.)
- IMBRICARIA MAXIMA, *Poir.*—Native of Bourbon, Mauritius, &c. The fruits are edible. (*Sapotaceæ*) [130]
- JACARANDA FILICIFOLIA, *D. Don.*—A beautiful tree, leafless at time of flowering; flowers of a beautiful blue colour produced in great profusion. Native of tropical South America. (*Bignoniaceæ*) [176]
- KIGELIA PINNATA, *DC.*—The "Cucumber tree." A tree, 10 to 35 ft. high. Flowers handsome. Flowering and fruiting racemes pendulous; ripe fruit 18 to 20 inches long by $2\frac{1}{2}$ to 3 in. in transverse diameter. Native of tropical Africa. (*Bignoniaceæ*) [138.]
- LAGERSTREEMIA FLOS-REGINÆ, *Retz.*—(Queen's Flower), when in blossom, is one of the most showy trees of the Indian forests. A moist, damp climate is most suitable for its growth and for the full development of its magenta or rose-coloured blossoms. It flowers from May to August. It reaches a height of 50 ft. The timber is blood red, and as it lasts well in water, it is used for boat building. In Burmah, it is employed more than any other timber except teak, for a variety of purposes, but it soon decays under ground. The astringent roots have been used as a remedy for thrush; the bark and leaves are purgative. (*Lythraceæ*) [66]
- LANDOLPHIA FLORIDA, *Benth.*, is the chief source of Mozambique rubber and *L. Petersiana* is also a source of the East African supply. African rubber is furnished by several species of the genus *Landolphia*. Woody climbers of the natural order *Apo-cynaceæ* [218]
- LATANIA COMMERSONII, *J. F. Gmel.*—A palm, a native of the Mauritius and Bourbon. (*Palmæ.*) [159]
- LECYTHIS ZABUCAJO, *Aubl.*—Sapucaia nuts, the seeds of this tree are nearly allied to the common Brazil nuts, but they have a better flavour. They have a corky shell, and are enclosed in a large urn-shaped seed-vessel about 6 inches across with a lid at the top. When the seeds are ripe the lids fall away, and the seeds are scattered; whereas, the seed-vessel of the Brazil nuts (*Bertholletia*) has no lid, and must be broken open with an axe to get at the nuts. The trees grow to a height of 80 feet in their native forests in Brazil. (*Myrtaceæ*) [67]
- LICUALA PELTATA, *Roxb.*—The "Chattah-pat" palm of the people of Assam has large round leaves which are used by the natives to make their "chattah" or umbrella hat. (*Palmæ*) [68]

LICUALA SPINOSA, *Thunb.*—A palm, a native of Malaya. (*Palmæ*) [152]

LIQUIDAMBAR STYRACIFLUA, *Linn.*—Sweet Gum. A large American tree extending from Connecticut and Illinois southward to Mexico and Guatemala. The resin exudes either from natural fissures, or from incisions. (*Hamamelidæ*) [112]

LIVISTONA AUSTRALIS, *Mart.*—This is one of the few palms indigenous to Australia, where it attains a height of 80 or 100 feet. It has large fan-shaped leaves, which in the unexpanded condition are made into hats after preparation by scalding and then drying in the shade. The "cabbage" is used as food in the same way as that of the Cabbage Palm in the West Indies (*Palmæ*) [29] (Pl. 8.)

LIVISTONA CHINENSIS, *R. Br.*, is a decorative Fan Palm, which will suit the higher elevations of the island. In its native country, China and Japan, the hairy stem-covering is used for fixing lime plaster to buildings. (*Palmæ*) [70] (Pl. 11, 16.)

LODOICEA SEHELLARUM, *Labill.*—The Coco-de mer, or double coco-nut. This extraordinary palm, the fruit of which, found floating on the waves of the Indian Ocean, or washed up on the shores of Ceylon and the Maldives, was known for centuries before the tree itself, grows in one or two small islands only of the Seychelles group, where it is now protected; its growth is extremely slow, a single leaf being annually sent up. As this palm attains frequently a height of 100 feet, it must live to a vast age. The nut takes ten years to ripen, and the seed (which is the largest known) a year or longer to germinate.

The correct name of this interesting Palm is *LODOICEA CALLIPYGE*, *Comm.*, but it is so generally known under the synonym *L. Sechellarum*, that, in order to avoid possible confusion, it was thought better to quote the latter name at the heading of this note. (*Palmæ*) [211]

LONCHOCARPUS CYANESCENS, *Benth.*—The Yoruba Indigo of west tropical Africa is used in its native country to produce a deep blue, very permanent when fixed with potash. The leaves are gathered young, powdered in a mortar into a black pasty state, made into balls the size of two fists, and then dried. In dyeing, one ball is used to a gallon of water, and the cloth is left four days in the dye. (*Leguminosæ*) [71]

MAMMEA AMERICANA, *Linn.*—Native of West Indies and tropical America. A spreading tree, 40 to 60 feet high; leaves simple, opposite; flowers large, white, fragrant; fruit larger than an orange, russet-brown. Wood remarkably durable, well adapted for house building, posts and piles; stands damp. It is beautifully grained and is used for fancy work. The Gum is

applied to extract jiggers: "dissolved in lime-juice, it destroys maggots in sores at a single dressing; and an infusion of the bark is astringent, and is useful to strengthen the recent cicatrices of sores."

A liqueur has been obtained by distillation from the flowers infused in spirits of wine, known in Martinique by the name of "*Crème des Creoles*."

Fruit of a sweetish, somewhat aromatic taste, and of a peculiar odour. (*Guttiferæ*) [175]

MANICARIA SACCIFERA, *Gaertn.*—The Bussu Palm of the tidal swamps of the Amazon, has a stem from 10 to 15 feet high, and leaves often 30 feet long and 4 or 5 feet wide. The rigid leaves which are the largest undivided leaves of any palm, form an excellent, thatch, lasting for 10 or 12 years. "An Indian will often take a week's voyage in order to get a canoe-load of the leaves to cover his house. The spathe, too, is much valued by the Indian, furnishing him with an excellent and durable cloth. Taken off entire, it forms bags in which he keeps the the red paint for his toilet or the silk cotton for his arrows, or he even stretches out the larger ones to make himself a cap, cunningly woven by nature without seam or joining. When cut open longitudinally and pressed flat, it is used to preserve his delicate feather ornaments and gala dresses, which are kept in a chest of plaited palm leaves, between layers of the smooth 'bussu' cloth." (A. R. Wallace.) (*Palmæ*) [72]

MANIHOT GLAZIOVII, *Muell. Arg.*—Ceara Rubber is yielded by this tree, a native of a dry arid region in Brazil, where it is obtained by paring off the outer surface of the bark to a height of 5 feet. The milky juice exudes slowly, and after some days it is pulled off in strings and rolled up into balls. (*Euphorbiacæ*)

MARAGOGIPE COFFEE.—This is a large-growing variety of Arabian Coffee (*Coffea arabica*, Linn.) found in Brazil. It is large and vigorous looking, having, at first sight, much of the habit of Liberian Coffee. The leaves though fully twice the size of those of Arabian Coffee, have, however, the papery texture and the undulating character distinguishing that species. The flowers also, are the flowers of *C. arabica*, and so are the cherries, except in size. The latter are nearly an inch long, red and soft when ripe with a silky, smooth surface and a very small proportion of pulp. The chartaceous integument known as the "parchment skin," is thin as in Arabian Coffee, and not hard and horny as in Liberian Coffee. The cleaned beans, before drying, form fully 30 per cent. by weight of the cherries, and in this respect Maragogipe Coffee is certainly very promising. (*Rubiaceæ*) [206]

MARANTA ARUNDINACEA, Linn.—Arrowroot is the name given to the starch extracted from the tuberous roots of certain plants. In Jamaica, there are two plants used for the purpose, *Maranta arundinacea* and *Canna edulis*, which latter is sometimes called "Spanish Arrowroot"

Maranta belongs to the ginger family and has yellowish white flowers. Canna is one of the plants often known as "Indian Shot," and has red flowers. Shoots are taken from the old roots, and planted during May, in holes about 2 feet apart every way. When the leaves fade, in about a year's time from planting, the roots are dried, and carefully washed. The outer skin is removed and the roots again washed. The roots are then grated, or pounded in wooden mortars, or crushed between rollers. The pulp is put into clear water, and very thoroughly mixed up by stirring. This process separates the starch grains from the fibrous portion which is removed by straining through sieves of progressive fineness. The water containing the starch grains, is allowed to settle, when the water is run off. To obtain the finest article, the washings are repeated several times, and all contamination avoided with dust, &c, or even iron in the water. The starch is dried on calico trays in the sun, and packed in cases as soon as possible. The fibrous refuse is good feeding for pigs. About 100lbs. of arrowroot may be obtained from 4 barrels of cleaned roots; and from 25 to 30 barrels from the acre. (*Scitamineæ*) [74]

MAURITIA FLEXUOSA, Linn. f.—The Æta Palm. Charles Kingsley, in his very interesting book, "At Last," speaks of this palm, as he saw it growing in the forests of Trinidad:

"The forest ended and a scene opened before us which made me understand the admiration which Humboldt and other travellers have expressed at the far vaster savannas of the Oroonoco.

"A large sheet of grey green grass, bordered by the forest wall, as far as the eye could see, and dotted with low bushes, weltered in mirage; while stretching out into it, some half a mile off, a grey promontory into a green sea,—was an object which filled me with more awe and admiration than any thing which I had seen in the Island.

"It was a wood of Moriche palms; like a Greek temple, many hundred yards in length, and, as I guessed, nearly a hundred feet in height; and like a Greek temple, ending abruptly at its full height. The grey columns, perfectly straight and parallel, supported a dark roof of leaves, grey underneath, and reflecting above from their broad fans, sheets of pale glittering light. Such serenity of grandeur I never saw in any group of trees; and when we rode up to it and tethered our

horses in its shade, it seemed to me almost irreverent not to kneel and worship in that temple not made with hands.

“The short, smooth columns of the Moriches towered around us till as we looked through the ‘pillared shade,’ the eye was lost in the green abysses of the forest. Overhead their great fan leaves form a groined roof, compared with which that of St. Mary Redcliff, or even of King’s College, is as clumsy as all man’s works are beside the works of God.”

Humboldt describes them thus:—“In the season of inundations these clumps of *Mauritia*, with their leaves in the form of a fan, have the appearance of a forest rising from the bosom of the waters. The navigator in proceeding along the channels of the delta of the Oronoco at night, sees with surprise the summit of the palm-trees illumined by large fires. These are the habitations of the Guaraons, which are suspended from the trunks of the trees. These tribes hang up mats in the air, which they fill with earth, and kindle on a layer of moist clay the fire necessary for their household wants. They have owed their liberty and their political independence for ages to the quaking and swampy soil, which they pass over in the time of drought, and on which they alone know how to walk in security to their solitude in the delta of the Oronoco, to their abode on the trees. The *Mauritia* palm-tree, the *tree of life* of the missionaries, not only affords the Guaraons a safe dwelling during the risings of the Oronoco, but its shelly fruit, its farinaceous pith, its juice abounding in saccharine matter, and the fibres of its leaf stalks, furnish them with food, wine, and thread proper for making cords and weaving hammocks. It is curious to observe in the lowest degree of human civilization the existence of a whole tribe depending on one single species of palm tree, similar to those insects which feed on one and the same flower or on one and the same part of a plant.”

A. R. Wallace goes into more detail as regards the uses of this palm:—“The leaves, fruit and stem of this tree are all useful to the natives of the interior. The leaf-stalks are applied to the same purposes as the Jupati, (*Raphia tædigera*). The epidermis of the leaves furnishes the material of which the string for hammocks, and cordage for a variety of purposes, is made. The unopened leaves form a thick pointed column rising from the very centre of the crown of foliage. This is cut down, and by a little shaking the tender leaflets fall apart. Each one is then skilfully stripped of its outer covering, a thin riband-like pellicle of a pale yellow colour which shrivels up almost into a thread. These are then tied in bundles and dried and are afterwards twisted by rolling on the breast or thigh into string, or with the fingers into thicker cords. The article

most commonly made from it is the "réde," or netted hammock, which is the almost universal bed of the native tribes of the Amazon. These are formed by doubling the string over two rods or poles about six or seven feet apart, till they are forty or fifty parallel threads, which are then secured at intervals of about a foot by cross strings twisted and tied on to every longitudinal one. A strong cord is then passed through the loop formed by all the strings brought together at each end, by which the hammock is hung up a few feet from the ground and in this open net the naked Indian sleeps beside his fire as comfortably as we do in our beds of down.

"Other tribes twist the strings together in a complicated manner so that the hammock is more elastic, and the Brazilians have introduced a variety of improvements by using a kind of knitting needle producing a closer web, or by a large wooden frame with rollers, on which they weave in a rude manner with a woof and weft as in a regular loom. They also dye the string of many brilliant colours which they work in symmetrical patterns, making the rédes or "maqueiras" as they are there called, among the gayest articles of furniture to be seen in a Brazilian house on the Amazon.

"From the fruits a favourite Indian beverage is produced. They are soaked in water till they begin to ferment, and the scales and pulpy matter soften and can be easily rubbed off in water. When strained through a sieve, it is ready for use, and has a slight acid taste and a peculiar flavour of the fruit at first rather disagreeable to European palates." (*Palmæ*) [75] (Pl. 2, 9.)

MAXIMILIANA MARTIANA, *Karst.*—This Palm, when full grown, has a lofty stem, with leaves 50ft. long. The large woody spathes which covers the young flowering branch, are used as baskets, cradles, and even to boil meat in. It grows in the drier forests of Brazil. (*Palmæ*) [76]

MESUA FERREA, *Linn.*—The Naghas tree of the Hindoos is every where cultivated in India for the beauty and fragrance of the flowers, the delicate colouring of the young leaves, and the excellent shade afforded by the leafy branches. The flowers are dried and used for *sachets*; and also in medicinal preparations, as they are astringent and stomachic, besides imparting a perfume. The oil expressed from the dried kernel of the seeds is applied as an embrocation for rheumatism, etc. The wood is one of the Iron Woods, extremely hard, heavy, and difficult to work, and proof against white ants. The Hindoo legend tells how one of the five arrows of Kamadeva, the Indian Cupid, is tipped with the wood of the Naghas. (*Guttifereæ*) [77]

MICHELIA CHAMPACA, *Linn.*—The Champaca tree is a native of India, and is commonly cultivated throughout that country. It is sacred to Vishnu, and is therefore planted near Hindu temples, the sweet-scented flowers being offered at the shrines.

The timber can be used for furniture and building, and the bark is bitter and aromatic.

Medicinally the flowers are said to be the cheapest, commonest and most useful drug in India, prescribed in dyspepsia, nausea and fever. They are of a yellow colour, and are used by the native women to adorn their dark hair.

The exquisite perfume of the flowers is alluded to by Shelley:—

“ The wandering airs they faint
On the dark, the silent stream—
The Champac odours fall
Like sweet thoughts in a dream.”

—(*Magnoliaceæ*) [78]

MIMUSOPS ELENGI, *Linn.*—An evergreen tree, frequently cultivated in India, wild in the Deccan and Malay Peninsula. It is cultivated for its ornamental appearance, and its fragrant flowers. The latter are valued for making garlands, are sometimes used for stuffing pillows and the latter distilled from them is esteemed as a perfume. From the seeds a fixed oil is obtained by expression, which is used for culinary purposes, for burning and for medicine.

The wood is close and even grained, pinkish to reddish-brown in colour, and takes a good polish. It is used in house-building, for cart shafts and cabinet-work, and is said to last for fifty years.—(*Sapotaceæ*) [135]

MONSTERA DELICIOSA, *Liebm.*—A Mexican species which has a succulent fruit, with luscious pine apple flavour, but it contains numerous minute hairs which irritate the throat, so that few people can eat the fruit with comfort. (*Aroidæ*) [155]

MUSA ENSETE, *Gmel.*—Abyssinian Banana. Native name “Ensete.” Native of mountains of Abyssinia to the hills of Equatorial Africa; southward of Victoria Nyanza Lake. The largest known banana. It was discovered by the traveller Bruce and is remarkable as being represented on ancient Egyptian sculptures. Plants growing in the cool climate of the Blue Mountains at 5,000 feet have leaves 20 feet long; the stem about 8 feet in circumference at the base, with a height of 30 feet. This species is well adapted for sub-tropical countries such as California, Florida, Algeria, and Canary Islands, and is often put out for the summer in the London Parks. When established in sheltered situations, it is a very ornamental plant having a noble and majestic habit. The

fruit is useless for purposes of food, but in Abyssinia the centre of the stem is sometimes eaten. As the plant produces no offsets and perishes after fruiting, it is propagated entirely from seed. (*Scitamineæ*) [211]

MUSA SAPIENTUM, *Linn.*—Banana, or Sweet Plantain. This is the sweet fruit used without cooking; it has various names in different parts of the world. The old voyagers called it “bonano.” In the time of Roxburgh the Hindu name for the banana was “kulla.” Usually among Europeans in India the word “plantain” is used in a general sense for both the banana and plantain. Latterly, however, even in India, a distinction has been made in regard to the size and delicacy of the fruit, the small being the banana and the large the plantain. The Spaniards of tropical America call the banana “bacove,” “bacooba,” or “pacooba”; while in other Spanish countries varieties of the bananas are known as “cambur” or “camburi,” or “platanogüineo.” The English in the West Indies call the small and delicate bananas “fig bananas,” or simply “figs.” The French call the banana “bananes de sages” or “figue banane.” In the Malay Archipelago, pisang always translated “plantain,” is used for both bananas and plantains. The variety known as “pisang maas” or the golden pisang, appears to come nearest to the banana as known elsewhere. —(*Scitamineæ*.)

MYRISTICA FRAGRANS, *Houtt.* The nutmeg. The most famous nutmeg gardens in the world are in Banda, one of the Spice Islands of the East Indies. Dr. H. O. Forbes in his “Naturalist’s Wanderings,” gives an interesting picture of Banda and its nutmeg groves.

“A sail of two nights and a day brought us to Banda.

“We walked through the town, and, wandering up the heights by a path overgrown with lycopods and ferns, we presently found ourselves under a delightfully shady canopy of tall kanary trees, and among the groves of nutmeg of which Banda is the famous garden. Quite a picturesque object in the wood was a boy busy gathering the fruit into a neat creel with a jointed pole like a fishing-rod, nipping off the stalk of the ripe nuts by two claw-like prongs with which the tip of his rod was armed, when they dropped into a little basket-like cage worked to the stem a few inches below. He came and showed us his basket full of beautiful fruit in its pale yellow shell, half of which is left on, in which was nestling the dark brown nut embroidered with its deep lake mace.

“Further on we came on one of the plantation houses, where a large number of men and women were peeling the mace, drying it in the sun, and packing both in boxes. These cases are all made of one size, carefully finished and caulked, and form

as delightful an article of cargo as could be wished. None but a trade *de luxe* would besit an island so ornate and so wonderfully situated as Banda. Its produce, grown in beautiful bowers, is gathered up round its umbrageous shores in long gaudily-painted canoes and in whose preparation or shipment not one hand-soiling operation is required; its atmosphere is charged with aromatic exhalations, its wharfs and streets are the picture of tidiness, and the very water that laps its coral shores is brighter and purer than almost any where else in the world. (*Myristiceæ*) [80] [Pl. 1.]

MYROXYLON TOLUIFERUM, H. B. & K.—The Balsam of Tolu possesses similar properties to those of the Balsam of Peru. The tree from which it is extracted grows to a height of 80 feet, nearly double that of the other balsam tree. It is a native of New Grenada. The mode of collecting is to make V-shaped cuts in the bark to the wood, when the balsam exudes and collects in a calabash placed at the bottom of the cut. The collection goes on from July to March. (*Leguminosæ*). [81]

NAPOLEONA IMPERIALIS, Beauv.—This is a small tree, native of western tropical Africa. The structure of the flower is interesting. The corolla consists of three rows: the outer is of a rich claret colour with a cream or apricot-coloured margin; it is divided into 5 lobes, each lobe with 6 or 7 ribs, spreading from the base like a fan; as it expands, it bends outwards, concealing the calyx. The next row is somewhat like the "crown" of the passion flower, consisting of a number of whitish threads tipped with pink. The third and innermost row is cup-shaped with the margin bent inwards and divided into numerous pinkish teeth. Within this, come the stamens, about 20 in number, cream-coloured with the points of a pale claret colour. The fruit is soft, somewhat like a pomegranate; the rind contains so much tannin that a kind of ink is made from it in Africa. (*Myrtaceæ*). [83]

NECTANDRA RODIÆI, Hook.—The Greenheart or Bibiri tree of British Guiana, is a large tree sixty or seventy feet high, frequently without branches for the first fifty feet, the trunk being between two and three feet in diameter and covered with an ash-coloured bark, which, under the name of Bibiru bark, is used medicinally as a tonic and febrifuge, its properties being due to the presence of an uncrystallizable alkaloid, found likewise in the seeds. These latter, however are more remarkable for containing upwards of fifty per cent. of starch, which the Indians mix with rotten wood, and make into a bitter, disagreeable kind of bread. The most valuable part of the tree is its timber, large quantities of which, are regularly exported for shipbuilding purposes, its great strength and durability, to-

gether with the long lengths in which it is obtainable, rendering it well suited for beams, planking, and similar purposes; and its reputation is so high that it is placed in the first or twelve-year class in Lloyd's list of shipbuilding woods, though it is by no means free from the attacks of the ship-worm, or of the fungi which are such a fertile cause of decay in ships' timbers. (*Laurineæ*). [198]

NEPHELIUM LAPPACEUM, *Linn* — A tall tree of the Malay Peninsula, where it is known under the names of *Ramboutan*, or *Rambosteen*. There are several varieties in cultivation. Cultivated for its edible pulpy aril. (*Sapindaceæ*). [145]

NEPHELIUM LIT-CHI, *Camb.* — The Litchi tree is a native of South China, and was first known in Peking in the third century of our era. It was introduced into Bengal in the 18th century, and is now, on account of its delicious fruit, cultivated in India almost as extensively as the mango. The fruits are at their best when just picked, when they look like bright pinkish strawberries, and the pulp is then deliciously bitter-sweet. The edible portion is the semi-transparent jelly-like pulp or 'aril' which envelopes the seed, and is enclosed by a thin reddish brittle shell. The dried fruit is exported to Europe, but in this state bears no resemblance to the fresh berry. (*Sapindaceæ*). [84]

NORANTEA GUIANENSIS, *Aubl.* — A beautiful, vigorous-growing climber. It is an epiphyte, the red branches throwing out numerous roots which support the plant on trees near which it has established itself. The flowers are violet, on long spikes, with large bladdery or cucullate, scarlet bracts.

Native of Trinidad, Guiana, and Brazil. (*Ternstræmiaceæ*). [1]

OLEA EUROPÆA *Linn.* — The olive is cultivated for the olive-oil and for pickling olives. The best oil is obtained by passing the ripe fruit through a mill which bruises the flesh but does not crack the stones. The mass is then put into bags under a screw-press. Inferior qualities of oil are the result of boiling the cake obtained thus from the press, and again pressing it. The pickling olives are unripe fruit rendered less bitter by soaking in water to which lime and wood-ashes are sometimes added, and then boiling in salt-and-water flavoured with aromatics. The wood is used by cabinet-makers. (*Oleaceæ*) [85].

ONCOBA SPINOSA, *Forsk.* — A handsome, white-flowered, spiny bush, from Arabia. (*Bixineæ*) [183]

ONCOSPERMA FASCICULATUM, *Thu.* — An elegant Palm from Ceylon. (*Palmæ*). [161]

OREODOXA REGIA, *H. B. & K.*—“The American Palms,” says Seeman, “may be said to have been anxious to appear to the best advantage, when they were about to form the acquaintance of those who were about to seek a new world in the west. They placed on the very threshold of their native country several representatives, which, in elegance and majesty of form, are equalled by few, and surpassed by scarcely any of the whole order of palms. Even ere the anxious voyager has set his foot on shore, he has already perceived their graceful foliage fluttering in the breeze, and waving, as it were, a hearty welcome to the newly-arriving stranger. Since the time when Columbus first discovered the West Indian Isles to the present day, these palms have been seen and admired by all who possess an eye for the beautiful”

The palms referred to are the Royal Palm of Cuba (*Oreodoxa regia*) and the Cabbage Palm of the West Indies (*Oreodoxa oleracea.*) (*Palmæ*). [86]

PACHIRA AQUATICA, *Aubl.*—A tree with large handsome flowers, belonging to the same family as the Silk Cotton tree and the Mahoe. It is a native of tropical South America and some of the West Indian Islands. Some of the species yield good fibre from the bark. (*Malvaceæ*). [87]

PACHIRA BARRIGON, *Seem*—The wool of the seeds is used in Panama to stuff pillows, cushions, &c, and the bark affords a useful fibre. (*Malvaceæ*). [118]

PACHIRA INSIGNIS, *Savign.*—A handsome tree, native of Mexico, and some of the West Indian Islands. (*Malvaceæ*). [148]

PANDANUS SP.—One of the two simple-leaved genera of *Pandanaceæ*, and the principal genus of the order. It is distinguished by its male and female flowers being always on separate plants. There are a considerable number of species which are confined to the eastern hemisphere, and a very large proportion of them to the Islands of the Indian Archipelago. *Pandanaceæ*. [169]

PANDANUS UTILIS, *Bory.*—The screw Pines are so-called from the way in which their pine-like leaves grow in spiral-fashion. They are nearly related to the Palms, and are remarkable for the way in which roots are put out from the stem. The tender tip of a root is protected in pushing through the soil by a cap, and this root cap is very large and evident in the Screw Pines. When the roots reach the ground, they serve not only as feeders for the plant, but they also help to support it.

This species is a native of Madagascar, and is commonly planted in Mauritius for the sake of its leaves, “which are employed for the purpose of package-bags for the transportation of coffee, sugar and grain from one place to another, and for

exportation. The preparation of the leaves for working into matting is simple and short. As soon as gathered, the spines on their edges and dorsal nerve are stripped off, and the leaves divided into slips of the breadth proper for the use they are required for."—(Hardwicke.) (*Pandanaceæ*). [89]

PANDANUS VANDERMEEESCHII, *Balf. f.*—A native of Madagascar. (*Pandanaceæ*). [170]

PARKIA ROXBURGHII, *G. Don.*—An erect tree 40 to 60 feet high, native of India and Malaya. The flowers are produced in dense heads with stalks 1 to 1½ feet long. The pods attain a foot or more in length, and each contains a number of seeds enveloped in a farinaceous pulp. (*Leguminosae*). [115]

PHŒNIX RUPICOLA, *T. Anders.*—A very handsome Palm from Sikkim Himalaya, also found in Assam and the Mishmi Hills. (*Palmæ*). [164]

PHYLLANTHUS EMBLICA, *Linn.*—A native of India. The seeds are given internally as a cooling remedy in bilious affections and nausea, and in infusion make a good drink in fevers. They are also used in diabetes. Infusion of the leaves is applied to sore eyes. Bark of the root mixed with honey is applied to aphthous inflammations of the mouth. The bark of the tree itself is astringent, and is used for tanning purposes. It is medicinally used in diarrhœa. The fruit is occasionally pickled, or preserved in sugar. When dry, it is said to be gently laxative. In the latter state the decoction is employed in fevers, and mixed with sugar, and drunk in vertigo. The young leaves mixed with sour milk are given by the natives in dysentery. In Travancore the natives put the young branches into the wells to impart a pleasant flavour to the water, especially if it be impure from the accumulation of vegetable matter or other causes. Antiscorbutic virtues have been attributed to the fruit, which are known as the *Myrobalani Emblici*. The flowers are employed by the Hindoo doctors for their supposed refrigerant and aperient qualities. The bark partakes of the astringency of the fruit. The tree yields a valuable timber. (*Euphorbiaceæ*). [139]

PHYLLARTHON COMORENSE, *D. C.*—Native of Madagascar, Mauritius, etc. In Mauritius the fruit is used for jellies, and is also sought after much by birds. (*Bignoniaceæ*). [194]

PHYTELEPHAS MICROCARPA, *Ruiz & Pavon.*—The Vegetable Ivory of commerce is the hard white seed of this plant, which is a kind of palm with a trunk more or less recumbent. The hard woody fruit is as large as a man's head. The seeds when quite young, contain a clear water used by travellers to quench their thirst, afterwards this liquid becomes milky and sweet, and fi-

nally changes into a substance as hard and as white as ivory.
(*Palmae*). [90]

PIMENTA ACRIS, *Wight* (more accurately *Amomis caryophyllata* Kr. & Urb.)—Wild Clove, Wild Cinnamon, Bay-berry. A tree of 30 to 40 feet high, of great beauty and elegance of growth, and the polished foliage is very fragrant. It grows in most of the West Indian Islands, and also occurs on the mainland of Venezuela. It has been introduced into India where it is cultivated.

The leaves have a sweet aromatic smell, resembling cinnamon; they are agreeably astringent, and therefore useful in sauces.

The dried leaves are distilled, and the "Bay-oil" is mixed with rum to form "Bay Rum". (See Bulletin of the Botanical Department, Dec, 1891, and March 1892.)

Bay Rum is official in the Pharmacopœia of the United States. It is used as a refreshing perfume in faintness, nervous headache, and other nervous affections. It is also employed by the perfumer in the preparation of hair-washes, &c. The aromatic berries, resembling cloves, are used in cooking. The wood is of a reddish colour; it is hard and heavy, and capable of being highly polished. It is used for cogs of mill-wheels. (*Myrtaceae*). [119 & 119]

PIMENTA OFFICINALIS, *Lindl.*—Pimento, Allspice. Native of West Indies and tropical America yielding the well-known Jamaica Allspice. A tree 30 feet high, with a very smooth, light grey bark.

The young stems are made into walking sticks and umbrella handles.

A valuable close-grained wood. Diameter of the tree up to one foot. (*Myrtaceae*). [203]

PINUS MASSONIANA, *D. Don.*—This tree, the "Black Pine" is more or less common all over Japan and China. It is a valley plant, and is frequently to be found standing about the marshy rice fields, attaining a height of 40 or 50 feet, but becoming a mere shrub at an elevation of 3,500 feet, on the more exposed sides of the mountains.

The Japanese call it "Red Pine" on account of its red coloured timber; "Black Pine" from its sombre appearance when old. The Chinese apply the term "Black Pine" on account of its dark green appearance; and "Common Pine" from its abundance. (*Coniferæ*). [190]

PISCIDIA ERYTHRINA, *Linn.*—Dogwood. Native of the West Indies, and tropical America. Found at low elevations,

growing to a height of 40 feet with a diameter of 2 feet, with pinnate leaves; flowers whitish with a purplish tinge; pod with longitudinal wings.

Bark of the root used medicinally. It is an intense narcotic and relieves toothache when placed in the hollow of carious teeth. The tincture is often used in the United States instead of opium. Bark of the stem used to intoxicate fish, by pounding it up and throwing it into the deep part of the stream. A decoction of the bark cures the mange in dogs.

The wood is very useful, tough and elastic, much used for felloes of wheels and for cart and carriage frames and other work requiring a tough wood. (*Leguminosæ*) [124]

PITHECOLOBIUM BERTERIANUM, *Benth.*—A handsome tree with, fragrant, white flowers. Native of Jamaica, Cuba, St. Domingo, and Central America. It is a valuable timber tree. (*Leguminosæ*). [220]

PODOCARPUS ELONGATA, *L'Herit.*—Cape Yellow Wood. This is a much larger tree than any other in Cape Colony. The wood has been used in very large quantities for beams, planks, flooring boards and similar purposes in the forest. It is a sister species of our native Yacca

The wood, when well selected and properly seasoned, should be of a light yellow colour and a straight even grain. (*Coniferae*). [111]

POSOQUERIA LONGIFLORA, *Aubl.*—Remarkable for its very long white hanging flowers, the corolla of which is funnel-shaped, with a very long tube. The generic name is a modification of the native name applied to *P. longiflora* in Guiana. (*Rubiaceæ*). [191]

PSIDIUM CATTLEIANUM, *Sabine*—The purple guava, though originally brought to Europe from China, is a native of Brazil. It has smooth round branchlets, smooth leathery leaves, and short one-flowered stalks. The fruits which are produced in great abundance, and are readily distinguished from the common guavas by their deep claret-coloured pitted rind, are filled with a juicy pale flesh of a very agreeable acid-sweet flavour. (*Myrtaceæ*). [122]

PTEROCARPUS DRACO, *Linn.*—This is the Dragon's Blood tree of the West Indies. There are several plants known in different parts of the world as Dragon's Blood, but this one is a native of Jamaica, a tree about 30 feet high. The common name is derived from the fact that when incisions are made in the bark, drops of red sap ooze out which flow slowly down the bark and gradually harden.

Jacquin states that formerly this red resin was imported

from Cartagena to Spain as "Sangre de Dragon." He also says that the bark, wood, and leaves are full of an astringent sap, and that the inhabitants use the bark of the trunk and root for cleaning the teeth. It grows in Jamaica, Guadaloupe, Trinidad, and in Central and Northern South America.

The tree has compound leaves, somewhat like the common cedar; yellow pea-like flowers, half an inch long; and a flat rounded pod, containing one seed. (*Leguminosæ*). [91]

PTEROCARPUS INDICUS, *Willd.*.—A large and lofty tree found in Burma and the Andaman Islands. The gum might be largely utilised as a substitute for true kino. The heartwood is dark-red, close-grained, with a slight aromatic scent. It is durable and not attacked by white ants. When thoroughly seasoned it is almost unaffected by alternate dryness and moisture of the atmosphere. It seasons well, works well, and takes a very fine polish. It is used for furniture, carts, gun-carriages, and other purposes, and is said to be the most useful wood in the Andamans, where it grows to an enormous size. (*Leguminosæ*). [185]

PTEROSPERMUM ACERIFOLIUM, *Willd.*.—A tall tree found in the sub-Himalayan tract as far east as Burma.

The wood is occasionally used for planking in Bengal, and it is said to take a fine polish, and to be suitable for making furniture. (*Sterculiaceæ*). [215]

PTEROSPERMUM LANCEÆFOLIUM, *Roxb.*.—A large tree of the sub-Himalayan tract from the Jumna eastwards and of Eastern Bengal down to Chittagong. Wood reddish, moderately hard. (*Sterculiaceæ*). [186]

QUASSIA AMARA, *Linn.*.—The wood is the original Quassia from Surinam which acquired reputation as a drug. When the demand exceeded the supply, it was found that a native tree of Jamaica (*Picræna excelsa*) was of equal value, which is known as Jamaica Quassia or Bitter Wood. (*Simarubaceæ*). [92]

RANDIA MACULATA, *D. C.*.—A shrub 10 to 15 feet high, is a native of Africa. It is nearly related to Gardenia, and in fact it is often called in gardens *Gardenia Stanleyana*. The flowers are fragrant and coloured white spotted inside with purple. (*Rubiaceæ*). [93]

RAPHIA RUFFIA, *Mart.*.—The Raphia Palm grows in brackish swamps in Madagascar. The trunk is not large but the pinnate leaves are often 50 feet in length. The Raphia fibre prepared from this Palm is quoted at 40/ per cwt. The fruit spikes are 3 feet long hanging down from amongst the leaves and weighing as much as 200 or 300 lbs. The fruits as large, as eggs, are covered with shining overlapping scales. (*Palmæ*). [94]

RAPHIA TÆDIGERA, Mart The Jupati Palm, says Mr. Wallace, is of one of the most striking of the many noble Palms which grow on the rich alluvium of the Amazon. Its comparatively short stem enables us fully to appreciate the enormous size of its leaves, which are at the same time equally remarkable for their elegant form. They rise nearly vertically from the stem and bend out on every side in graceful curves forming a magnificent plume seventy feet in height and forty in diameter. The stem does not generally exceed six or eight feet in height, and is about a foot in diameter, clothed for some distance down with the persistent sheathing bases of the leaf-stalks and the numerous spinous processes which proceed from them.

The leaf-stalk of this tree is most extensively useful. It is often twelve or fifteen feet long below the first leaflets, and four or five inches in diameter, perfectly straight and cylindrical. When dried, it almost equals the quill of a bird for strength and lightness, owing to its thin hard outer covering and soft internal pith. But it is too valuable to the Indian for him to use it entire. He splits off the smooth glossy rind in perfectly straight strips, and makes baskets and window blinds. The remaining part is of a consistence between pith and wood, and is split up into laths about half an inch thick and serves for a variety of purposes. Window shutters, boxes, bird cages, partitions and even entire houses are constructed of it. In the little village of Nazare near Para, many houses of this kind may be seen in which all the walls are of this material, supported by a few posts at the angles and fastened together with pegs and slender creepers. The hand may be easily pushed through one of these walls, but as the inhabitants do not trouble themselves with the possession of any article worth stealing, they sleep as composedly as if stone walls and iron bolts shut them in with all the security of a more advanced civilisation. The same material is also used for stoppers for bottles. (*Palmæ*). [95]

RAVENALA MADAGASCARIENSIS, *Sonner*.—The Traveller's Tree of Madagascar is one of the most beautiful and striking members of the Banana family. At the top of the trunk the upper leaves are in two rows with long stalks, arranged like an enormous fan. As the wild pines of Jamaica hold water, which is sometimes of service to hunters in the woods, so the sheath of the leaf-stalks of the Traveller's Tree, store up water for the plants' own needs, and each one pierced from below, will yield the thirsty traveller half-a-pint, or so, of refreshing water. The blades of the leaves are used for thatch. The flowers are individually much like those of the Banana, but they are supported by large bracts arranged in two rows along the stalk.

The seeds are edible, and are covered with a blue pulpy matter, which yields an essential oil. (*Scitamineæ*). [96]

RHAPIS FLABELLIFORMIS, *Ait.*—The Ground Rattan is a low-growing palm with a number of reed-like stems growing several together in dense tufts. It is a native of China and Japan.

The stems are very slender, and are made use of for various purposes. They are however quite distinct from the Rattan cane. It is an excellent plant for table decorations and will stand the climate of the hills. (*Palmæ*). [97]

RHODOLEIA CHAMPIONI, *Hook.*—A beautiful shrub or small tree native of the Island of Hong Kong, remarkable for the flower heads being surrounded by several rows of imbricated bracts, whilst the bright pink petals of all the five or six flowers of the head are arranged round the circumference, giving it the appearance of a Camellia. (*Hamamelideæ*). [227]

SABAL ADANSONI, *Guerns.*—The dwarf Palmetto. Native of the southern United States. (*Palmæ*). [153]

SABAL BLACKBURNIANA, *Glazebrook.*—W. Indies. This is the Bull Thatch Palm. The leaves are used for thatching; and hats, baskets, brooms, &c., are made from the leaf-fibres. (*Palmæ*). [151]

SABAL PALMETTO, *Lodd.*—The Palmetto of the southern United States has gained renown in two wars. The stems are extremely tough and during the War of Independence they were used with great success for making stockades. Hence the Palmetto was introduced into the arms of South Carolina, and on the breaking out of the Civil War the Palmetto flag became a party emblem.

The stems attain a height of 40 feet; they are almost imperishable under water, not being attacked by the teredo, and are therefore of the greatest utility for making wharves.

The leaves of the Palmetto and also those of the Dwarf Palmetto (*Sabal Adansonii*) of the same region are used for plaiting into light and durable hats, (*Palmæ*). [98]

SAMADERA INDICA, *Gaertn.*—This tree is the source of the Niepa Bark of Commerce. It is 30 to 35 feet high, found in India and Ceylon.

The bark is of a pale yellow colour; it contains a bitter principle called *Samaderin*, has a taste like quassia, and is used as a febrifuge. An infusion of the wood is taken as a general tonic.

The root as well as the oil expressed from the seeds is used medicinally. The oil is said to form a good local application in rheumatism. The bruised seeds are externally applied in erysipelas, (*Simarubæ*). [188]

SAPINDUS MARGINATUS, D.C.—The genus *Sapindus* is found in both hemispheres, mostly within the limits of the tropics. The fruits are fleshy externally and do not open when ripe. Those of several species are acrid, and are called soap-berries, from their being sometimes used in the tropics as a substitute for soap, their outer covering or shell containing a saponaceous principle (saponine) in sufficient abundance to produce a lather with water.

Their excessively hard, round, black seeds are used for making rosaries, necklaces, bracelets, buttons, &c. (*Sapindaceæ*). [141]

SARACA INDICA, Linn.—The *Asoka*. A low erect tree of India, Ceylon and Malaya.

A decoction of the bark in milk is much used by native physicians in uterine affections.

The *Asoka* is one of the sacred trees of the Hindoos which they are ordered to worship. Its flowers, probably on account of their beauty and the delicacy of their perfume, which in the months of April and May is exhaled throughout the night, are much used in temple decoration. The tree is a symbol of Love, and is dedicated to Kama, the Hindu God of Love. Like the *Agnus Castus* it is believed to have a certain charm in preserving chastity. (*Leguminosæ*). [226]

SARCOCEPHALUS ESCULENTUS, Afzel.—This small tree is a native of Upper Guinea. Its fruit, known as the Sierra Leone Peach, is really a union of small fruits as the Pine-Apple is. The fragrant flowers are small, half an inch long, of a white pale pink or yellowish colour, and are crowded together into heads of about two inches in diameter. The edible fruit is thought by some to resemble the apple in flavour. (*Rubiaceæ*). [150]

SEMECARPUS ANACARDIUM, Linn. f.—The Marking Nut Tree of India. The juice of the nut is used for marking cotton clothes; it is mixed with a little quicklime and water as a mordant. But it is so acrid in its nature, that care has to be taken in its use. It is also employed as a dye, colouring a greyish-black. It is, however, applied in India by the natives for rheumatism and sprains, for warts, and in scrofulous eruptions. This tree is related to the Cashew, but the receptacle (the Cashew fruit) is small in the Marking Nut Tree. (*Anacardiaceæ*). [100]

SIMABA CEDRON, Planch.—A small tree, native of New Grenada, which bears a fruit about the size of a swan's egg, containing one seed. The Cedron of commerce, which looks like a blanched almond, but is larger, is the kernel of the fruit.

As a remedy for the bites of serpents, it appears to have been known to the inhabitants from time immemorial, and was first reported as deserving of notice in 1699, but it was not till very recently that anything certain was known either of the seed or its uses. Part of its reputation is owing to its febrifugal powers in interittent fever, it being successfully prescribed in that disease by the physicians of New Grenada, a country abounding in forests of Cinchona trees; but it principally rests upon its efficacy as an antidote for the bites of snakes, scorpions, and other noxious animals, it being universally believed that its application will neutralise the poison even of the most dangerous among them. When a bite has been received, a small quantity mixed with water is applied to the wound, and about two grains scraped into brandy or into water, is given internally. The active principle on which the medicinal qualities of the Cedron depend has been separated by M. Lecoy, who has named it *Cedrine*. Every part of the plant, but especially the seed, is, owing to its presence, intensely bitter. (*Simarubææ*). [229]

SMILAX PAPHYRACEA, Duham.—Sarsaparilla. Native of tropical America. A large perennial climber, with large rootstock; which gives off numerous roots 6 to 8 feet long; leaves a foot long cordate; flowers small and inconspicuous.

Roots are the official part of the plant. Sarsaparilla is alterative, tonic, diaphoretic, and diuretic. Employed in syphilitic affections, in chronic forms of rheumatism, gout, scrofulous affections, and skin diseases. (*Liliacææ*) [216]

SPATHODEA CAMPANULATA, Beauv.—Grows to a height of 80 feet at Castleton. The branches do not spread, but the mass of rich orange-coloured flowers gives it a most attractive appearance. (*Bignoniacææ*). [102]

STERCULIA ALATA, Roxb.—A tall tree a native of India and Burma. The wood is generally light, soft, often spongy (*Sterculiacææ*). [126]

STEREOSPERMUM CHELONOIDES, D.C.—A large deciduous tree, bark brown, wood hard, grey, no heartwood. Native of India and Burma. (*Bignoniacææ*). [131]

STEVENSONIA GRANDIFOLIA, F. Duncan.—A splendid Palm from the Seychelles. (*Palmææ*). [174]

STRYCHNOS NUX-VOMICA, Linn.—The seeds of this tree are known as Nux-vomica. They are flat and nearly round, and are bitter to the taste from containing three poisonous alkaloids, *strychnia*, *brucia*, and *igasuria*. The first of them is a very active poison, but possesses valuable tonic or stimulant properties. (*Loganiacææ*). [103]

SWIETENIA MAHAGONI, *Linn.*—Mahogany Native of Jamaica, Cuba, Bahamas, and Central America. A lofty graceful tree; leaves pinnate; flowers small, greenish-yellow; seed-vessel opening by 5 valves from the base; and seeds flat, winged

Wood, handsome, durable, much used in general building and for furniture and ornamental work

Bark astringent; used for diarrhœa by boiling an ounce of bruised bark in two pints of water down to one half. Bark of boughs, a good bitter and febrifuge. (*Meliaceæ*). [114]

TABERNÆMONTANA LONGIFLORA, *Benth.*—A robust elegant shrub with white flowers and milky juice, native of Sierra Leone. (*Apocynaceæ*). [137]

TECTONA GRANDIS, *Linn. f.*—This, the Teak Tree, is a native of central and south India, and Burma. It does not grow near the coast, but on low hills up to 3,000 feet, an essential being perfect drainage. As a timber its commercial value ranks next to Mahogany. "The sap wood is white and small; the heartwood when cut green has a pleasant and strong aromatic fragrance and a beautiful dark golden yellow colour, which on seasoning soon darkens into brown mottled with darker streaks. The timber retains its fragrance to a great age, the characteristic odour being apparent whenever a fresh cut is made. It is moderately hard, exceedingly durable and strong, does not split, crack, warp, shrink, or alter its shape when once seasoned, works easily and takes a good polish. It seems to require an annual rainfall of 30 inches, but to thrive best with from 50 inches to 120 inches mean annual rainfall."—(Gamble.) (*Verbenaceæ*). [104]

TERMINALIA ARJUNA, *Bedd.*—The Arjun tree is a native of India and Ceylon. The bark is astringent; it is given medicinally in heart diseases, contusions, &c., and is used in dyeing to produce a light brown *Khaki* colour. (*Combretaceæ*). [105]

THEOBROMA CACAO, *Linn.*—This genus is named from the Greek words *theos* 'god' and *broma* 'food,' in consequence of the well known Cocoa or Chocolate being the produce of its seeds.

As an article of food, cocoa is exceedingly valuable, from the large amount of nutritive matter it contains; but as a refreshing beverage it is much inferior to either tea or coffee, owing to the large amount (50 per cent.) of fat which it contains, and also to the fact that the whole of the substance is taken into the stomach, while with tea or coffee only an infusion is drunk. It contains a peculiar principle, which is called *theobromine*. (*Sterculiaceæ*).

55
THESPESIA POPULNEA, *Soland.*—The Tulip Tree. A moderate-sized evergreen tree, found along the sea-shore in the tropics generally. The bark yields a strong fibre, employed in the rough state, for tying bundles. In Burma it is said to be used for cordage. The sap-wood is soft, pale reddish to brown, with small dark-coloured, hard heartwood; weight 50 lbs per cubic foot. It is strong, even-grained and durable, and is used in India for making gun-stocks, carts, carriages, and furniture; in Burma for carts, wheel-spokes, furniture, and purposes of carpentry generally.

The Tulip Tree is largely planted in India in gardens and along roadsides to give shade. (*Malvaceæ*). [221]

THRINAX PARVIFLORA, *Sw*—The Royal Palmetto, or Palmetto Thatch Palm, is a native of Jamaica, Florida, and Central America. The stem is very slender, and sometimes attains a height of 40 feet. The fibre affords material for ropes. (*Palmæ*). [106]

TRACHYLOBIUM VERRUCOSUM, *Oliv.*—One of the Copal trees. Tropical Africa. Copal is a hard resinous substance resembling amber, a natural exudation from certain tropical trees. It is also called Gum Anime. Copal is yielded by trees now growing; but the greatest quantity is found in the sand in localities where no trees now exist, but the remains of insects and even leaves and flowers found embedded in the resin are sufficient evidence to prove that it is the produce of trees that once grew where the resin is now found. (*Leguminosæ*). [134]

VANILLA PLANIFOLIA, *Andr.*—Vanilla. Native of tropical America. A climbing orchid, with pale yellowish green flowers, and a long pod; these pods, gathered before they are quite ripe and cured, form Vanilla of commerce.

Vanilla is used in perfumery, and for flavouring chocolate liqueurs &c. (*Orchideæ*) [205]

VERSCHAFFELTIA SPLENDIDA, *H. Wendl.*—A very handsome, spiny Palm, producing aërial roots like a Pandanus. Native of the Seychelles (*Palmæ*). [163]

VICTORIA REGIA, *Lindl*—The *Victoria regia* is certainly the queen of all water lilies, but in the narrow confines of the tank at Castleton, it is unable to expand to its full size and beauty.

Sir Robert Schomburgh discovered this lily in British Guiana, and gave the following account to the Royal Geographical Society:—

“It was on the 1st of January, 1837, while contending with the difficulties that nature interposed in different forms, to stem our progress up the river Berbice that we arrived at a part where the river expanded and formed a currentless basin. Some object

on the southern extremity of this basin attracted my attention, and I was unable to form an idea what it could be; but, animating the crew to increase the rate of their paddling, we soon came opposite the object which had raised my curiosity, and behold, a vegetable wonder! All calamities were forgotten, I was a botanist, and felt myself rewarded! There were gigantic leaves, five to six feet across, flat with a broad rim, lighter green above and vivid crimson below, floating upon the water; while in character with the wonderful foliage, I saw luxuriant flowers, each consisting of numerous petals, passing in alternate tints, from pure white to rose and pink. The smooth water was covered with the blossoms, and as I rowed from one to the other, I always found something new to admire. The flower-stalk is an inch thick near the calyx and studded with elastic prickles, about three-quarters of an inch long. When expanded, the four-leaved calyx measures a foot in diameter, but is concealed by the expansion of the hundred-petaled corolla. This beautiful flower when it first unfolds is white with a pink centre; the colour spreads as the bloom increases in age; and, at a day old the whole is rose-coloured. As if to add to the charm of this noble Water-Lily, it diffuses a sweet scent. As in the case of others in the same tribe, the petals and stamens pass gradually into each other, and many petaloid leaves may be observed having vestiges of an anther. The seeds are numerous and imbedded in a spongy substance. Ascending the river, we found this plant frequently, and the higher we advanced, the more gigantic did the specimens become; one leaf we measured was six feet five inches in diameter, the rim five inches and a half high and the flowers a foot and a quarter across." (*Nymphæaceæ*) [107]

WORMIA BURBIDGEI, *Hook.*—Flowers showy, pale golden-yellow. Native of North Borneo. (*Dilleniaceæ*). [117]

ZAMIA INTEGRIFOLIA, *Ait.*—A native of dry sea coasts in Jamaica, is represented by a specimen at the base of the Moriche Palm. It is nearly allied to *Cycas*, and also yields starch. (*Cycadaceæ*). [108]

ZINGIBER OFFICINALE, *Roscoe.*—Ginger is the dried root-stock of *Zingiber officinale*, a plant with leafy stems, 3 or 4 feet high, distinct flowering stems 6 to 12 inches high with small, yellow and purple flowers in a cone-like head.

Small pieces or protuberances of the root-stock 1 or 2 inches long are planted during March or April, 4 inches deep and 9 to 12 inches apart. It is well to cover the land with a mulching of dead leaves, weeds, straw, or litter, mixed with manure. In a few months the whole ground will be covered. The flowers appear in September. When the stalks wither in the following

January or February, it is time to dig up the roots. When the tubers have become mature, and have put forth stems, they are fibrous; but before this takes place, while they are still succulent, and the young stalks are no more than 5 or 6 inches long, they should be taken up for preserving. Ginger is an exhausting crop on the soil, and should not be planted in the same ground two consecutive years.

Jamaica Ginger of commerce is prepared from the best and soundest roots, by scraping off the outer dark-coloured part, and then carefully drying without boiling. "Preserved Ginger" is made from the young tubers, which are scalded, washed in cold water, and then peeled. The roots are then covered with a weak syrup, and left for two days. The syrup is then poured off, and replaced by a stronger syrup, and this is repeated two or three times, until the syrup is thick, and the ginger bright and nearly transparent. The yield per acre is said to be 4,000 lbs. and upwards. (*Zingiberaceæ*) [109]

ZIZYPHUS JUJUBA, *Lam.*—A small tree, the "Jujube" wild and extensively cultivated throughout the tropics of the Old World.

The unripe fruit is pickled; the ripe pulp is dried, mixed with salt and tamarinds, to form a condiment; the kernels are also eaten. The leaves are a good fodder for cattle and goats, and are also largely used as food for *tasar* silk-worms, in certain parts of the North-West Himalaya; the cocoons of this tree are said to be superior to those of any other. (*Rhamnaceæ*). [82]

ZIZYPHUS RUGOSA, *Lam.*—A large, evergreen, scrambling shrub or small tree, of India and Ceylon. The fruit is eaten by natives in all localities in which the plant grows. The wood is only valuable for fuel. (*Rhamnaceæ*). [225]

ERRATA.

For "Pandanus odoratissima" read "Pandanus odoratissimus"

For "Diplothemium caudesens" read "Diplothemium caudescens."

For "Cocos botryophoa" read "Cocos botryophora"

For "Phœix rupicola" read "Phœnix rupicola"

For "Hyophorbe Verschaffeltia" read "Hyophorbe Verschaffeltii."

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The Blocks of Plates 1 and 5 to 16 have been most kindly lent to me for the purpose of this Guide, and my grateful acknowledgement is here placed on record.

The Frontispiece, Plate 1, is from a photograph taken by Dr. L. M. Underwood, published in the Journal of the New York Botanical Garden, July, 1903. The block is lent by Dr. N. L. Britton, Director in Chief of the Garden.

Plates 5 to 16 are from photographs taken by Dr. Alfred Rehder of the Arnold Arboretum, in the year 1903, published in "Möller's Deutsche Gärtner-Zeitung," 18th and 25th July, 1903, with descriptive articles. The blocks are lent by Herr Ludwig Möller.



MAURITIA FLEXUOSA
CYCAS CIRCINALIS
CYCAS REVOLUTA

PANDANUS ODORATISSIMA



ARAUCARIA
CUNNINGHAMII
ALPINIA
NUTANS

ARAUCARIA
EXCELSA
DIPLOTHEMIUM
CAUDESSENS

OREODOXA
REGIA
STEVENSANIA
GRANDIFOLIA
CYCAS CIRCINALIS

COCOS
BOTRYOPHOA



CORYPHA ELATA

CHRYSALIDOCARPUS
LUTESCENS
VICTORIA REGIA
NYMPHAEAS

RAPHIA TAEDIGERA

DYPSIS
PINNATIFRONS



ARTOCARPUS
INTEGRIFOLIA

ARTOCARPUS
INCISA

ACROCOMIA
LASIOSPATHA



BASSIA LATIFOLIA

EUTERPE OLERACEA



CARYOTA URENS

PHENIX ACAULIS



CHRYSALIDOCARPUS LUTESCENS

LIVISTONA
AUSTRALIS



CYCAS CIRCINALIS
CYCAS REVOLUTA

MAURITIA FLEXUOSA





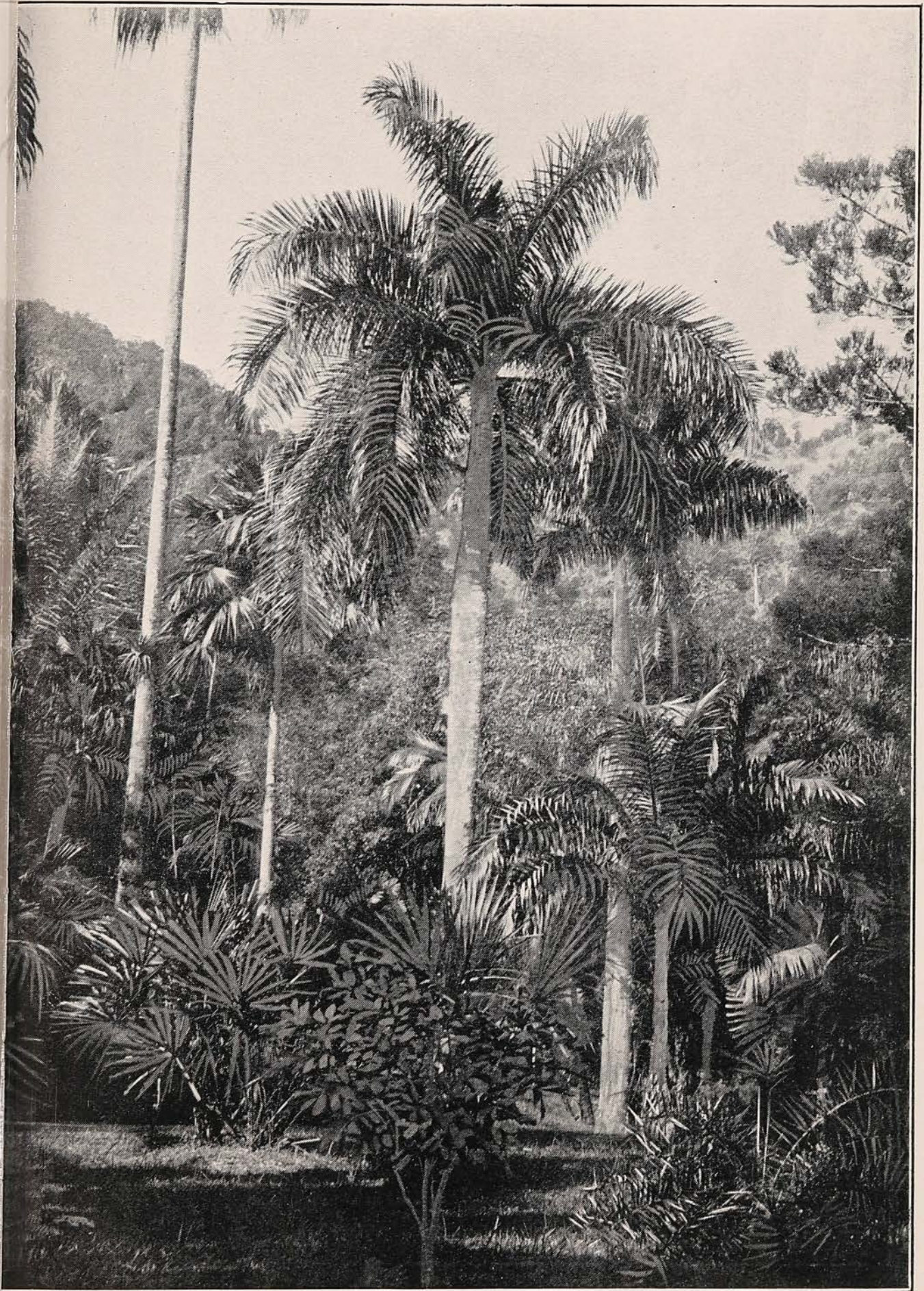
LICUALA ELEGANS

LIVISTONA CHINENSIS

PHŒNIX ACAULIS



LIVISTONA OLIVAEFORMIS



OREODOXA REGIA



CYATHEA ARBOREA

DENDROCALAMUS STRICTUS
RAVENALA MADAGASCARIENSIS
NYMPHAEAS



COCOS PLUMOSA
THRINAX PARVIFLORA



RAPHIA TÆDIGERA

ARAUCARIA

ARAUCARIA EXCELSA

OREODOXA REGIA

CUNNINGHAMII

LIVISTONA CHINENSIS

STEVENSONIA GRANDIFOLIA

SABAL BLACKBURNIANA

DIPLOTHHEMIUM CAUDESCENS



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