Records

of the

Botanical Survey of India

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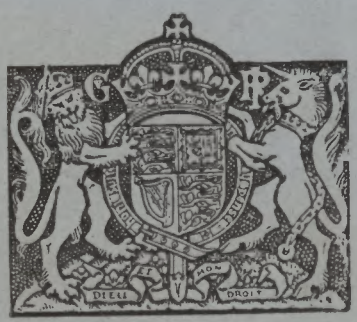
By

J. M. COWAN, M.A., D.Sc.



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THE FLORA OF THE CHAKARIA SUNDARBANS.

BY

J. M. COWAN, M.A., D.Sc.

I. INTRODUCTION.

THE littoral flora of the Indo-Malayan Coasts has been very fully described by Schimper in his classical work "Die-Indo-Malayische-Strand Flora." Prain in the second volume of these Records has given us a very full and detailed account of the Flora of the Gangetic Sundarbans. The littoral forests of Burma have been described by Kurz and by Stamp, who has also illustrated them, in his "Vegetation of Burma." Schimper's observations were made largely in the Malayan Archipelego and the plants of this region have been dealt with by Karsten too. Prain has described the Flora of the Cocos Group at the north end of the Andamans and that of the Lacadive Archipelego.

Our knowledge of the littoral flora of these regions is thus very complete and probably the largest isolated compact area of mangrove forests not yet described, is the area known as the Chakaria Sundarbans in Chittagong, about half way between the Sundarbans of the Gangetic delta and those of the Irrawaddy.

In view of the work which has already been done, the flora of the Chakaria Sundarbans is of particular interest, as it exhibits certain unique features. Botanical collections were made by Heinig and by the writer when preparing a Forest Working Plan. These collections were mainly of the trees and they have been supplemented by sending collectors from the Royal Botanic Gardens, Calcutta, who paid special attention to herbaceous species, so that now the herbarium collection from this locality is very complete.

II. TOPOGRAPHY.

Situated in Longitude 92° east and Latitude 21° 41′ north in the district of Chittagong, the easternmost part of Bengal, the Chakaria Sundarbans is the name given to a series of islands in the delta of the Matamori river. The Matamori rises in the Chittagong Hill Tracts

and after following a winding course for about 200 miles, enters the Moiskal Channel, an arm of the sea about a mile in width, separating Moiskal Island from the mainland. The Matamori enters the Moiskal Channel by three main outlets, the Bura Mori, the Gabur Mori and the Mangla and these are connected by numerous creeks. The width of the delta at the mouth is 9 miles and the area within it is divided into 11 low lying islands. These islands, together with a small portion of the mainland, form a maritime swamp with a slight slope from north-east to south-west, and all but a small portion in the north-east corner is submerged at every high tide. At spring tides the whole of the area is inundated.

The soil is a muddy alluvium resting on sandstone of Tertiary age. For the most part, along the outer fringe and along the rivers and creeks, the muddy soil shelves directly to the water. There is no beach such as is found in the Gangetic Sundarbans, as the river does not reach the open sea and sand banks are few and, with only one or two exceptions, are submerged except at the lowest tides.

The maritime swamp at present extends to an area of 28 square miles. In quite recent years, however, it covered a very much larger expanse for it is recorded that in 1911 the area of the Chakaria Sundarbans was 71 square miles. As a muddy bank or *bund* to a height of four feet is sufficient to exclude the rising tide, a great part of the former swamp has been reclaimed by the building of mud banks and the land is now already under cultivation or is being rapidly brought under it. These mud banks bound the swamp on much the greater part of its inner limits, so that, for the most part, the mangrove vegetation of the tidal flats suddenly gives place to rice fields.

In the north-east of the area the inflow of the water is checked by a natural bank with a precipitious face, formed by the Mangla river having cut into hilly land. It is only over a small area between Phalakata and the Mangla river, where the land is higher, that the muddy swamp disappears with the natural rise of the ground, giving place to waste land or to high level forest.

III. NATURE OF THE VEGETATION.

The 28 square miles within the *bunds* bear mangrove forest which owes its origin to the fruits and seeds of littoral species, borne to the locality by ocean currents.

These forests are stunted, reaching an average height of about 25 feet and it is only very exceptionally that an individual tree rises to 60 feet.

One of the chief characteristics of the locality is the paucity of species. Excluding an area of about one acre on Charalia where there are still the remains of a former village and the weeds of the reclaimed fields, the number of species found is only 53 belonging to 42 genera and 22 natural orders.

The Mangrove Forests.

The forests consist mainly of an Association of two species—*Ceriops Roxburghiana* and *Avicennia officinalis* (*var. tomentosa*). The former which has usually been coppiced forms a dense growth 5 to 15 feet high with scattered trees of the latter species overhead, reaching a height of 30 or 40 feet. *Ceriops Roxburghiana* is the most frequent species, *Avicennia officinalis* (*var. tomentosa*) is the most widely distributed being found practically everywhere.

Within this Association groups of *Kandelia Rheedii* and *Bruguiera caryophylloides* are found where the level of the ground is slightly above the average and *Bruguiera gymnorhiza* and *Bruguiera parviflora* where the ground is somewhat lower.

Over a considerable area *Ceriops Roxburghiana* grows as pure forest and may be regarded as forming a separate Association.

Where an area of considerable extent is below the general level, and this is notably so on Badurkhali island owing to the slight slope from north-east to south-west, the land is of course submerged for longer periods. In such places *Aegialitis rotundifolia* is found in large Associations. This is the only tree that flourishes in such localities and its average height is only 10 feet. A slender creeper *Derris uliginosa* is also characteristic of these localities binding together the stems of the *Aegialitis* so that an almost impenetrable thicket is formed. Near the margin of this Association *Avicennia officinalis* (*var. tomentosa*) is found.

On higher land, subject to inundation for shorter periods, especially in the north-east of the area, the principal tree is *Heritiera minor* which forms a characteristic Association. *Excœcaria Agallocha* may also be found and clumps of the gregarious *Phœnix palludosa* are fairly common. Species characteristic of other Associations are absent except *Avicennia officinalis* (*var. tomentosa*) which grows almost everywhere and is sometimes mixed with *Heritiera minor*.

On the sea front and on the larger rivers, especially the Gabur Mori where there are large shelving muddy banks, large trees of *Sonneratia apetala* are typical. These occupy a strip about 100 feet wide along the edge of the streams. On the outer fringe of such strips there is usually a dense mass of naturally regenerated saplings of the same species. *Avicennia officinalis* may also be found occasionally in these localities but

it is very much less frequent than the former species. Sometimes it is mixed with *Sonneratia apetala* or infrequently it entirely replaces it.

The edges of the creeks and smaller streams, where the banks are usually perpendicular, are characterised by *Rhizophora mucronata* mixed with *Avicennia officinalis* or by *Aegiceras majus* or *Sonneratia apetala* or occasionally by *Carapa moluccensis* and *Findlaysonia obovata*, the latter growing at the water edge.

Besides the species already mentioned the only trees occurring actually on the muddy flats are *Carapa obovata*, *Avicennia alba*, and *Sonneratia Griffithii*. There are in addition to the trees a number of shrubs and climbers which are noted in the list that follows.

Parasites and epiphytes are represented by *Cuscuta reflexa*, which commonly grows on shrubs near the banks of the streams, and by *Viscum monoicum* which grows on several different species. *Hoya parasitica* seems to prefer *Excœcaria Agallocha*. Herbaceous species are almost absent.

A feature very characteristic of the whole locality is the profusion of *Dalbergia spinosa*, a thorny scrambler which grows almost everywhere throughout the area. In the Gangetic Sundarbans it is found only sporadically and is scarce, whilst here almost the only ground from which it is absent is that occupied by the *Aegialitis* Association. Its numerous branches grow densely and, as they are armed with sharp thorns, they make progression through the forest difficult. *Acanthus ilicifolius* is also much commoner in this area than in the Sundarbans proper. In the open it has a bushy habit and is 2 to 3 feet high, but it makes its way into the forest where it grows as a scrambler with long trailing branches.

From Phalakata to Fashiakhali the land is higher than to the east of Phalakata and, as the mud banks are not quite continuous, the tides penetrate beyond the muddy flats to sandy ground. *Excœcaria Agallocha* is the commonest tree in this region but it is scattered and the plant which occurs most frequently is *Acrostichum aureum*, a fern which grows n large clumps. *Tamarix gallica*, usually very stunted, is also common, while *Cynometra ramiflora* and *Pongamia glabra* are occasionally found. Other species which occur in this locality are *Acanthus ilicifolius*, *Blumea lacera*, *Calotropis procera*, *Ipomea Pes-carpœ*, *Herpestes monniera* and *Vernonia cinerea*.

The Vegetation of Former Village Sites.

Were it not for the fact that two of the islands were once under cultivation, the list of species in the Chakaria Sundarbans

would be extremely short. Prior to 1897, however, the greater part of both Badurkhali and Charalia Islands were cultivated. In that year the majority of the inhabitants of the villages as well as those on the neighbouring island of Kutubdea perished in an immense tidal wave which swept far inland. There has been no cultivation in the Chakaria Sundarbans since that date.

From Badurkhali all traces of cultivation have disappeared except that the boundary of the *Aegialitis* Association corresponds very closely with the limits of the former cultivation so that the open ground probably favoured the establishment of this species.

On Charalia Island also, mangrove forest has invaded practically the whole of the land which was formerly cultivated and is still encroaching upon it. The whole of the area is inundated at exceptionally high tides and the soil with the exception of about two acres in the centre is muddy. On these two acres the soil is sandy and the principal species found are those which have already been noted as occurring on the higher sandy soil between Phalakata and Fashiakhali. There is a clearing of rather less than an acre in the centre, on the margins of which *Excœcaria Agallocha* occurs either scattered or in large clumps, while in the depressions there are no trees but masses of *Acanthus ilicifolius*. Further from the centre *Excœcaria* is mixed with *Tamarix gallica*. On the lower ground which is daily submerged at high tides *Aegialitis rotundifolia* forms a strip of pure forest. Radiating still further outwards, where the water reaches an average depth of two feet at high tides and where the soil has become muddy *Avicennia officinalis* (*var. nigra*) and *Sonneratia apetala* are the species found. Beyond this there is mixed forest, *Avicennia officinalis* (*var. nigra*) predominating.

Indicated by a small mound situated near the centre of the clearing and seldom reached by the tides the site of the former village and the edges of the former cultivation can be distinguished. This small area accounts for almost one-third of the species in the list which follows and there are on this one acre, three-fifths as many species as are found on the whole of the remainder of the 28 square miles of forest which surround it.

Care was taken to collect all the species found in this locality and they are of considerable interest. The great majority have been introduced by man either directly by planting or indirectly through the agency of his cattle or as weeds in his crops.

Aegle Marmelos, *Artocarpus integrifolia*, *Mangifera indica*, *Psidium Guyava*, *Tamarindus indica* and *Zizyphus Jujuba* have been planted on account of their fruits. *Amaranthus viridis* a commonly cultivated pot herb, *Solanum Torvum* of which both the fruits are eaten and the roots taken medicinally, *Cyperus corymbosa* which is used for making mats

and *Erythrina indica*, frequently used as a hedge plant, are almost certainly here as the result of deliberate planting by the villagers. It is not unlikely that there should be added to this list, *Odina Wodier* the fruits of which are eaten, and *Ficus Rumphii* which is regarded as sacred, although both species may have grown from seed deposited by fruit eating birds. Cattle were frequently driven between the island and the mainland and *Antidesma Ghœshembilla*, *Ficus altissima*, *Premna bengalensis* and *Vitex pubescens*, all excellent fodder plants, have either been brought to the island by cattle or carried there by birds. Cattle too may have been responsible for the presence of the following plants or they may with equal probability have been introduced inadvertently as weeds of the field crops—*Achyranthes aspera*, *Crotalaria quinquefolia*, *Pouzolzia indica*, *Sida cordifolia*, *Sida rhombifolia*, *Tephrosia purpurea* and *Urena lobata*.

The presence of the villagers has been therefore, indirectly at least, the dominating factor in determinating the vegetation of this small area.

Agencies other than man account for the presence of another eight species.

Fruit eating birds have carried the seeds of *Syzygium fruticosum*, *Glochidion lanceolarium*, *Grewia Microcos*, and perhaps of one or two of the species already mentioned.

Seeds of *Bombax malabaricum* and of *Vernonia cinerea* were probably wind dispersed or the latter may be an inadvertent weed.

The fruits of *Aeschynomene indica* may have been planted, as the pith of this species would have been useful to the villagers as floats for their fishing nets or they may have been borne by water while *Panicum repens* is probably a recent introduction by water and *Cæsalpinia Nuga* is a survival of the sea-borne flora. These species complete the list of plants on the old village site in Charalia.

The Vegetation of the Reclaimed Fields.

The reclaimed fields adjoining the swamps are remarkably free from weeds and only the following species have been found :—*Alternanthera sessilis*, *Bulbostylis barbata*, *Desmodium triflorum*, *Fimbristylis æstivalis*, *Fimbristylis argentea*, *Fimbristylis ferruginea*, *Fimbristylis polytrichoides*, *Hydrocotyle asiatica*, *Hypericum japonicum*, *Nelsonia campestris*, *Pulchea indica*, *Sesuvium Portulacastum*, *Sphæranthus africanus* and *Sphæromorphea Russeliana* with *Hygrorhiza aristata* and *Monochroia vaginalis* in water at the edges of the fields.

The Vegetation of the Mud Banks.

One or two of the above mentioned species are found also on the mud banks surrounding the area although *Suæda maritima* is the commonest species. *Hibiscus tiliaceus*, which although common in the Sundarbans is somewhat rare in this forest, is typically found on mud banks south or west of Phalakata.

The Transition to High Level Forest.

The steep bank at the edge of the Mangla river already referred to is some 40 feet high at its highest point, but it gradually falls off till there is no perceptible check to the inflow of the tide. There is a strip of land reaching about 100 yards in width, where the mud gradually becomes shallower giving place to loamy soil on the inner margin and, over a length of about half a mile where high level forest meets the mangrove, species of both formations mingle. The last mangrove species to survive are *Rhizophora mucronata*, *Heritiera minor* and *Avicennia officinalis*, the latter reaching the inner margin of the strip. Passing outwards from the mangrove forests, the first high level species to be met with are *Syzygium operculatum* (occasionally with *Loranthus pentrandus* parasitic on it), *Odina Wodier*, *Dipterocarpus turbinatus*, *Pterospermum acerifolium* and *Quercus spicata*, var. *Chittagonga*, all growing some distance into the mud. These were followed, on slightly higher land, by *Dillenia pentagyna*, *Bauhinia variegata*, *Albizzia procera*, *Terminalia Chebula*, *Hollarrhena antidysenterica*, *Garcinia Cowa* and *Ficus Benjamina*. The first herbaceous species to be met with are *Panicum repens*, *Oplismenus Burmanii*, *Nephrolepis cordifolia*, *Pogonanthera saccharoideum* and *Clerodendron infortunatum*.

The Decline of the Mangrove Formation.

It has been noted that the area of mangrove forest in this region was recently very much larger than at present. The advance of the tide can be so easily checked that the conversion of the swamp into paddy land presents but little difficulty. The process of reclamation is still going on and its effect on the vegetation is interesting.

When a *bund* has been built, the salt is quickly washed out of the soil by the heavy monsoon rains and the original vegetation begins to wither and die. The power of resistance of the various species to the changed conditions, which ensue on the erection of the *bund*, varies. The least resisting tree is *Sonneratia apetala*, next *Aegialitis rotundifolia*, followed by *Ceriops Roxburghiana*. All of these die within one year after the exclusion of the salt water. *Avicennia officinalis* (*var. tomentosa*)

survives longer than any other tree, namely for about five years and isolated dying trees can be seen widely scattered among the field crops. The creeper *Dalbergia spinosa* is the most resistant species of all and, when it has not been cut out, it flourishes as long as the soil is even slightly brackish, growing from a single plant into a huge bushy clump, which may attain a height of 20 feet and a diameter of 100 feet.

By the end of the first season, the majority of the trees have died and have been cut down and a crop of paddy has been grown among the stumps by dibbling in the seedlings. By the time this crop is harvested the roots of the trees have rotted away and the stumps are easily removed. The land is then ready for ploughing and with extremely little cultivation it will produce a heavy rice crop, for when the jungle has once been cut down it does not grow again and owing to the brackishness of the soil there are, as has been pointed out, very few weeds.

The Rise of the Mangrove Formation.

The Chakaria Sundarbans is interesting, not only as illustrating the survival of mangrove species when high level conditions are introduced, but also as exhibiting the sequence of the invasion of the mangrove species on land which has been under cultivation. When the rise of the water is gradual *Excœcaria Agallocha* is the first species to appear followed closely by *Tamarix gallica* and *Acanthus ilicifolius*, the latter tending to grow in hollows where the soil becomes somewhat muddy. These are followed by *Aegialitis rotundifolia*, but if the rise of water has been sudden then this is the first species to appear. Following the *Aegialitis*, *Sonneratia apetala* and *Avicennia officinalis* (*var. nigra*) appear to be again replaced by a permanent Association.

This sequence is exhibited not only on the formerly cultivated land in Charalia but also on other land which has been reclaimed for some time, where salt water penetrates through the muddy banks. On the outer side of a *bund* soon after it has been built, seedlings of *Excœcaria Agallocha* spring up naturally, followed by those of *Tamarix gallica* and *Acanthus ilicifolias*, while in muddy depressions occasional plants of *Dalbergia spinosa*, *Derris scandens*, *Pandanus fascicularis* and *Hibiscus tiliaceus* are found.

Outstanding Features.

The vegetation of the Chakaria Sundarbans is therefore characterized by :—

(1) The paucity of species, due partly to the smallness and isolation of the area and partly, when comparing it with the Gangetic Sundarbans, to the scarcity of higher land which has at some time or other been under cultivation.

(2) The stunted growth of the trees, probably due to the fact that there are no large rivers bringing down great volumes of fresh water in the rainy season so that the water remains salty throughout the year.

In the Gangetic Sundarbans it is on areas where the water is less salty that the valuable forests of *Heritiera minor* are found. The Chakaria Sundarbans are not unlike the western portion of the Gangetic Sundarbans, but differ in the absence of sand dunes on the sea face with a characteristic flora where the sand bank meets the muddy flats. At the same time the invasion of silt by *Pandanus fascicularis* followed by *Ceriops Roxburghiana* which soon ousts the former species may be constantly observed in the Gangetic Sundarbans while no such succession is to be found in this locality. The Chakaria Sundarbans differ also in the abundance of *Dalbergia spinosa* and by the presence of pure *Aegialitis rotundifolia* forests, a species which only grows sporadically in the Sundarbans proper. A notable feature in this area is the entire absence of *Nipa fruticans*.

IV. SYSTEMATIC LIST OF THE PLANTS.

The order followed in the subjoined list of plants from the Chakaria Sundarbans is that of the Flora of British India (cited as F. B. I.); there descriptions of most of the species may be found. References are also given to Prain's Bengal Plants (cited as P. B. P.), with which work the identification of the species mentioned should not prove difficult. The flowering and fruiting times of the more important species are denoted by the letters Fl., or Fr., followed by the number of the month. Vernacular names are, in Chittagong particularly, unreliable and only those of the commonest species, which can be relied on, have been given.

DICOTYLEDONES.

1. TAMARICACEÆ.

1. Tamarix Linn.

1. Tamarix gallica Linn. var. **indica** Dyer, F. B. I. i, 248; P. B. P. 242; Fr. 1-3; Vernac. *Urussia.*

A small tree, 5-20 feet high, usually growing on higher somewhat sandy ground and associated with *Excœcaria Agallocha*. Occasionally found in *Sundri* (*Heritiera minor*) forest. Not used.

Distribution. Throughout India, Burma and Ceylon, N. and S. Europe, N. and Tropical Africa, S. E. Asia.

2. HYPERICACEÆ.

2. Hypericum Linn.

2. Hypericum japonicum Thunb. F. B. I. i, 256; P. B. P. 244.
A weed in reclaimed fields near Phalakata.
Distribution. India, New Zealand, Australia, Japan, China and Java.

3. MALVACEÆ.

3. Sida Linn.

3. Sida rhombifolia Linn. F. B. I. i, 323; P. B. P. 259.
A shrubby herb on the formerly cultivated area in Charalia.
Distribution. Tropics of both hemispheres.
4. Sida cordifolia Linn. F. B. I. i, 324; P. B. P. 258.
A weed on Charalia island on the old village site.
Distribution. Tropics.

4. Urena Linn.

5. Urena lobata Linn. F. B. I. i, 329; P. B. P. 261.
A weed on the formerly cultivated area on Charalia is and.
Distribution. Tropics of both hemis heres.

5. Hibiscus Med.

6. Hibiscus tiliaceus Linn. F. B. I. i, 343; P. B. P. 269; Fl. 1-2; Fr. 4-5; Vernac. *Bolai.*

A shrub or small tree, 10-25 feet high, somewhat rare within the forests but common on *bunds* and on the banks of streams within the reclaimed area, also found at the edge of the village site on Charalia. It is frequently used in Chittagong as a hedge plant in villages close to the sea. In the Kulna Sundarbans it is very much commoner on the banks of tidal creeks than it is here.

Distribution. Tropics of both hemishpheres, usually near the coast.

4. BOMBACACEÆ.

6. Bombax Linn.

7. Bombax malabaricum DC. F. B. I. i, 349 ; P. B. P. 271 ; Vernac. *Tula.*

Represented by a solitary large tree on the Charalia village site.

Distribution. India, Ceylon, Java and Sumatra.

5. STERCULIACEÆ.

7. Heritiera Aiton.

8. Heritiera minor Roxb. *H. Fomes.* F. B. I. i, 363 ; P. B. P. 274 ; Fl. 4-5 ; Fr. 6-7 ; Vernac. *Sundri.*

A tree 25-35 feet high in the east of the area where it is commonest, smaller in the west. Maximum girth 2′ 6″. Gregarious. It occasionally grows on sand but less vigorously than on mud. It never attains the size that it does in the Kulna Sundarbans. It is used for houseposts, fencing stakes, and fuel.

Distribution. In the Gangetic Delta and along the shores of the Eastern Peninsula. Borneo.

8. Brownlowia Roxb.

9. Brownlowia lanceolata Benth. F. B. I. i, 381 ; P. B. P. 281 ; Fl. 5 ; Fr. 6 ; Vernac. *Lota Sundri.*

A bush common on the banks of creeks or an almost prostrate creeper within *Sundri* and other forests. In this area it never grows to the size of a tree.

Distribution. Sundarbans. Tenasserim.

6. TILIACEÆ.

9. Grewia Linn.

10. Grewia Microcos Linn. F. B. I. i, 392 ; P. B. P. 282 ; Fl. 4-5 ; Fr. 6-9 ; Vernac. *Aswar.*

A small tree very common throughout the Chittagong Collectorate and found on the old village site in Charalia.

Distribution. Eastern and Western Peninsula, Ceylon, Java and China.

7. RUTACEÆ.

10. Paramignya Wight.

11. Paramignya citrifolia Hk. f. F. B. I. i, 510; P. B. P. 304; Vernac. *Ban nebu.*

A thorny shrub, not uncommon on the tidal flats.

Distribution. Chittagong.

12. Paramignya longispina Hk. f. F. B. I. i, 511; Vernac. *Ban nebu*

A thorny shrub; rare.

Distribution. India and Malayan Peninsula.

11. Aegle Correa.

13. Aegle Marmelos Correa. F. B. I. i, 516; P. B. P. 305; Vernac. *Bael.*

A small thorny tree both wild and cultivated in the Chittagong Collectorate. Found on the deserted village site on Charalia Island.

Distribution. Throughout India.

8. MELIACEÆ.

12. Carapa Aubl.

14. Carapa obovata Blume. F. B. I. i, 567; P. B. P. 318; Fl. 9-10; Fr. 1-2; Vernac. *Karamphala.*

A tree up to 40 feet high, not very common and found on low-lying land in the interior of the islands. It is found scattered singly or occasionally in small groups of 2-5 trees. Used for firewood.

Distribution. Asia.

15. Carapa moluccensis Lamk. var. **gangetica.** F. B. I. i, 567; P. B. P. 1273; Fl. 2; Fr. 3.

A tree up to 25 feet high with a maximum girth of 2 feet and with vertical root suckers. It is found sporadically on higher land and on the banks of the smaller streams. It is used for houseposts and fuel.

Distribution. India, Ceylon, Africa, Malaya and N. Australia.

9. RHAMNACEÆ.

13. Zizyphus Juss.

16. Zizyphus Jujuba Lamk. F. B. I. i, 623; P. B. P. 333; Fl. 9-10; Fr. 11-12; Vernac. *Boroi.*

A small thorny tree common in the Collectorate both wild and cultivated. Found on Charalia Island.

Distribution. India, Africa, Malaya, China and Australia.

10. ANACARDIACEÆ.

14. Mangifera Linn.

17. Mangifera indica Linn. F. B. I. ii, 3 ; P. B. P. 352 ; Fl. 1-2 ; Fr. 5-6 ; Vernac. *Am.*

The mango is commonly cultivated in the District and a single specimen is found on the old village site on Charalia.

Distribution. Tropics.

15. Odina Roxb.

18. Odina Wodier Roxb. F. B. I. ii, 29 ; P. B. P. 354 ; Fl. 2-3 ; Fr. 5-10 ; Vernac. *Bhadi.*

An exceedingly common tree in the Chittagong forests and frequently planted. Within the area it is found on high land near Phalakata and on the old village site in Charalia.

Distribution. India, Ceylon and the Adamans.

16. Crotalaria Linn.

19. Crotalaria quinquefolia Linn. F. B. I. ii, 84 ; P. B. P. 373.

An erect annual on the village clearing in Charalia.

Distribution. India, Malaya and the Phillipines.

11. LEGUMINOSÆ.

17. Aeschynomene Linn.

20. Aeschynomene indica Linn. F. B. I. ii, 151 ; P. B. P. 418.

A shrubby annual occurring on old cultivation on Charalia.

Distribution. Tropics of the Eastern Hemisphere.

18. Desmodium Desv.

21. Desmodium triflorum DC. F. B. I. ii, 173 ; P. B. P. 424.

A prostrate shrub, common in reclaimed fields.

Distribution. Cosmopolitan in the Tropics.

19. Erythrina Linn.

22. Erythrina indica Lam. F. B. I. ii, 188 ; P. B. P. 398 ; Fl. 1-3 ; Fr. 4-8 ; Vernac. *Madar.*

A deciduous tree, both wild and frequently propagated by cuttings for hedges near villages in the Collectorate. It is found in the deserted village on Charalia.

Distribution. India, Java, Polynesia.

20. Tephrosia Pers.

23. Tephrosia purpurea Pers. F. B. I. ii, 112 ; P. B. P. 405.

A much branched perennial herb found on sandy ground in the Charalia village site.

Distribution. Everywhere in the tropics.

21. Dalbergia Linn.

24. Dalbergia spinosa Roxb. F. B. I. ii, 238 ; P. B. P. 411 ; Fl. 12-2, Fr. 7-8, Vernac. *Chulia Kanta.*

A straggling spiny shrub scrambling to a height of 30 feet with a maximum girth of 8 inches. It is exceedingly common everywhere, often forming impenetrable thickets, especially along the river banks. On reclaimed land it survives in huge bushy clumps. It makes a good fuel but is rarely cut owing to its spines.

Distribution. Coasts of Chittagong, Burma and Coromandel.

22. Pongamia Vent.

25. Pongamia glabra Vent. F. B. I. ii, 240 ; P. B. P. 407 ; Fl. 3-5 ; Fr. 6-12 ; Vernac. *Karanj.*

A small tree found only on the north-east boundary of the area where the highest tides just reach it. It is not found on the sea face as in the Kulna Sundarbans.

Distribution. India, Malaya, N. Australia and Polynesia.

23. Derris Lour.

26. Derris scandens Benth. F. B. I. ii, 240 ; P. B. P. 408 ; Fl. 3-4 ; Fr. 6-12 ; Vernac. *Kalia Lata.*

A common climber.

Distribution. E. Asia, China and N. Australia.

27. Derris uliginosa Benth. F. B. I. ii, 241 ; P. B. P. 408 ; Fl. 3 ; Fr. 7 ; Vernac. *Kalia Lata.*

A slender climber.

Distribution. S. E. Asia, Polynesia, E. Africa, China and N. Australia.

24. Cæsalpinia Linn.

28. Cæsalpinia Nuga Ait. F. B. I. ii, 255 ; P. B. P. 449 ; Fl. 12-1 ; Fr. 1-4.

A straggling shrub on the banks of streams and in the Charalia clearing.

Distribution. India, Malaya, China, N. Australia and Polynesia.

25. Cynometra Linn.

29. Cynometra ramiflora Linn. var. **mimosoides.** Wall. F. B. I. ii, 267 ; P. B. P. 443 ; Fl. 2 ; Fr. 3-5 ; Vernac. *Shingra.*

A small branching tree, usually about 10 feet high. It is found only on higher land in the north-east corner of the area, growing near mud banks. It is used for fuel.

Distribution. Coasts of W. India, Burma, Ceylon, Andamans and Malaya.

26. Tamarindus Linn.

30. Tamarindus indica Linn. F. B. I. ii, 273 ; P. B. P. 444 ; Fl. 5-6 ; Fr. 12-1 ; Vernac. *Amli.*

The Tamarind is found on the village site on Charalia island.

Distribution. General in the tropics.

12. RHIZOPHORACEÆ.

27. Rhizophora Linn.

31. Rhizophora mucronata Lam. F. B. I. ii, 435 ; P. B. P. 475 ; Fl. 1 ; Fr. 1-2 ; Vernac. *Hawa.*

A small tree 20 to 30 feet high with a maximum girth of 2 feet, gregarious on muddy banks, particularly on those of the smaller creeks Used principally for fishing stakes and firewood.

Distribution. Tropical shores of the Eastern Hemisphere.

32. Rhizophora conjugata Linn. F. B. I. 436 ; P. B. P. 475 ; Fl. 1 ; Fr. 2 ; Vernac. *Hawa.*

Associated with the former species. It is distinguished from it by its sessile flowers.

Distribution. Tropical shores of the Eastern Hemisphere.

28. Ceriops Arn.

33. Ceriops Roxburghiana Arn. F. B. I. ii, 436; P. B. P. 476; Fl. 1-4; Fr. 4-6; Vernac. *Gattia.*

The commonest tree on the tidal flats, both on lower and higher land and usually growing gregariously either as pure forest or forming an underwood. Its height varies from 8-15 feet. The wood is used for fuel and the bark by fishermen for tanning their nets.

Distribution. Tropical shores of the Eastern Hemisphere.

29. Kandelia W. & A.

34. Kandelia Rheedii W. & A. F. B. I. ii, 437; P. B. P. 476; Fl. 11-12; Fr. 1-2; Vernac. *Rohinia.*

A tree 30 feet high with a maximum girth of 2 feet 6 inches. It occurs sporadically, usually one or two trees together. It is cut for fuel and fishing stakes.

Distribution. Shores of S. E. Asia.

30. Bruguiera Lam.

35. Bruguiera gymnorhiza Lamk. F. B. I. ii, 437; P. B. P. 477; Fl. 12-1; Fr. 2-3; Vernac. *Natinga.*

A tree 30 feet high with a maximum girth of 2 feet, growing sporadically in low-lying, muddy situations. The flowers are large with a club shaped calyx.

Distribution. Tropical shores of the Eastern Hemisphere.

36. Bruguiera caryophylloides Blume. F. B. I. ii, 438; Fl. 1; Fr. 2-3; Vernac. *Tushia.*

A tree 20 to 30 feet high and up to 2 feet in girth, found scattered on both the higher and lower parts of the islands. It is used for firewood and fishing stakes.

Distribution. Indian and Malayan coasts.

37. Bruguiera parviflora W. & A. F. B. I. ii, 438; P. B. P. 1275; Fl. 1; Fr. 2-3; Vernac. *Natinga.*

A small tree closely associated in the area with *B. gymnorhiza.* The flowers are small and have a bell-shaped calyx.

Distribution. Shores of Indo-China and Malaya.

13. MYRTACEÆ.

31. Psidium Linn.

38. Psidium Guyava Linn. F. B. I. ii, 468; P. B. P. 487; Vernac. *Amrut.*

The guava is another plant found on Charalia island.

Distribution. Naturalised throughout India.

32. Syzygium Gærtn.

39. Syzygium fruticsum DC. *Eugenia fruticosa.* F. B. I. ii, 499; P. B. P. 491; Fl. 1; Fr. 3; Vernac. *Jam.*

A small tree in the deserted village on Charalia.

Distribution. E. Bengal, Burma.

14. LYTHRACEÆ.

33. Sonneratia Linn. f.

40. Sonneratia apetala Ham. F. B. I. ii, 579; P. B. P. 505; Fl. 4-5; Fr. 6; Vernac. *Kerba.*

A tall graceful tree of the river banks where it usually occurs pure. Behind the outer ringe of trees it is found mixed with *Avicennia officinalis* and in the interior it occurs sporadically. It is cut for firewood.

Distribution. Coasts of W. India and Indo-China.

41. Sonneratia Griffithii Kurz. F. B. I. ii, 580; Fl. 1; Fr. 1-2; Vernac. *Lemshi.*

A small tree up to 30 feet high. It is found sporadically on the river banks and is rare.

Distribution. Indo-China and Malaya.

15. RUBIACEÆ.

34. Dentella Forst.

42. Dentella repens. Forst. F. B. I. iii, 42; P. B. P. 555.

A straggling weed on the edges of the reclaimed rice fields.

Distribution. India, Malaya, N. Australia and Polynesia.

16. FICOIDACEÆ.

35. Sesuvium Linn.

43. Sesuvium Portulacastrum Linn. F. B. I. ii, 509 ; P. B. P. 532.
A common herb of the older mudbanks or *bunds*.
Distribution. Cosmopolitan on tropical shores.

17. UMBELLIFERÆ.

36. Hydrocotyle Linn.

44. Hydrocotyle asiatica Linn. F. B. I. ii, 669 ; P. B. P. 535; Vernac. *Thulkari sag.*
A weed of the adjoining reclaimed fields and on the land just reached by the highest tides, near Phalakata.
Distribution. Tropics and sub-tropics.

18. COMPOSITÆ.

37. Vernonia Schreb.

45. Vernonia cinerea Less. F. B. I. iii, 233 ; P. B. P. 590.
This, one of the commonest Indian weeds, is found on the higher ground adjoining the tidal swamps and also on the old village site in Charalia on the banks of pools.
Distribution. Tropical Asia, Africa and Australia.

38. Blumea DC.

46. Blumea lacera DC. F. B. I. iii, 263 ; P. B. P. 598.
A weed on the higher ground near Phalakata.
Distribution. Tropical Asia and Africa.

39. Pluchea Cass.

47. Pluchea indica Less. F. B. I. iii, 272 ; P. B. P. 598 ; Vernac. *Kukronda.*
A low shrub of the tidal flats.
Distribution. S. E. Asia.

40. Sphæranthus Linn.

48. Spæranthus africanus Linn. F. B. I. iii, 275; P. B. P. 601; Vernac. *Ganga Sag.*

A herb growing on *chars* or sandbanks, where the water is slightly saline.

Distribution. Tropics of the Eastern Hemisphere.

41. Sphæromorphæa DC.

49. Sphæromorphæa Russeliana DC. F. B. I. iii, 317; P. B. P. 621.

A small straggling weed of the adjoining rice fields.

Distribution. Bengal, Behar, Burma, Siam.

19. PLUMBAGINACEÆ.

42. Aegialitis R. Br.

50. Aegialitis rotundifolia Roxb. F. B. I. iii, 479; P. B. P. 638; Fl. 1-4, Fr. 6-7; Vernac. *Nunia.*

A small straight deciduous tree 8 to 12 feet high with a few slender branches. It is very common and gregarious on low-lying land where it covers considerable areas. It occurs sporadically on the higher portions of the area. It is used for fencing posts and cut for firewood, simply owing to its abundance and to the lack of better material. Salt has been extracted from the ash obtained by burning the stems.

Distribution. Indo-China and Malaya.

20. MYRSINACEÆ.

43. Aegiceras Gærtn.

51. Aegiceras majus Gærtn. F. B. I. iii, 533; P. B. P. 645; Fl. 1-2; Fr. 3-4; Vernac. *Kasalong.*

A small shrubby tree 10 feet high, found chiefly along the river banks on the higher land where the soil is somewhat sandy and where it usually grows gregariously. On low-lying land in the interior of the islands scattered trees are not uncommon. It is used only for fuel.

Distribution. Cosmopolitan on tropical shores.

21. APOCYNACEÆ.

44. Cerbera Linn.

52. Cerbera Odollam Gærtn. F. B. I. iii, 638; P. B. P. 670; Fl. 11; Fr. 2; Vernac. *Dhakur.*

A small evergreen tree.

Distribution. S. E. Asia, Australia and Polynesia.

22. ASCLEPIADACEÆ.

45. Finlaysonia Wall.

53. Finlaysonia obovata Wall. F. B. I. iv, 7; P. B. P. 686; Fl. 4; Fr. 5-7; Vernac. *Lamanchi.*

An evergreen climber on the tidal flats.

Distribution. Shores of Indo-China and Malaya.

46. Calotropis Br.

54. Calotropis procera Br. F. B. I. iv, 18; P. B. P. 689; Vernac. *Swet Akanda.*

A shrub 4-5 feet high on the edges of reclaimed fields near Phalakata.

Distribution. Tropics, Africa and Persia.

47. Sarcolobus Br.

55. Sarcolobus globosus Wall. F. B. I. iv, 27; P. B. P. 693; Fl. 7-8; Fr. 9-1; Vernac. *Baoni Lata.*

A twining shrub on the banks of streams.

Distribution. Indo-China and Malaya.

56. Sarcolobus carinatus Wall. F. B. I. iv, 28; P. B. P. 693; Vernac. *Hartang.*

A twining shrub on the banks of rivers.

Distribution. Burma, Malaya and the Nicobar Islands.

48. Tylophora Br.

57. Tylophora tenuis Blume. F. B. I. iv, 42; P. B. P. 698.

A slender herb twining on *Excœcaria Agallocha* on the higher land.

Distribution. India, Java, Borneo.

58. Tylophora asthmatica W. & A. F. B. I. iv, 45 ; P. B. P. 698 ; Vernac. *Anta-mul.*

A common creeper in the mangrove forests, especially on *Dalbergia spinosa.*

Distribution. India, Malaya, Siam and Borneo.

49. Hoya R. Br.

59. Hoya parasitica Wall. F. B. I. iv, 57 ; P. B. P. 700.

A large epiphyte found on *Excœcaria Agallocha* near Phalakata.

Distribution. Burma, Malaya and Andamans.

23. CONVOLVULACEÆ.

50. Ipomœa Linn.

60. Ipomœa Pes-carpæ Roth. *I. biloba,* F. B. I. iv, 212 ; P. B. P. 736 ; Fl. 1 ; Vernac. *Chagul-kuri.*

A creeper found on *Excœcaria Agallocha* and twining on shrubs near the edges of reclaimed fields, and trailing on a sandbank in the Moiskhal Channel, east of and close to Bhadurkhali.

Distribution. Cosmopolitan on Tropical sea coasts.

51. Cuscuta Linn.

61. Cuscuta reflexa Roxb. F. B. I. iv, 225 ; P. B. P. 723 ; Fl. 12-1 ; Fr. 2.

A twining parasite frequently found in profusion on *Sonneratia apetala* near the banks of the streams and also on *Avicennia.*

Distribution. Throughout India and Malaya.

24. SOLANACEÆ.

52. Solanum Linn.

62. Solanum Torvum Swartz. F. B. I. iv, 234 ; P. B. P. 746.

A small shrub of waste places found on the Charalia village site.

Distribution. Malaya, China, Trop. America.

25. SCROPHULARIACEÆ.

53. Herpestis.

63. Herpestis monnieria H. B. and K. F. B. I. iv, 272 ; P. B. P. 766.
A succulent weed in the marshy ground near Phalakata ; very common.
Distribution. Warm countries.

26. ACANTHACEÆ.

54. Nelsonia R. Br.

64. Nelsonia campestris R. Br. F. B. I. iv, 394 ; P. B. P. 797.
A weed of the reclaimed fields and higher land near Phalakata.
Distribution. S. E. Asia, Australia, Africa and America.

55. Acanthus Linn.

65. Acanthus ilicifolius Linn. F. B. I. iv, 481 ; P. B. P. 800 ; Fl. 4-10 ; Fr. 6-2 ; Vernac. *Hargaza.*
A spiny shrub with holly-like leaves common everywhere but growing more profusely on low-lying muddy ground. In the open, as at the edge of the clearing on Charalia, it has a bushy habit. When growing under trees it assumes the habit of a scrambler, but is killed by dense shade.
Distribution. S. E. Asia and N. Australia.

66. Acanthus volubilis Wall. F. B. I. iv, 481 ; P. B. P. 800.
A twining shrub, found on the edges of the creeks and smaller streams.
Distribution. Sea-shores of India, Malaya and Siam.

56. Premna Linn.

67. Premna bengalensis Clarke. F. B. I. iv, 577 ; P. B. P. 831.
A small tree by the edges of pools of water in the Charalia clearing.
Distribution. Bengal and Assam.

27. VERBENACEÆ.

57. Vitex Linn.

68. Vitex pubescens Vahl. F. B. I. iv, 585 ; P. B. P. 833.
A medium sized tree found in the old village site on Charalia.
Distribution. E. India and Malaya.

58. Clerodendron Linn.

69. Clerodendron inerme Gærtn. F. B. I. iv, 589 ; P. B. P. 835 Fl. 1-5 ; Fr. 5-7 ; Vernac. *Ban-Jai.*
An evergreen shrub of the river banks.
Distribution. India, Indo-China.
70. Clerodendron nerifolium Wall. F. B. I. iv, 589 ; P. B. P. 835 ; Fl. 10-12 ; Fr. 11-3 ; Vernac. *Koek-tita.*
A shrub of the river banks.
Distribution. Indo-China, Malaya, Phillipines, Australia and China.

59. Avicennia Linn.

71. Avicennia officinalis Linn. F. B. I. iv, 604 ; P. B. P. 838, Vernac *Baen.*

Three varieties of *Baen* are distinguished locally, *Kala Baen*, *Boro Baen* and *Dulia Baen*. All three are included under *A. officinalis* in the Flora of British India, but the third is distinguished as var. *alba* Blume. Prain has elevated this variety to a specific rank, as it differs by having narrow capsules as well as in the leaves.

Mr. Biswas, Curator of the Herbarium, Calcutta, has, at my request, examined all the material in the herbarium, including my own specimens and can find no fixed distinguishing character between the first and second local varieties. No fresh material has, however, been available.

In the field, it is usually not difficult to distinguish between these forms but the difference is principally in the leaf.

Kala Baen. (*A. officinalis* Linn. of the Flora of British India, of Prain in the Flora of the Sundarbans and of Kurz in his Flora of Burma). This variety has leaves 2-3 inch long, 1-1½ inch broad, acute, tapering at the base, with only a sparse whitish tomentum beneath. The foliage, when seen from a distance, is darker than that of the second variety.

It is a tree 40 feet high and up to 5 feet in girth which grows sporadically on muddy low-lying land on or near the banks of streams. It is very rare inside the forest. Its wood is used for fuel and fencing posts but it is difficult to split.

In the preceding notes it is referred to as *A. officinalis* var. *nigra.*

Boro Baen. (*A. officinalis* Linn. of the Flora of British India and of Prain, *A. tomentosa*, Willd. of Roxburgh in the Flora India and *A. tomentosa* Roxb. of Kurz). This variety has leaves 2-3½ inch long by 1½-2½ inches broad, rounded at the apex and only slightly or suddenly tapering at the base, with a thick whitish or yellowish tomentum beneath.

It is a tree 40 feet high and up to 5 feet in girth and is very common everywhere throughout the Chakaria Sundarbans and gregarious. It is used for posts and for firewood and is not particularly difficult to split.

It is referred to as *A. officinalis* var. *tomentosa* in the preceding notes.

72. Avicennia alba Blume. *A. officinalis* var. *alba.* F. B. I. iv, 604; P. B. P. 838; Vernac. *Dulia Baen.*

A tree 20 to 30 feet high, girth 2½ feet, occuring sporadically in the interior of the forest on both high and low land, but more common on the former. Leaves 3-4 inches long, ¾ to 1¼ inch broad, acute or almost acuminate, tapering to the base and with a white tomentum beneath. When seen from a distance the foliage of this species is much lighter in appearance than that of the former. The wood is used for firewood and fencing stakes.

*Note.—Since going to press I have obtained from the Forest Range Officer of the Chakaria Sundarbans, fruits of both *Kalo* and *Boro Baen* as well as those of *Dulia Baen.* All are different and on germination the seedlings also are found to differ *A. officinalis* and *A. tomentosa* are therefore undoubtedly distinct species and will be described as soon as complete fresh material can be obtained.

28. AMARANTACEÆ.

60. Amarantus Linn.

73. Amarantus viridis Linn. F. B. I. iv, 720; P. B. P. 871; Vernac. *Maris sag.*

A slender weed found on Charalia on land formerly cultivated.

Distribution. Tropics and warm countries.

61. Achyranthes Linn.

74. Achyranthes aspera Linn. F. B. I. iv, 730; P. B. P. 875.

A coarse herb found on the old village site on Charalia Island.

Distribution. Asia, Africa, Australia and America.

62. Alternanthera Forsk.

75. Alternanthera sessilis R. Br. F. B. I. iv, 731 ; P. B. P. 875.

A prostrate herb found in reclaimed fields and on the higher land, near Phalakata, in salt marshes.

Distribution. All warm countries.

29. CHENOPODIACEÆ.

63. Suæda Forsk.

76. Suæda maritima Dumort. F. B. I. v, 14 ; P. B. P. 878 ; Fl. 12-1 ; Fr. 1-4.

An erect herb of the mud banks and edges of the streams.

Distribution. Asia, Europe, W. Africa and N. America.

30. LORANTHACEÆ.

64. Viscum Linn.

77. Viscum monoicum Roxb. F. B. I. v, 224 ; P. B. P. 912.

A parasitic shrub on *Excœcaria Agallocha*, plentiful near the Mangla River.

Distribution. Eastern Peninsula.

65. Glochidion.

78. Glochidion lanceolarium Dalz. F. B. I. v, 308 ; P. B. P. 930.

A small tree on the Charalia village site.

Distribution. N. W. India to Chittagong.

66. Antidesma.

79. Antidesma Ghesæmbilla Gærtn. F. B. I. v, 357 ; P. B. P. 938 ; Vernac. *Bhudi jam.*

A large shrub or small tree in the Charalia clearing on the edges of pools of water.

Distribution. India, Malaya, China, Africa.

31. EUPHORBIACEÆ.

67. Excœcaria Linn.

80. Excœcaria Agallocha Linn. F. B. I. v, 472; P. B. P. 955; Fl. 9-1.; Fr. 6-10; Vernac. *Goan.*

A tree 30 feet high and up to 3 feet in girth, common on higher land mixed with *Sundri*, also on sandy soil extending to the limits of the mangrove area and even into waste land beyond. The sap is poisonous. The timber is used for firewood and also, on account of its extreme lightness, for floats for fishing nets.

Distribution. Coasts of S. E. Asia, N. Australia and Polynesia.

32. MORACEÆ.

68. Ficus Linn.

81. Ficus altissima Blume. F. B. I. v, 504; P. B. P. 979.
A large tree on the deserted village site in Charalia.
Distribution. India, Ceylon and Malaya.

69. Ficus Linn.

82. Ficus Rumphii Blume. F B. I. v, 512; P. B. P. 980.
A large tree on the old village site on Charalia.
Distribution. India and Malaya.

70. Artocarpus Forst.

83. Artocarpus integrifolia Linn. f. F. B. I. v, 541; P. B. P. 971.
The Jack tree, formerly cultivated, and still surviving on the Charalia village site.
Distribution. Cultivated throughout India.

71. Pouzolzia.

84. Pouzolzia indica Gaud. F. B. I. v, 581; P. B. P. 965.
A perennial herb in the Charalia clearing.
Distribution. India, Malaya, China.

MONOCOTYLEDONES.

33. PONTEDERIACEÆ.

72. Monochoria Presl.

85. Monochoria vaginalis Presl. F. B. I. vi, 363 ; P. B. P. 1079.
An aquatic herb in drains or in water at the edges of reclaimed fields.
Distribution. Malaya, China, Japan, Tropical Africa.

34. FLAGELLARIACEÆ.

73. Flagellaria Linn.

86. Flagellaria indica Linn. F. B. I. vi, 390 ; P. B. P. 1087 ; Vernac. *Harcharal.*
A climber of the tidal flats.
Distribution. Tropics of the Eastern Hemisphere near sea coasts.

35. CYPERACEÆ.

74. Cyperus.

87. Cyperus corymbosus Rottb. F. B. I. vi, 612 ; P. B. P. 1144.
A tall sedge used for mat making, found on the old village site in Charalia.
Distribution. Asia, Africa and America.

75. Fimbristylis Vahl.

88. Fimbristylis polytrichoides Vahl. F. B. I. vi, 632 ; P. B. P. 1153.
A slender glabrous weed on the edges of the reclaimed fields and on waste land about Phalakata.
Distribution. Tropics of the world.

89. Fimbristylis æstivalis Vahl. F. B. I. vi, 637 ; P. B. P. 1154.
A small annual weed of the reclaimed rice fields.
Distribution. South and East Asia, Australia and America.

90. Fimbristylis ferruginea Vahl. F. B. I. vi, 638 ; P. B. P. 1154.
A tufted herb in the reclaimed fields and in marshy places near Phalakata.
Distribution. All warmer regions.

91. Fimbristylis argentea Vahl. F. B. I. vi, 640 ; P. B. P. 1154.
A slender tufted annual of the reclaimed fields.
Distribution. India, Ceylon and Mauritius.

76. Bulbostylis Kunth.

92. Bulbostylis barbata Kunth. F. B. I. vi, 651 ; P. B. P. 1156.
A small tufted annual on the edges of the rice fields and on waste land.
Distribution. Warm regions.

36. PALMACEÆ.

77. Phœnix Linn.

93. Phœnix palludosa Roxb. F. B. I. vi, 427 ; P. B. P. 1096 ; Vernac. *Hantal.*
A gregarious palm, 15 feet high and with a girth of 7 inches, usually growing in clumps on high land and often associated with *Sundri*. The stems are used for roof purlins and the leaves for thatching.
Distribution. All Indo-Chinese coasts.

37. PANDANACEÆ.

78. Pandanus Linn. f.

94. Pandanus fascicularis Lam. F. B. I. vi, 485 ; P. B. P. 1101 ; Fl. 10-11 ; Fr. 12-1 ; Vernac. *Keora-kanta.*
A gregarious much-branched bush found in both muddy and sandy places, often in clearings. Not used.
Distribution. India, Indo-China, Malaya, S. China and Polynesia.

38. GRAMINEÆ.

79. Panicum Linn.

95. Panicum repens Linn. F. B. I. vii, 49 ; P. B. P. 1179.
A perennial grass on the formerly cultivated land on Charalia.
Distribution. E. Europe, Asia, Africa and America.

80. Hygrorhiza Nees.

96. Hygrorhiza aristata Nees. F. B. I. vii, 95 ; P. B. P. 1185.

A small floating grass in water at the edges of reclaimed land near Phalakata.

Distribution. India and Ceylon.

81. Anthistiria Linn.

97. Anthistiria gigantea Cav. var. **arundiaceæ** Hack. F. B. I. vii, 217 ; P. B. P. 1207.

A tall grass found here and there on the river banks.

Distribution. India, China, Malaya, Australia.

82. Phragmites Trin.

98. Phragmites Karka Trin. F. B. I. vii, 304 ; P. B. P. 1218.

A tall perennial grass of the river banks.

Distribution. Tropical Asia, Japan, Africa, Australia.

FILICES.

39. POLYPODIACEÆ.

83. Acrostichum Linn.

99. Acrostichum aureum Linn. P. B. P. 1261.

A gregarious fern, very common on higher land, especially found Phalakata.

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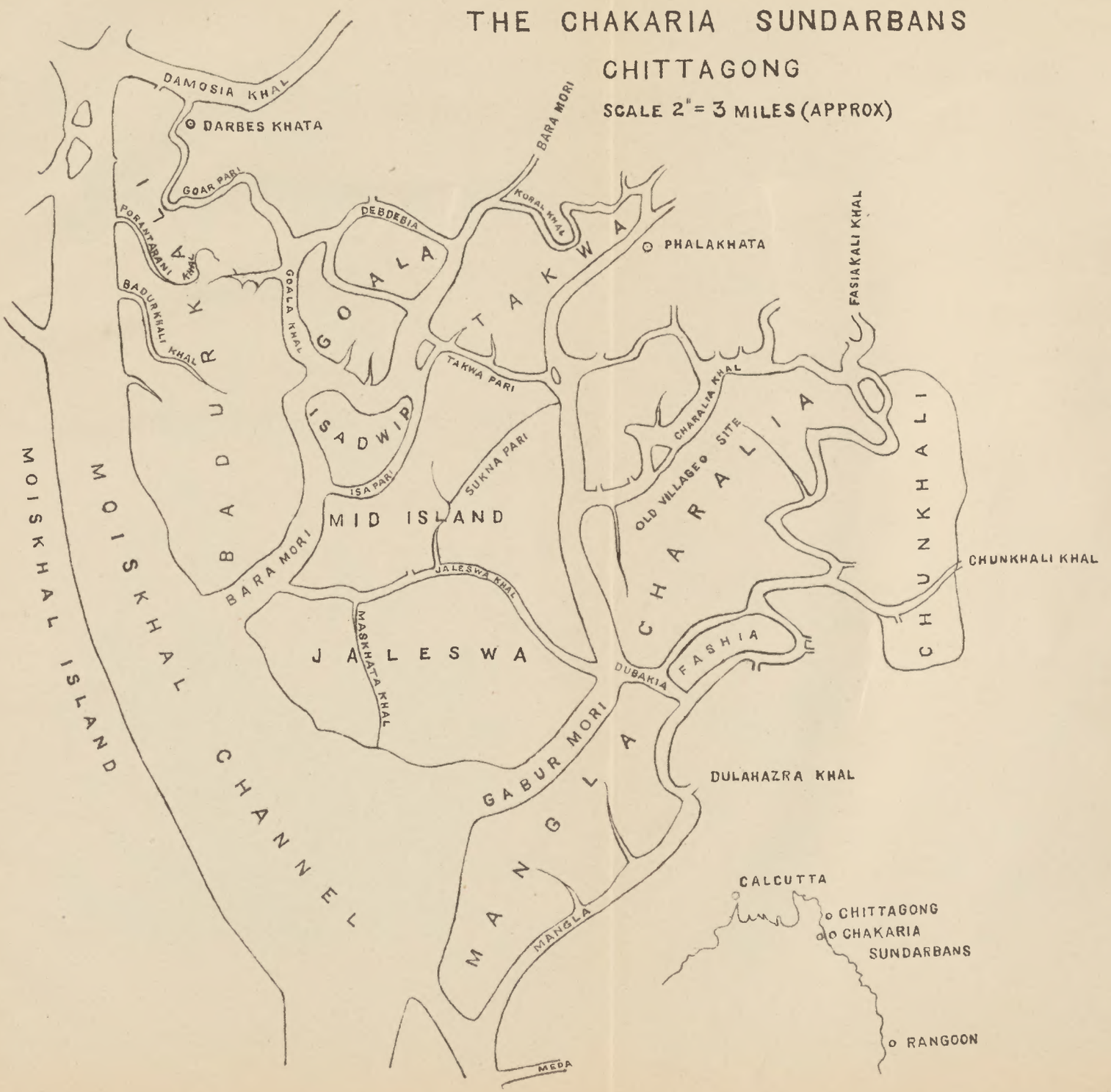
THE CHAKARIA SUNDARBANS
CHITTAGONG
SCALE 2" = 3 MILES (APPROX)
DAMOSIA KHAL
DARBES KHATA
BARA MORI
GOAR PARI
KORAL KHAL
DEBDEBIA
PHALAKHATA
FASIAKALI KHAL
PORAHATABANI KHAL
BADURKHALI KHAL
GOALA KHAL
GOALA
TAKWA
TAKWA PARI
CHARALIA KHAL
CHARALIA
CHUNKHALI
ISADWIP
ISA PARI
SUKNA PARI
OLD VILLAGE SITE
MID ISLAND
BADURKHALI
BARA MORI
JALESWA KHAL
CHUNKHALI KHAL
MOISKHAL ISLAND
MOISKHAL CHANNEL
JALESWA
MASKHATA KHAL
DUBAKIA
FASHIA
GABUR MORI
DULAHAZRA KHAL
MANGLA
MANGLA
MEDA
CALCUTTA
CHITTAGONG
CHAKARIA
SUNDARBANS
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