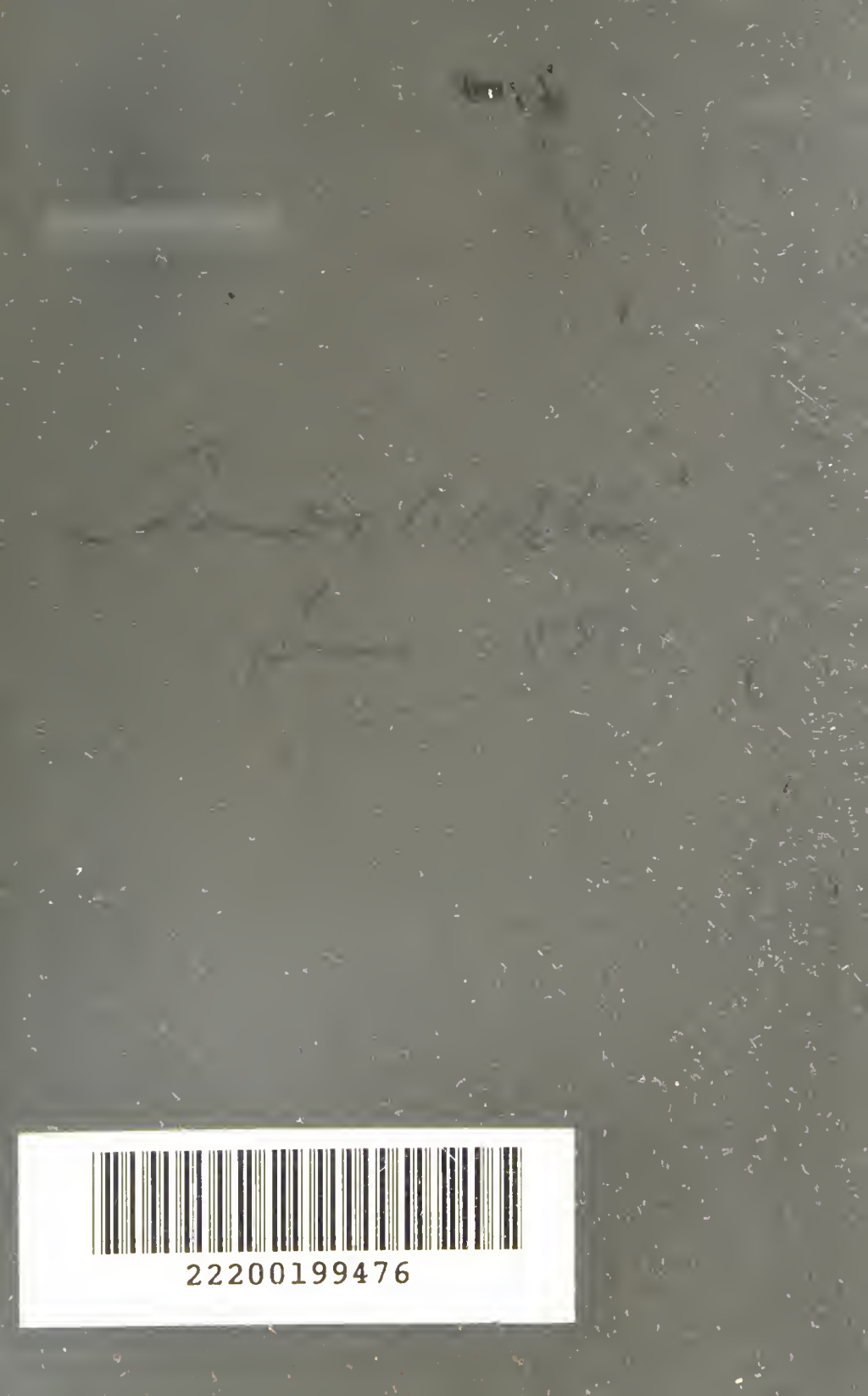
Sketch of the Forestry of West Africa

Alfd Moloney C.M.G



SKETCH

OF THE

FORESTRY OF WEST AFRICA

WITH PARTICULAR REFERENCE TO

ITS PRESENT PRINCIPAL COMMERCIAL PRODUCTS.

BY

ALFRED MOLONEY, C.M.G.,

OF THE GOVERNMENT OF THE COLONY OF LAGOS.

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TO HIS WIFE.

THIS work, which monopolised much of its Author's spare time that should otherwise have been devoted to her society, is gratefully dedicated to one of the best of women and the most devoted of wives, who, during its preparation, generously supported him by her consideration and self-sacrifice, and shared conjointly the hope that it would prove of some advantage, in the direction of the enlightenment and progress, to the people of West Africa for whom chiefly it has been put together.

THE AUTHOR.

CONTENTS.

SKETCH

OF THE

FORESTRY OF WEST AFRICA.

As a humble contribution by the Author commemorative of the Jubilee of Her Most Gracious Majesty the Queen.

I.

It is with some pleasure I have endeavoured here to build up a Work that, however poor, may be deemed worthy of addition to the Literature of the current year commemorative of the Queen's Jubilee.

The task might have been undertaken by more able hands; yet, in order that West Africa, described by pessimists and disparagers as the Land of "Bush" (for where ignorance is bliss it is folly to be wise), might have some share of representation on this auspicious and ever-to-be-gratefully-remembered Anniversary, I have willingly undertaken the duty: it has been a severe one, for both temperature and other local demands on my time have not been favourable. I have done my best so far as time at my disposal

and climate have admitted, so that for shortcomings and a generous hearing and verdict the writer leaves himself in the hands of his readers.

"So vast is this vegetable kingdom, that the animal world sickens and dies out before it—this immense forest holds scarcely a living creature. For months I have trodden its labyrinths, and seen only a diminutive deer, a grey monkey, and a few serpents. How little we knew in England of the true nature of this forest. 'It will,' wrote one wise man to a daily paper, 'take plenty of petroleum oil. Pour it over the forest, and then set fire to it.'"

"'I know tropical forests well,' wrote another. 'The underbush will burn when the dry weather comes, as it does in Burmah and Tenasserim; then you will be able to march through it with ease.'

"But, alas! the African forest is always green, always wet, always fireproof."

Such is the poetic description, in his 'Akimfoo,' by the "Great Lone Land" Butler, of a West African forest; and, although he must be given credit for taking advantage of an author's picture-writing and licence, yet in the main his verbal illustration can be accepted.

With such a prologue or preface, it would not be too much for any one to expect botanically great scientific and commercial results from such a field. The field has existed, and still exists; but while the results scientifically are comparatively meagre, yet

commercially they are important. It will, however, be my endeavour to give here a sketch of what has been done, so far as I can within the scope of this Book.

In June, 1874, a Circular Despatch covering a copy of a representation made by the Commissioner of Woods and Forests was addressed by the Secretary of State for the Colonies to the Officers Administering the Governments of Her Majesty's Colonies. It covered a list of questions as to Foreign and Colonial Timber used for ship-building, general building, and railway purposes ; for furniture, fancy articles, firewood, lath-wood, shingles for roofs, &c. ; also as to timber from which valuable barks, gums, dye-woods are derived. As the headings under which information was asked may at any time prove useful and more productive in results, I will here repeat them :—

1. What are the kinds of timber trees produced in the country, and to what uses are they generally applied ? (State the botanical name where known.)

2. Are the forests or lands producing the trees owned by the Government or by private persons ?

3. What is the approximate extent of timber-producing forests or lands at the present time ?

4. Is this area increasing or diminishing ?

5. If diminishing, from what cause ?

6. Are any steps taken for the prevention of waste or for replanting any area which has been cleared ?

7. What is the quantity of timber which might fairly be cut every year without permanent injury to the forests?

8. What is the quantity actually cut every year?

9. What is the proportion for home consumption and for export?

10. What have been the annual exports of each kind of timber during the last 10 years; stating the proportions to each country, and the value of such exports?

11. What are the reasons for or causes of the increase or diminution of quantity or value in the exports?

12. (If it be so), what are the causes of the small exportations in comparison with the capability of production?

13. Have any observations been made or conclusions arrived at as to the climatic influence of forests or the effect of their clearance on the rainfall, floods, &c.?

14. Forward any reports made by departments or societies, or any Acts of Legislature bearing on the subject.

A like endeavour to that made in June, 1874, by the Colonial Office was made in the same year by the Foreign Office, through Her Majesty's Representatives abroad, towards the collection of information on the production and consumption of timber in foreign countries. The result was compiled in Command Paper C. 1161 of 1875.

So far as the West African British Possessions,

including islands adjacent, are concerned, the Gambia and St. Helena seem alone to have at all responded to the invitation to supply information, which has been condensed into the following analysis* :—

"The timber products of Gambia are—Mahogany, used for ship-building; rosewood, used for boat and canoe building; 'runs,' the male species of which is used for bridge and house building; black stick, used for boat-building; mangrove, used for props, posts, and small vessels; black mangrove, used in native houses; monkey bread, the bark of which is used for making ropes; cotton tree, used for canoes, and for the manufacture of domestic utensils; and the india-rubber tree."

"The forests are owned by the Government. They are said to be diminishing owing to the operations of woodcutters. At the date when these statistics were compiled the acting Administrator was contemplating the framing of an Ordinance to restrain the cutting of wood and the imposition of a licence duty. The export trade in timber ceased with the introduction of iron shipbuilding, but the Board of Trade Returns show a rise in the values of caoutchouc exported from Gambia and Sierra Leone to the United Kingdom from £1,959 in 1872 to £25,276 in 1876, and the value of gum exports for the latter year as £18,363."

Parturiunt montes, nascetur ridiculus mus.

* Command Paper 2197 of 1878.

From St. Helena was received the following information. :—

"The principal timber tree of the island is the pinaster. There are other exotic trees, but they are grown merely for ornament. The cinchona has been recently introduced into the island, and has been found to thrive. About one half of the timbered land in the island belongs to the Government.

"There are in all about five hundred acres planted with trees, but not more than one-third of this area would yield timber. The self-sown trees are sufficient to counterbalance the annual consumption. It is estimated that the growth of three or four acres may be cut each year without injury to the wood-lands."

There will be found in the following pages the area, according to the last Statistical Abstract of the United Kingdom, of each of our Possessions along this Coast; but in the Return in the same publication of the "Extent of Crown Lands in various Colonial Possessions," West Africa is noticeable by its absence. Although its exclusion may be in a measure accounted for by the absence of compiled information of extent of lands sold and unalienated, yet it must be understood that all land in the Settlements on the Gambia, of Sierra Leone, and in the Islands of Lagos, and within a certain limit on the Gold Coast, other than what may have been previous to cession or settlement acquired, sold since by the Crown, or otherwise alienated, is Crown Land; while in the

Protected Territories of the Gold Coast and Lagos Colonies limitations as to the territorial rights of the Sovereign have not yet been definitely fixed.

It will prove generally a blessing to the people and to commerce to find, in the future, more extended utilisation, on equitable and reasonable terms, dependent on current requirements, on nature of soil, and on prospects both present and prospective, of such territory in those Colonies as remains at the disposition of the Crown.

The Island of St. Helena lies in lat. 15° 55′ S. and long. 5° 42′ W. Some 1,100 miles divide it from the African Coast.

The area of 47 square miles has been returned as composed of 28,800 acres.

From a clear and able Report by D. Morris, Esq., late Director of the Public Gardens and Plantations, Jamaica, now Assistant-Director of Royal Gardens, Kew, upon the present position and prospects of the Agricultural resources of the Island of St. Helena, published by the Colonial Office in the early part of 1884, I extract as follows :—

"The present population of St. Helena according to the census of 1881, excluding the garrison and shipping, is about 4,500. Of this number more than one half (2,435) live in Jamestown.

"As regards occupation, there are only 70 persons (males) returned as farmers and small cultivators, and 477 (males) as labourers.

"During the last ten years large numbers of labourers and small cultivators have emigrated to the Cape and Natal, and at the present time labour is scarce and expensive. Wages range from 2*s.* to 2*s.* 6*d.* per day, but the quality even at this price is not quite satisfactory.

"The Crown lands, with the exception of Longwood Farm and a few other places, are barren wastes on the outskirts of the island, incapable of cultivation.

"Of the area, two-thirds are composed of barren rocky wastes or clayey slopes totally unfit in their present condition for any agricultural operations.

"About 8,000 acres are in pasture and hay land. The tendency is to throw more and more land out of cultivation and place it in grass. There is a retrograde step as regards the agricultural interests of the island, but it is inevitable under the influences which obtain at present.

"Under forest, both of indigenous and introduced trees, in detached and straggling patches, there may be altogether about 400 acres.

"Under cultivation, with root crops, forage, orchards, and gardens, there are not quite 300 acres.

"This last area, viz. 300 acres, practically represents all the land now used for raising crops and for contributing to the food supply of the inhabitants."

I understand that in St. Helena there is now absolutely no indigenous timber, the native trees

being of quite small dimensions; and the foreign element is next to nothing, and undeveloped.

Of the Flora of St. Helena an account will be found in Melliss's Book on that island; but its Botany, as well as that of Ascension, is fully given in the Botany of the '*Challenger* Expedition,' 1873–6, which was prepared by Mr. W. B. Hemsley, A.L.S., from which it will be observed in the following extract that in the Island of Ascension, the area of which is about 34 square miles, there is no native arboreous vegetation, *Hedyotis adscensonis* and *Euphorbia origanoides* being the only endemics.

"*Ascension.*—Whether this island ever supported anything more than its present extremely meagre flora is problematical: but the presence of two distinct endemic species of flowering plants, belonging to widely diffused genera, is no help to the solution of the problem. The one, *Hedyotis adscensonis*, is not very different from African and Asiatic species; and the other, *Euphorbia origanoides*, belongs to a group of littoral, mostly shrubby species, widely spread in Polynesia, with one species in the West Indies and the Bermudas, and two on the Western Coast of Tropical Africa. Two St. Helena endemic plants are recorded from Ascension; but there are no specimens in the London Herbaria corroborating this, and it is almost certain that there was some mistake."—Vol. I. Botany, '*Challenger* Expedition,' Report III., p. 65.

"St. Helena was discovered by a Portuguese, Jean

de Noya, in 1501, on the 18th of August, St. Helena's Day—hence the name the island bears. At that date it was entirely covered with forests, the trees drooping over the tremendous precipices that overhung the sea. Now nearly the whole of the indigenous vegetation has disappeared, except on the upper part of the Central Ridge, and is only very partially replaced by introduced plants, in consequence of the soil having been washed off from its rocky foundation since the destruction of its forests."—Vol. I. Botany, '*Challenger* Expedition, 1873–6,' Report III., p. 49.

The following may be appropriately inserted here from Cook's first voyage around the world, when in 1771 he visited St. Helena :—

"Among the native products of this island, which are not numerous, must be reckoned ebony (*Melhania melanoxylon*), though the trees are now nearly extinct, and are not remembered to have been plenty ; pieces of wood are frequently found in the valleys of a fine thick colour and a hardness almost equal to iron : these pieces, however, are always so short and crooked that no use can be made of them. Whether the tree is the same with that which produces ebony upon the Isle of Bourbon or the islands adjacent is not known, as the French have not yet published any account of it."

Now as to our own Possessions on the west side of the Continent of Africa, the West African Settlements, commonly understood as Sierra Leone and the

Gambia, were reconstituted under Letters Patent of the 17th December, 1874, into one Government, comprising Her Majesty's Settlement of Sierra Leone, embracing all places, settlements, and territories which may at any time belong to Her Majesty in West Africa between the 6th and 12th degrees of N. latitude, and lying to the westward of the 10th degree of W. longitude, and Her Majesty's Settlement on the Gambia, comprising all places, settlements, and territories which may at any time belong to Her Majesty in West Africa, between the 12th and 15th degrees of N. latitude, and lying to the westward of the 10th degree of W. longitude.

The population of the British Settlements on the Gambia, with an area of 69 square miles, was given, in 1881, as 14,150, of whom 105 were Europeans, including crews of ships in harbour. Of the total, 4,454 were returned as farmers and farm labourers, and 506 as mechanics whose pursuits are mainly, if not altogether, confined to the Island of St Mary.

The population of Sierra Leone and its dependencies, with an estimated area of 3,000 square miles, was given, in 1881, as 60,546, of whom 271 were whites, inclusive of 108 crews of vessels in harbour. Of this total 12,317 were farmers, farm labourers, and market people, and 2,293 mechanics. On the former group the Colonial Secretary reported as follows :—

"Farmers, farm labourers, and market people number 12,317, but one half of these belong to the Quiah and

second Eastern districts; and as a large number of the remainder are market women, who do little else than purchase vegetables in the districts and bring them to the town to sell, it reduces the class of people who are most needed, namely, the agriculturists, considerably below the minimum of the number required.

"Of mechanics, butchers, bakers, &c., the numbers, 2,611, may be considered proportionate to the population ; but it must not be supposed that the 2,293 who are pleased to return themselves as mechanics in any way represent the real numbers who are authorized by experience or capability to claim such a title. The real number of artizans or mechanics who have any right to the term in the true meaning of the word is very limited, and it is to be regretted that in Sierra Leone, where the people are apt to learn and tolerably quick to apply when they give care and attention, there is not a greater number of thorough workmen to teach their handicraft, and become examples to the rising generation. A youth who has been two years with a carpenter, boat-builder, blacksmith, or mason, arrogates the title to himself without any compunction, and frequently, whilst he is learning from an indifferent teacher the rudiments of his trade, he sets himself up as a master of his profession."

"There is hardly a single trade that can turn out half-a-dozen men who would be certificated by any European firm for possessing a thorough knowledge of it."

It is very difficult to form an estimate as to the numbers of any native population of a somewhat migratory character and of a Protectorate—for we must remember that Her Majesty's Settlements on the Gold Coast are represented by "Colony" and "Protected Territories"—the statements alone of natives as to numbers being uncertain, and, I may say, quite unreliable.

Then again natives are peculiarly suspicious, and would be disposed to be at once on their guard against supplying information, which they would view as intended to be directed against themselves in the shape of taxation, perhaps conscription, as was fancied at places in the Ashantee War, 1873-4.

The population of the Gold Coast, with an estimated area of 18,784 square miles, has, it would seem, not yet been got within the range of "practical statistics." It will be ideal to state that the people have been repeatedly consigned to the estimate in round numbers of 400,000, at least up to 1885, when the estimate progressed to 651,000.

The Gold Coast Colony—prior to the following date—made up of the Settlements on the Gold Coast and the Settlement of Lagos—comprises, according to Letters Patent of 22nd January, 1883, all places, settlements, and territories belonging to Her Majesty the Queen in West Africa between the 5th degree of W. longitude and the 5th degree of E. longitude. These Settlements are divided by a strip of coast and

country, commonly known as the Dahomean seaboard and territory, which has, unfortunately for the trade of the Gold Coast and Lagos, been internationally divided up between Germans, French, and Portuguese.

The population of the Gold Coast has, as already stated, never yet got beyond an estimate. Lagos was, however, more favoured, for in 1881 the Census effort there applied, and gave its population as 75,270, inclusive of 117 whites and 68 mulattoes ; there were, according to the Census, 5,592 under the heading "Traders, manufacturers, mechanics, artisans," and 11,083 returned as farmers and agricultural labourers.

The thatched houses in Lagos numbered then 5,961. The walls of these buildings are of wattle, with or without mud daubed over, and the thatch is generally composed of palm leaves (*Raphia vinifera*) ; in some instances and places, of grass.

The natives, outside of the professional classes, on the Gold Coast, as to their employments may be described as cultivators, traders, artificers, fishermen, labourers, or servants. One of the many grand issues of the emancipation of the unfortunate slaves in 1874 has been the more general spread of the farming (former slave) class, and the consequently increased cultivation in proportion. This may not have been felt as regards cultivation of products that benefit by marked increase directly the Exports, but rather in cultivation for home consumption, bringing about

better supplied native markets, more settled habits and vested interests, increased sale of Imports, improved condition of People, and thereby direct benefit to Commerce.

The Colony of Lagos, with an area of 1069 square miles, is situated between the 2° and 6° E. long., and its history may be learnt from the following data.

The former "British Settlements," which comprised the Island of Lagos, Iddo island, Ebute Metta or Northern District (conterminous with Eastern and Western Districts, exclusive of Appa, Katanu and Mahin kingdoms and of the Ogbo and Jakri Territories), were added, in August, 1861, in consideration of a pension of £1,000 per annum during his lifetime to the British Crown by the then reigning king, Docemo, who died in 1885.

As regards the Eastern District, extending and inclusive of Odé, Docemo's action was supported by the renewed cession, in February, 1863, of that part by Kosoko, formerly king of Lagos, and Docemo's rival. And as to the Western District, its inclusion in the Treaty of 1861 was ratified by its repeated cession by the Chiefs of Badagry on the 7th July, 1863.

Under Letters Patent of the 24th January, 1851, provision was made for the government of the Queen's subjects with Her Forts and Settlements on the Gold Coast lying between the 10° W.L. and the 10° E.L., within which came the "British Settlements" ceded in 1861.

For the separate government of the Settlements of Lagos it was deemed expedient to provide, which was done under the Royal Commission dated 13th March, 1863.

Next, the erection of a Central General Government, with its centre at Freetown, Sierra Leone, was provided for under Royal Commission dated 19th February, 1866, when the Administrative independence of the Settlements of Lagos merged into the general government exercised from Sierra Leone by a Governor-in-Chief for all Her Majesty's Possessions on the West Coast of Africa.

After the Ashantee War, 1873–4, it became expedient to redistribute the general administration provided for under Royal Commission of 1866, when the Settlements on the Gold Coast and the Settlements of Lagos were erected into the Gold Coast Colony, under Royal Letters Patent dated 24th July, 1874.

Her Majesty's Possessions at Lagos were increased in September, 1879, by the acquisition of the Kingdom of Katanu, to the south and east of the Denham Waters, on voluntary cession, by its kings, chiefs, princes and elders ; of the Kingdom of Appa (lying between the Kingdom of Katanu and the Western District) in 1883, on voluntary cession, by its king, chiefs, princes and elders ; in 1885, of the Kingdom of Mahin, and of the Ogbo and Jakri Territories, by voluntary cession on the part of the respective native Authorities, lying between the Eastern District and

the Benin River. Thus these Possessions are conterminous with the English Niger Protectorate, and represent with the latter a coast line extending from the Western Boundary of Katanu Kingdom to Ambas Bay, and forming a sea-board of over 500 miles.

In view of its commercial importance and in generous compliance with the popular demand, by further Letters Patent dated 13th of January, 1886, Lagos was again separated from the Gold Coast and erected into an independent Colony, which was proclaimed on the 13th February, 1886.

The grand inland waters of Lagos, extending to the Volta in the one direction, and to the Oil Rivers in the other, are approached from the sea by a well-buoyed Bar, the dangers and difficulties of which are reduced to a minimum by the presence of a fleet of local Bar steamers. For Bar service there is available a competent staff of European pilots.

This port constitutes the only safe harbour along six hundred miles of coast, and its trade is likely to have a grand future, which must, as has been the case in the past, be largely dependent on the peace of the surrounding and interior tribes and nations. Inter-tribal wars, or rather guerilla and kidnapping expeditions, that have unfortunately from time to time been carried on, act as a commercial barometer.

What has been and was known as the "Interior War," begun in 1877, between the Ibadans and Egbas, gave rise to the Ekiti-parapo Confederation, which, with

the Ifés, Modakekes, Jebus (tribes around Lagos), it has brought within its meshes. It has spasmodically continued since, but has of late applied to a smaller area.

Worthless intrigue gave way at last to the exercise of common sense, and action, at the instance of the parties concerned, was in March, last year, directed inland by the Government of Lagos towards the general restoration of order to the Interior, which has fortunately resulted in the conclusion of a treaty of peace, friendship, and commerce among the contending parties; in the breaking up of the two hostile camps of Kiji and Oke Mesi, and in the dispersion of the armies that occupied for years those camps; and, thereby, in the restoration to agricultural, social and commercial pursuits of several thousands of people (from my messengers, I learnt, some 200,000).

Within the limits of West Tropical Africa, as defined by Professor Oliver in his 'Flora of Tropical Africa,' lie also the following Foreign European possessions.

The French possessions are generally represented as Senegambia, Assine and Dabou, Porto Novo and Gaboon; with a returned population in 1878 of 324,038.

According to 'Notices statistiques sur les Colonies Françaises, 1883,' the population of the Senegal had increased to 190,789 persons, composed of 90,521 men and 100,268 women and girls, besides having a fluctuating population of 2,135. Of the population of the Gaboon it is said that the nomadic life which the

natives lead does not admit of the estimate of the number of the population, but that on the coast occupied by the European element the population comes up to 200 souls ; and of the cultivation it is said that "manioc" is the principal farming, with dried fish the ordinary food of the people. Rice and maize are cultivated to a small extent. The imports from Senegambia and the other French settlements into the United Kingdom do not afford detailed particulars, which by way of comparison I had hoped to have here inserted.

I notice, however, in the 'Statesman's Year Book, 1886,' the French Possessions in Africa represented as—Senegambia, with an area of 250,000 square miles, and a population of 197,644 ; Gaboon and Gold Coast, with an area of 20,000 and a population of 186,133 ; and the Congo Region, of an area of 430,000, with a population of 500,000 : and that France claims also as "Protectorate, a considerable area in West Africa extending along the Ogoué and its tributaries to the Central Congo," and extended "in 1882–3 the area of her Protectorate in Senegambia as far as Bukako on the Niger."

French Gold Coast Possessions are made up of Grand Bassam, Assine, Grand Popo, Kotonu, Porto Novo.

The Portuguese Possessions on this coast are represented as—in Senegambia, Bissao, area 26 square miles, lying between the rivers Cacheo and Nunez,

with a population (1873) of 9,282 ; Prince's and St. Thomas Islands, area 454 square miles, with a population (1878–9) of 21,037 ; Ajuda (Whydah), area 13 square miles, with a population (1873) of 4,500 ; the countries of Angola, Ambriz, Benguela, and Mossamedes, situated between Rivers Loge and Cape Frio, with an estimated area of 312,509 square miles, and an estimated people of 2,000,000 ; and the Congo districts, of an estimated area of 382,683, with a population of 350,000.

From the 'Statesman's Year Book, 1886,' I extract as follows :—

"At the Berlin Congress, 1884–5, the claim of Portugal was admitted to the territory from Ambriz to the mouth of the Congo—along the river to nearly opposite Vivi, eastward to the River Kwango, and south along the river to beyond 10° S.L. : also to a small stretch of coast north of the Congo, including Cabinda and Landana."

According to the Census of 1878, the Cape Verde Islands, ten in number—the most important Portuguese Colonial possession—divided into windward and leeward groups, with an area of 1,650 square miles, situated abreast of Senegambia, about 320 miles from the Western Coast of Africa, contained a population of 99,318. In 1881 the British subjects were 89.

The Cape Verde Islands lie so approximately, viz. between 17° 13′ and 14° 45″ N.L., and 22° 45″ and 25° 25″ W.L., to our Possessions on the Gambia, that I

am induced to here make a brief allusion to them. As to their Flora, I must refer my readers to the work on the Botany of the Islands, by P. Barker Webb, under the title 'Spicelegia Gorgonea.'

Until 1879, these islands, with the other Portuguese Possessions on the coast of Guinea, formed one Province: the islands by themselves now form a Portuguese Province. They are of volcanic nature, of high elevation, and in the valleys fertile.

The uncertainty of water supply and frequent droughts paralyse trade and destroy the crops there, and in consequence the islands should offer a market for certain West African products, especially corn (*Zea Mays*), which can be grown cheap and good, and of two crops annually. I may add that these islands are somewhat supplied with this corn from the Portuguese Possessions lying south and adjacent to the Gambia. Indeed from the Gambia itself corn has found its way to them, spasmodically as are efforts sustained generally in West Africa.

Even from Lagos, so much further south and east, it has been proved that corn can be shipped to England with profitable results. It can be grown extensively and procured—taken in quantity—at the former place, in fact in most places on the Gold Coast, at 9*d.* per bushel.

Here, as elsewhere along this coast, American trade insinuates itself and progresses, whether in wooden gimcracks, furniture, rum, or tobacco.

The trade in cereals and wood-work done with the United States, conducted by sailing ships, is of moment, and among the Imports for 1882 into these islands were found—

	Kilos.	Lbs.	Reis.
Corn meal . .	5,053	11,116	188,000
Flour . . .	140,081	304,178	13,850,300
Worked wood material	..	..	1,513,450
Manufactured tobacco	9,145	20,119	3,062,000

—About £3,965

There were exported to the United States during the same year—

	Reis.
Coffee	841,116
Willow furniture	19,200

—About £190.

The planting as a Government duty of the turqueira trees (*Jatropha Curcas*, or *Curcas purgans*) by thousands is now being proceeded with in those islands, but under difficulties in consequence of droughts.

Oil is made in some countries from the seed, for lighting and medicinal purposes. The seeds are largely exported from Portugal to France, the chief market being Marseilles, for use in the manufacture of soap and for lighting purposes. About 350,000 bushels of the seed are annually exported to Portugal from the Cape de Verde Islands. As to its yield, *vide* table at page 74. This shrub would grow, under culture, luxuriantly in West Africa. We have there many rich samples growing without care or appreciation.

On the other Portuguese Possessions, which offer, as well as the other parts of West Africa, extensive fields for the development of economic botany, there will be found remarks as regards the different products in the market.

In addition to the Canary Islands, the other Spanish Possessions on this coast appear as Fernando Po, Annabon, Elobey, Corisco, San Juan, &c., with an area of 850 square miles, and a given population of 36,000, exclusive of that of the first-mentioned group, represented by 279,806 (about).

I observe further that Spain also claims the West Coast of Africa between Capes Bojador and Blanco, the district of Ifin, near Cape Nun, opposite the Canary Islands, the islands of Elobey on the West Coast of Africa, and the country on the banks of the rivers Muni and Naya."—'Statesman's Year Book, 1886.'

The Canaries should, properly speaking, be out of this Book, for they do not lie within the Tropics. Yet I call attention to them in view of the fact that nine-tenths of the inhabitants of the Canary and Cape Verde Islands, represented by 280,000 and 99,000 (approximate), live upon fish with toasted corn or flour, "Gofio," a considerable proportion of which, as Indian corn, comes from Europe and Asia, whereas it might be supplied from West Africa, a nearer and cheaper field.

By the growth now of sugar-cane and tobacco are

represented fresh and necessary industries in those islands, consequent on the falling off of prices obtained for cochineal. Tobacco from these islands of local growth finds its way already to West Africa. The sugar-cane plants have and are being received from Madeira, where they were and are imported from Mauritius.

Of the Spanish Island of Fernando Po, the Landers, in their 'Niger,' published in 1833, write :—

"There are various sorts of timber at Fernando Po, among which the African oak is very plentiful, and particularly so in George's Bay, where it grows close to the sea-side. Satin wood, ebony, *lignum vitæ*, yellow camwood, and several sorts of mahogany, besides other wood of a very hard nature, grow in profusion all over the island, and may probably hereafter become valuable."

"During 1884 Germany extended her Empire beyond the bounds of Europe by taking under her protection certain portions of the West Coast of Africa. On the slave coast Germany has annexed the territories of Togo and Bajida, extending about twenty-four miles beyond the eastern limit of the British Gold Coast Colony. In Biafra Bay to the east of the British Oil River Territory, Germany has annexed the district of Bimbia, the island of Nikol, and the various kinglets of the Cameroon River, the district of Malimba, Plantation and Criby where the French Territory of Gaboon is reached.

On the South-West Coast of Africa Germany has annexed the coast of Damaraland from Cape Frio, the southernmost point of Portuguese Possessions, to Walvisch Bay, and the Namaqualand coast from Walvisch Bay to the Orange River, the north boundary of Cape Colony."—'Statesman's Year Book, 1886.'

In Command Paper C. 1161 will be found, in the form of tables marked "Export," Statistics of Timber from the United States for and inclusive of the years 1866–1873, which will give some idea of the African trade in this commodity. The headings under countries to which timber has been exported have varied in the years given. A regular export, however, to West Africa of timber proceeds from the United States of America.

This information, of course, dates back some years; but it will admit, notwithstanding, of a comparative estimate of the Timber Import Trade in the direction to which it applies, and will serve as a basis for completion later to date.

In explanation of the international distribution of this trade I may add, however, of the United States export trade, that "British Possessions in Africa" would seem to include the Cape Colony and Natal; the "French Possessions in Africa," those in North as well as West Africa; the "Portuguese," Madeira, Azores, and all other Portuguese Possessions; and "All other Spanish," Canary Islands, Philippine, San Domingo, and all West Africa Possessions.

As regards trade with British Africa, it would seem to include Her Majesty's Possessions in South Africa and Natal; so that the statistics do not afford the same pointed interest and value they would otherwise, could I have used and confined figures to West Africa and the West African Islands alone.

Reporting on the Forestry of Sweden and Norway, Mr. Dering stated, *vide* Command Paper just referred to :—

"There is hardly a maritime country in the world, with the exception of China and Japan, to which the produce of Swedish forests does not appear to find its way."

West Africa is not here an exception. Swedish and Norwegian vessels regularly find their way to this coast, and as an instance I would here give that, according to the Specification and Value of Exports from Sweden of each kind of timber during 1872 to each foreign country, consignments, as under, valued at £7,000 17*s.* 6*d.*, reached Africa exclusive of the Cape of Good Hope—meaning Cape Colony.

	Pieces.	Cubic Feet.	Kroner.	English Value.
Timber trees . . .	23	778	280	
Beams and spars . .	642	22,554	14,660	
Deals and planks. .		160,718	110,896	
Fashioned wood			180	
			126,016 =	£7,000 17*s.* 6*d.*

Although from Norway no direct African timber trade of any importance seems to exist—for in 1870 the exports were represented by 108 Commercial Lasts, averaging in total about 216 tons, of planed timber and flooring—yet, as Great Britain has absorbed nearly one half of the whole timber export represented by sawn timber, deals, battens, boards, staves, &c., no doubt a fair proportion as manufactured articles finds a market later in West Africa.

Through the courtesy of Mr. J. Bolton, of Messrs. Stanford, I am enabled to here summarise the result of the late European scramble for Africa and the positions consequent thereon. Its Western side is now almost completely appropriated by European Powers. The Sultan of Morocco claims the coast from Gibraltar Strait as far as Wady Dra'a, from which to Cape Bojador the coast is commercially worked by an English Company—"The North-West Africa Trading Company"—with its head-quarters at Cape Juby. From Cape Bojador to Levrier Bay, in lat. 21° N., Spain has declared herself mistress. From Levrier Bay to Punshavel Point on the right of the Saloum River the coast is French ; from a point opposite to Punshavel Point on the left bank of the Saloum River to southern limit of British Combo is the Gambia, the first British West African Settlement. Next to Gambia and conterminous with British Combo is Foreign Combo, a native State somewhat under British protection, presided over by

a Mohammedan Chief—Alimami Phodey Selah. Then we come again to French territory, extending on either side of the Casamance River as far south as Cape Roxo. From Cape Roxo to the River Cassini—a distance, as the crow flies, of more than 100 miles—the coast is held by Portugal. The River Cassini itself is claimed by France, and her territory here extends to the Mellicorie River, where is met the British West African Settlement of Sierra Leone, extending to the Manah River in lat. 6° 50′ N. From this point to the River San Pedro, a distance of nearly 350 miles—stretches the Native African Republic of Liberia. From the Rio San Pedro to Grand Lahou there appears a portion of unappropriated coast of upwards of 100 miles in extent.

From Grand Lahou to Assine is the French Ivory Coast Settlement, and from Newtown, Assine, to Bey Beach is the British Gold Coast Colony.

From Bey Beach to Little Popo is one of the recently-acquired German Protectorates, and conterminous with it is the French acquirement of Grand Popo, which again adjoins the Portuguese Protectorate of Whydah, which is conterminous with the French Possession of Kotonu, where begins the British Colony of Lagos, ending with the Benin River, whence the British coast-line runs continuously past the Niger River and its many mouths to the Rio del Rey. From Rio del Rey to the Campo River in 1° 20′ N. lat. is German, whence to the northern flank

of Cape St. John is French. From Cape St. John to the centre of Corisco Bay is Spanish, from which to the Chiloango River at Landana is French. From Chiloango River to Vermilion Point is Portuguese, where begins the Congo Free State, ending on the north bank of the Congo River. From the southern bank of the Congo to the Rio Cunene is the Portuguese territory of Angola, &c. From the Rio Cunene to the Orange River is German territory, with two exceptions—British Walvisch Bay, with some 40 miles of coast-line, and a group of small islands lying close to the coast, called Penguin Islands. At the Orange River begins the British South African Colony.

II.

In the Preface to his 'Flora of Tropical Africa,' 1868, Professor Oliver (from whom I take the liberty to quote) has deemed it expedient to divide Western Tropical Africa into two principal geographical regions, viz. :—

1. Upper Guinea, including under this term the Western Coast Region from the River Senegal on the north to Cape Lopez immediately south from the equator ; the interior drained by rivers intermediate between these limits and the small islands of the Gulf of Guinea, Fernando Po, Prince's Island, St. Thomas and Annabon.

2. Lower Guinea, Western Tropical Africa from Cape Lopez southward to the Tropic of Capricorn, including Congo, Angola, Benguela, and Mossamedes.

The collections—I get my information from the above-quoted Preface—of botanical specimens received from time to time from the first Region, together with many from Sierra Leone, Fernando Po, and Accra, and other points on which is based the information as to Upper Guinea, were :—

1. The plants collected by Dr. Theodore Vogel and his assistant, Mr. Ansell, on the Niger Expedi-

tion in 1841, which formed the basis of the 'Flora Nigritiana' of Dr. Hooker and Mr. Bentham, published in 1849.

2. The plants collected by Mr. Charles Barter under Dr. Baikie's Expedition in 1857, 1858, and 1859, as well as those of the latter gentleman.

3. The important contribution made by Mr. Gustav Mann, under the auspices of the Admiralty, in Fernando Po, St. Thomas and Prince's Island, Old Calabar, Cameroon Mountains, Corisco Bay, Rivers Muni and Gaboon, and the Sierra del Crystal.

4. Collections chiefly in the neighbourhood of Abbeokuta, by the late Dr. Irving.

5. The collections of Rev. W. C. Thomson from Old Calabar and its neighbourhood, from Senegambia by Heudelot and Leprieur, of M. Bidjem and of Don, Whitfield, Miss Turner, and others from Sierra Leone.

The collections in the Herbarium of the British Museum have also been referred to; of Afzelius, Smeathmann, Daniell, and others of Sierra Leone, of Leprieur and Perrottet in Senegambia.

For the material from Lower Guinea, Professor Oliver acknowledged his indebtedness to Dr. Friedrich Welwitsch as regards the Congo, to Professor Christian Smith, to Captain R. F. Burton, and to Dr. Curror as regards Elephants' Bay.

Although it may be advanced that such references have to do with the Science of Botany rather than

with its economic value, yet the information which has reached, and on which has been built the Flora of Tropical Africa, has contained important data which should be useful "to future explorers and residents in Africa interested in the natural productions and economic products of the country." It is, I might venture to remark, a pity that the Economic does not as a rule somewhat merge into the General Botanic interest, and that the Science of Botany does not condescend to admit more of the introduction of economic notes explanatory and suggestive of particulars on points of commercial interest. It may, and very naturally, be advanced that either subject affords a sufficient field for itself. I will acknowledge the justice of such an assertion. But who are more able and can more readily and fully deal with the addition suggested than the many gentlemen who make the Science of Botany a lifelong study, and who have so many veins of information, inaccessible to the many, within their grasp and under their control? Much useful work in an economic sense I must acknowledge has been done, and I would ask not to be viewed as a reflector or disparager, but rather as a suggester.

III.

ALTHOUGH I have so far given definitions of the various Possessions in West Africa, yet much more may be expected in the direction of affording forestry statistics. True, on the one side, those Possessions have a marked and fixed water boundary to the west or south, according to the course of the Atlantic; but otherwise inland, to the north, to the east, and again to the south, boundaries can be compared to the rings of concentric circles as observed when a stone is thrown into water—they are ever moving outwards, never inwards.

This may in a measure account for the want of territorial definiteness, and, I may say, somewhat in consequence, for the entire absence of information on the forested or deforested portion of the colonised countries in West Africa, and on their grand prolific interior which must still be looked upon as scientifically and commercially unexplored.

I endeavoured in vain to gather some forestry statistics as regards the French Possessions, hoping to find that, among those comparatively much more advanced Colonies, data existed not procurable cer-

tainly in our own Colonies. I fancy the other Possessions are no further advanced in this direction.

Our next step, then, it would seem, is to turn to the Exports from this comparative "terra incognita," and thence glean facts that come within our knowledge to illustrate their importance to the trade of the United Kingdom.

In the first place it is suggested what are the present economic botanical productions. They, taking them in the order of their value to the Mother Country, are chiefly, so far as are known commercially, palm oil, nuts, and kernels, caoutchouc, coffee, gum, dye-wood, cocoa, cotton, fibres, and wood. Under headings mentioned I have put together data-statistics for so many years, and in a later part of this Work I will hope to furnish the distribution of such Imports.

PALM OIL.—On the 20th March, 1845, an Order was issued from the House of Commons for a Return of an Account of the quantity of palm oil annually imported into the United Kingdom from the West Coast of Africa since the year 1790, when the palm oil industry may be said to have been in its infancy: it has since become the chief staple of trade in the Gold Coast, Lagos Colonies, and elsewhere.

The Return which follows was then completed to date, and has, with the additional information since afforded, been placed at my disposal through the courtesy of E. Banner, Esq., Wessex House,

Northumberland Avenue, London, W.C. The figures speak for themselves of the growth of this trade, and of the important part the *Elais guineensis* has played and commercially still plays in West Africa. Query whether it will continue to play, in view of price to which its oil has fallen, from £52 per ton it formerly fetched; of the scare and temporary cessation of business its low price caused last year; and of its growing rivals in the shape of petroleum, tallow, home and foreign; cotton, ground-nut and linseed oils?

I must say, however, that if there is a commodity which from the circumstances and conditions of the growth of the palm-tree, the harvest of its crop, and the manufacture of its oil, should be able to accommodate itself to any variation of the market, it is palm oil.

Years.	Quantity.	Years.	Quantity.
	cwt.		cwt.
1790	2,599	1807	2,233
1791	3,625	1808	11,047
1792	4,609	1809	14,983
1793	3,071	1810	25,754
1794	1,584	1811	23,537
1795	1,350	1812	11,637
1796	Records destroyed by fire.	1813	Records destroyed by fire.
1797	2,164	1814	19,344
1798	3,336	1815	41,278
1799	4,147	1816	23,831
1800	4,467	1817	29,700
1801	3,897	1818	29,310
1802	7,718	1819	74,049
1803	9,790	1820	17,456
1804	6,327	1821	102,490
1805	4,327	1822	63,754
1806	7,215	1823	65,402

Years.	Quantity.	Years.	Quantity.
	cwt.		cwt.
1824	73,989	1833	266,991
1825	85,366	1834	269,907
1826	99,068	1835	256,337
1827	94,246	1836	276,635
1828	126,553	1837	223,292
1829	179,922	1838	281,373
1830	213,467	1839	343,449
1831	163,288	1840	315,458
1832	217,804		

* About 1873–4, floating cargoes began to go direct to France owing to the imposition of a surtax on indirect imports. In 1875 about 3,000 tons went in floating cargoes direct to the continent, in 1876 the quantity had risen to 10,000 tons, and since then 10,000 to 15,000 tons have gone annually.

Years.	Quantity.	Quantity re-exported in tons.	Years.	Quantity.	Quantity re-exported in tons.
	cwt.			cwt.	
1841	397,076	3 m.	1865	706,380	
1842	420,171	2¼ m.	1866	698,580	
1843	407,884	3¾ m.	1867	761,760	
1844	414,570	3⅓ m.	1868	830,000	
1845	500,833	1¾ m.	1869	703,560	
1846	360,452	3½ m.	1870	868,270	14¼
1847	469,348	4¾ m.	1871	1,031,635	25½
1848	499,719	4¼ m.	1872	995,006	23¾
1849	493,364	7¼ m.		Tons.	Exported.
1850	434,450	3¾ m.	1873	44,827	21,380
1851	584,477	5¾ m.	1874	44,741	20,510
1852	507,896	5½ m.	1875	42,490	21,823
1853	620,134	5 m.	1876	41,827	19,500
1854	731,659	7 m.	1877	40,076	19,159
1855	780,599	8¾ m.	1878	42,500	19,339
1856	786,700	9½ m.	1879	43,469	17,801
1857	854,791	10¼ m.	1880	51,319	22,161
1858	778,230	8¾ m.	1881	40,987	22,764
1859	685,794	7¾ m.	1882	40,077	21,407
1860	804,326	9½ m.	1883	37,176	17,827
1861	740,332	8¼ m.	1884	41,291	18,051
1862	865,890	11½ m.	1885	44,924	19,444
1863	790,224	10 m.	1886	49,655	24,454
1864	619,780				

Here also is a West African native product other than Liberian coffee that finds its way to different parts of the world. I would mention that at the instance, in 1876, of Sir Joseph Hooker, and with the co-operation of the Colonial Office, action was begun for the introduction from the West Coast of Africa into Labuan of the *Elais guineensis* as a means towards the establishment of an industry considered to be well adapted for that and adjacent islands.

On its introduction the Acting Governor of Labuan reported in 1878 that 700 young trees were yielded by the experiment, and, "notwithstanding a drought which was quite exceptional and lasted for nearly five months, flourished and were transplanted in July last."

It will be interesting to follow up this acclimatisation and industry.

In connection with the growth and methods in use there in the extraction of the oil (both palm and kernel) the Governor of the Gold Coast Colony was addressed in 1877 by the Secretary of State for the Colonies, and the following full Report, under "Cultivation and Produce," which I give in extenso, was the issue—to be found printed in the *Gardeners' Chronicle* for June 30th, 1877—and for which we are indebted to the late zealous and able Dr. Africanus Beale Horton :—

CULTIVATION.—"The ripe nut is selected for this

purpose. The ground is first well raked, and the nuts scattered broadcast over it and lightly covered with earth, or a number of nuts ranging from six to ten are deposited in one spot at various distances and covered with earth. The planting must be during the rainy season, as it requires a good quantity of water. When the young shoots have grown to about a foot in height they are carefully removed in the evening, and transplanted a distance of at least fifteen feet from one another, and if planted during one season, it is better to allow them to remain until the next before they are transplanted.

"The African oil palm grows luxuriantly and bears more abundantly at the height of from ten to twelve feet in a damp, semi-marshy soil, where water does not, however, stand. In arid, dry soil it becomes stumpy and grows very slowly, and sometimes bears at four feet; but to cultivate the plant so as to ensure a proper growth, a development of a good number of nut branches, large in size, with nuts well supplied with flesh, or what is technically called 'fat nuts,' the trees must be at a distance of at least twenty feet from one another and well supplied with water.

"The supply of nuts fit for use is biennial, but the most abundant supply of commercial oil is obtained from nuts gathered during the rainy season."

COMMERCIAL PALM OIL MANUFACTURE.—(*a*) "The nut bunches are cut down from the trees and put

in a heap outside in the air, where they are allowed to remain for a week or ten days, which causes the joints of the nuts to be weakened by the process of decomposition, and allows them to be detached by simply beating them against any substance ; the nuts are gathered and the husks (decayed sepals) that adhere to their base removed, either by the hand or by rubbing them together, and separated by throwing them in the air, and allowing a strong breeze to blow them away. A hole about four feet is dug in the earth, which is lined with plantain leaves, into which the nuts with the hard unyielding pulp are put, and covered over first with plaintain leaves and then with palm leaves and earth.

"The nuts are allowed to remain here for various periods from three weeks to three months, until decomposition of a more or less extent has taken place, so that when removed the pulp is soft, and appears as if it had been thoroughly boiled. They are now put into a trough made by digging a hole four feet in depth into the earth, and paving it below and around with rough stones. In some cases a portion of the nuts is boiled in iron or earthenware pots and then mixed with the unboiled portion, before putting into the trough.

"They are now pounded with wooden pestles by several persons standing round the trough until the pulp is quite removed from the surface of the hard nut, the whole is removed from the trough, put into

a heap and the stones taken out, leaving the oily fibrous pulp, which is put into a pot with a small quantity of water under a good fire and well stirred until the oil begins to melt out. The pulp is then removed and put into a rough net opened at both ends, to which are attached two or three short sticks, by turning which at opposite directions the oil is squeezed out; from the nettings it runs into a receiver or tub, leaving the fibre in it.

"The longer the oil-nuts remain underground the thicker the oil will be when made; the quality will also be inferior, and the smell bad; *cæteris paribus*, the shorter time, within certain limits, the nuts are underground, the more superior will be the quality of the oil made from them. This in a great measure will account for the difference in the quality of the oil shipped from different parts of the coast."

Palm Oil for Home Consumption.—(*b*) "The nut bunches are kept in a hot place for three or four days, and the nuts are taken out; a small quantity—from three to four lbs.—is made at a time; they are boiled in iron pots, then put into wooden mortar and pounded with wooden pestles. The pulpy mass is then mixed with tepid water with the hand, the chaff is first removed, and afterwards the stones. The oil remains mixed in the water, which is passed through a sieve, to remove the remaining chaff, into a pot placed on the fire, and heated to boiling point, and

allowed to continue in that state whilst the oil floats up as a bright red substance. The water at this stage is being continually stirred and the oil removed as it floats up, until the whole is removed. The oil is now put into a pot and heated, to drive out any water it may contain."

SECOND PALM KERNEL OIL, (*a*) WHITE, (*b*) BROWN OR BLACK.—"The nuts which have been subjected to the process already described in making oil, deprived of their external pulp or old nuts picked up from under the palm-tree, are put in the sun for days, and even months, until they are perfectly dry; they are then broken between two stones, and the kernels obtained whole or in perfect condition and fit for exportation, and is the commercial palm-kernel. If they have not been perfectly dried, the kernels break into pieces."

WHITE KERNEL OIL.—(*a*) "The kernels are put into wooden mortar and pounded very fine; then removed to a grinding-stone and ground into a homogeneous mass, which is put into cold water and stirred with the hand; the oil rises in white lumps on the surface of the water, which is collected and boiled. It is of a very light straw colour, and when exposed to the sun and dew becomes after a time perfectly white."

BROWN OR BLACK KERNEL OIL.—(*b*) "The kernels

are put into a pan and fried, the oil oozes out into it from them, and it is strained; the fried nuts are put into wooden mortar, pounded, and afterwards finely ground on a grinding-stone; the mass is thrown into a small quantity of boiling water and stirred continually, the oil rises as a supernatant fluid, and is removed until none rises. The pulpy mass is removed from the fire and spread out in a large bowl and allowed to cool, after which it is again ground and put by until the cool of the day, when it is mixed with a little water to soften it. It is now beaten with the hand for some time, until the air comes out in white pellets. As soon as this is observed a large quantity of water is put into it and the oil in some fatty substance floats on the top, which is skimmed off and boiled and the pure oil obtained.

"Under the circumstances detailed above, the exported kernel could not retain its germinating power; besides, I think, like cocoa-nut and the other plants of the palm tribe, for plantation the nut requires the hard exterior covering for protection in the earth."

The following table (page 44) is drawn up from the General Imports into the United Kingdom of the palm oil exported from West Africa as designated, and is useful in showing in a measure the direction, for eight years, of the export trade.

In view of these statistics it may afford approximate means of calculation to show how much we owe, apart from its botanic interest, in the way of the immense

tracts of country that lie covered by this beautiful tree, commercially to the *Elais guineensis*, when I say that on an average a palm-tree is supposed to yield 20lbs. nuts a season (of which there are two) and that a good crop should afford in oil 35 to 45% of the weight. This is supported somewhat by the fact that a gallon of palm oil weighs about 9 lbs. The fruitfulness and size of palm-trees are dependent on the soil. They bear in seven to twelve years, and for thirty-five to forty years. According to native estimate and wasteful process of manufacture it will take 30 to 35 lbs. of palm-oil nuts to give a gallon of palm oil.

I have been further informed that 120 bunches of palm nuts go to make six old wine gallons of oil, and 6,000 bunches to make a ton of palm oil; but I would be disposed to question the accuracy of this information, as the yield would depend on size and richness of the nuts and clusters.

The nature and quality of this commodity vary with locality and care in preparation.

In the trade it is called "hard" when it contains a larger proportion of "stearine," "soft" when it contains a smaller proportion, and "medium" when it sets after melting, whether hard or soft.

The "hard" oil is exported chiefly from the Congo, the Niger, Brass, New Calabar; Saltpond, Appam, Winnebah of the Gold Coast Colony; is used by candle manufacturers: while the "soft" oils from

Year.	Articles.	Countries whence imported.	Quantities. Cwts.	Quantities. Total.	Value. £	Value. Total.
1878	Oil Palm	From West Coast of Africa (foreign) . .	..		..	
		,, Fernando Po	4,271		7,576	
		,, Portuguese Possessions	3,791		6,297	
		,, W. C. A., not particularly designated	461,074		797,648	
		,, British West Africa	15,970		28,394	
		,, ,, Gold Coast.	178,137		313,754	
				Cwts. 663,243		£ 1,153,669
1879	,,	,, Fernando Po	6,460		10,310	
		,, Portuguese Possessions	3,544		5,475	
		,, W. C. A., not particularly designated	657,142		996,294	
		,, British West Africa	5,835		8,894	
		,, ,, Gold Coast.	202,152		310,301	
				875,133		1,331,274
1880	,,	,, Fernando Po	5,642		8,588	
		,, Portuguese Possessions	10,921		16,608	
		,, W. C. A., not particularly designated	723,179		1,063,797	
		,, West Africa Settlements (British) .	12,130		17,783	
		,, ,, Gold Coast ,, .	261,284		384,403	
				1,013,156		1,491,179
1881	,,	,, W. C. A., not particularly designated	636,229		923,578	
		,, West Africa Settlements (British) .	9,224		12,378	
		,, The Gold Coast ,, .	164,724		243,100	
				810,177		1,179,056

1882	,,	,,	W. C. A., not particularly designated	608,290		924,971	
		,,	French Possessions	8,124		12,149	
		,,	West Africa Settlements (British) .	13,113		20,367	
		,,	The Gold Coast ,, .	145,991		223,462	
					775,518		1,180,949
1883	,,	,,	W. C. A., not particularly designated	522,360		910,741	
		,,	French Possessions, W. A. . . .	7,645		13,467	
		,,	West Africa Settlements (British) .	9,438		17,327	
		,,	The Gold Coast ,, .	163,453		299,069	
		,,	Portuguese Possessions, W. A. . .	2,556		4,708	
					705,452		1,245,312
1884	,,	,,	W. C. A., not particularly designated	454,295		757,359	
		,,	French Possessions	10,083		16,441	
		,,	West Africa Settlements (British) .	10,196		17,006	
		,,	The Gold Coast ,, .	340,346		575,196	
		,,	Fernando Po (Spanish)	4,097		6,878	
		,,	Portuguese Possessions	764		1,369	
					819,781		1,374,249
1885	,,	,,	W. C. A., not particularly designated	486,113		649,147	
		,,	French Possessions	8,798		12,161	
		,,	Fernando Po (Spanish)	4,204		5,540	
		,,	Portuguese Possessions	745		977	
		,,	West Africa Settlements (British) .	14,602		18,551	
		,,	The Gold Coast ,, .	357,810		486,385	
		,,	Other British Possessions	70		101	
					872,342		1,172,862

Lagos, Bonny, Opobo, Old Calabar, Operta (Niger), Cameroon, Sierra Leone, Sherbro, &c., are used principally for lubricating, and soap.

Lagos oil, which is imported in a very pure state, and fetches the highest price, is required largely by tin-plate manufacturers in South Wales.

The difference in nature of oil, although obtained from the same tree, *Elais guineensis*, is attributed to soil, climate, time of gathering nuts and mode of preparation. And I am informed that "soft" oil is shipped from rivers near to "hard" oil exporting rivers.

The market value of oil must depend largely on its purity: that from Lagos, known as the purest, fetches the highest price, and it is the only oil sold precisely in the condition imported. All other oils from the water and impurities contained have to be analysed when sold, and the buyer is entitled to an allowance proportionate to impure condition on analysis.

The "regular" oil, that is, what comes from Bonny, Benin, Old Calabar, Opobo, Niger, Operta, New Calabar, Brass, Cameroon, Congo, Accra, Addah, &c., is only subject to this allowance if the water and impurities exceed 2 per cent.

All other oil, that from Lagos of course excepted, is called "irregular," and is sold on the basis of purity, the buyer getting an allowance for the total percentage of water and impurities found on analysis.

Oil usually imported in an impure state is of less

value than that which is clean, apart from allowance on analysis, because it requires special cleaning, and consequently entails more outlay.

The import from West Africa into Liverpool—the chief market for palm oil—is given for ten years in the following table :—

Year.	Tons.	Year.	Tons.
1876	38,648	1882	39,114
1877	38,900	1883	35,804
1878	35,064	1884	42,651
1879	38,793	1885	40,354
1880	45,787	1886 (11 months)	44,644
1881	38,526		

In December last, the quotations of palm oil were as follows :—

	£	s.	d.		£	s.	d.
Lagos	23	5	0	Accra, Addah, Quittah	21	5	0
Bonny	21	15	0	Loanda	21	0	0
Opobo	21	15	0	Saltpond, Appam, Winnebah	19	5	0
Operta	21	10	0	Grand Bassa	19	10	0
Benin	21	5	0	Sierra Leone, Sherbro	21	0	0
Cameroon	21	15	0	Other irregular oils	19*l.* to 21*l.*		
Old Calabar	22	0	0				
Niger	21	0	0				
Brass	21	0	0				
New Calabar	21	0	0				
Congo	21	0	0				

The following useful and interesting notes on Palm Oil are by Mr. A. Norman Tate, analytical and consulting chemist and consulting chemical engineer, Liverpool :—

"Palm oil as imported into this country contains varying amounts of water and impurities such as sand, earthy matters, vegetable fibre, mucilage, &c.

The proportion of water and impurities in the 'regular' oils varies from under one per cent. (this is rare) to 7 or 8 per cent., but rarely exceeds 5 or 6 per cent. In the 'irregular' oils, water and impurities are frequently as high as 16 or 18 per cent., and sometimes even so much as 25 or 30 per cent.; but most of the irregular samples run from about 5 to 10 or 12 per cent.

"The oil itself when fresh consists chiefly of the fatty bodies known as tripalmitin, a compound of palmitic acid and glycerol, or glycerin, and triolein, a compound of oleic acid and glycerol, or glycerin, the tripalmitin being present in greater quantity. There are also present in most specimens of the oil free fatty acids, and these increase in quantity as the oil becomes older.

"The oil is largely used for soap-making, and generally in combination with tallow and other fats. And by processes of saponification, or treatment at high temperature with super-heated steam, its constituents are separated into a solid fatty acid, palmitic acid (often mixed with other solid fatty acids), a liquid oily body, oleic acid, and glycerin. The solid fats are largely used for candle-making, whilst the oleic acid is employed for lubricating and many other purposes for which the liquid oils, such as olive, are used. The glycerin when refined is made use of in medicine, surgery, for the manufacture of the explosive nitro-glycerin, and many other purposes.

"Some typical samples of Palm oil from which water and impurities had been removed gave me the following results":—

	Brass.	Benin.	Lagos.	New Calabar.	Old Calabar.	Grand Bassa.
Specific gravity at 15° C.	921·3	922·8	920·3	926·9	920·9	924·5
Saponification equivalent	280·2	282·2	285·4	280·9	284·5	278·8
Percentage of fatty acids	96–97	96–96·5	94–97	94–97	94·2–95	95·5–96·5
Solidifying point of fatty acids	44·4–45·8	45·–45·5	44·5–45·5	44·2–45·5	44·2–45·5	41·5–42·3
Combining weight of fatty acids	273·4	273·7	272·7	273·2	273·2	273·0

As to the distribution of the *Elais guineensis*, Dr. Schweinfurth, in his 'Heart of Africa,' says: "On the south of the Welle there is a very extensive cultivation of the oil palm. It is a tree that, although common to the west coasts, has not hitherto been found in the Nile districts, and consequently, like the cola-nuts, which the wealthier of the Monbuttoo are accustomed to chew, it yields a significant evidence of the western associations of the people." And speaking of the Monbuttoo country, he adds: "The oil palm (*Elais*) is here at the extreme northern limit to which cultivation has ever transferred it, as it is still utterly unknown in all the districts of the Nile. Not until we crossed the Welle did we find it planted out in groves, and to judge from appearances it had only been planted even there for purposes of experiment."

NUTS AND KERNELS.—"Nuts and Kernels" may

be mentioned as an Official Heading, and applicable in its embrace to Imports commonly used for expressing oil therefrom. The component parts are not specialised in the Statistical Yearly Abstract prepared by the Imperial Custom House.

However, quantities imported into the United Kingdom for eight years ended and inclusive of 1885 are afforded in the Return (page 51).

Such imports were chiefly composed of the kernel of the fruit of the West African Palm-oil tree (*Elais guineensis*), and of the ground nut (*Arachis hypogœa*), although beni-seed (*Sesamum indicum*), the kernel of the cocoa-nut (*Cocos nucifera*), the *niko* and *m'poga* nuts (West African Parinaria, so far undetermined from insufficiency of botanical material supplied), the tooloocounah, carapa or crab nut (*carapa guineensis*), akee nut (*Blighia sapida*), cashew (alien) nut (*Anacardium occidentale*), ordeal or Calabar bean (*Physostigma venenosum*), opachelo nut (*Pentaclethra macrophylla*), coco-plum kernel (*Chrysobalanus Icaco*), Niger or Ramtil seed (*Guizotia abyssinica*), the Dika almond (*Irvingia Barteri*), tambacoombah and other oil-yielding nuts of doubtless much commercial value in the future are to be found among the exports from West Africa, which is in its infancy as a prolific and profitable field of discovery and utilisation in the matter of other undiscovered oil-yielding kernels.

According to Kew Report 1877, the M'poga nut exudes abundantly oil on pressure by the fingers,

Year.	Articles.	Countries whence imported.	Quantities.		Value.	
			Tons.	Total.	£	Total.
1878	Nuts and kernels	West Coast of Africa (foreign)	10,373		142,851	
		,, ,, (British)	2,298		30,973	
		The Gold Coast	11,150	Tons. 23,821	158,720	£ 332,544
1879	,, ,,	West Coast of Africa (foreign)	11,629		158,571	
		,, ,, (British)	2,748		33,994	
		The Gold Coast	9,666	24,043	131,094	323,659
1880	,, ,,	West Coast of Africa (foreign)	17,172		235,927	
		,, ,, (British)	1,615		20,133	
		The Gold Coast	15,999	34,786	215,694	471,754
1881	,, ,,	West Coast of Africa (foreign)	16,396		199,108	
		,, ,, (British)	1,966		22,079	
		The Gold Coast	5,699	24,061	65,724	286,911
1882	,, ,,	West Coast of Africa (foreign)	24,943		290,325	
		West Africa Settlements	6,979		80,015	
		The Gold Coast	9,963	41,885	113,969	484,309
1883	,, ,,	West Africa Settlements (British)	3,537		44,285	
		The Gold Coast (British)	11,369		146,022	
		West Africa (foreign)	24,130	39,036	300,609	490,916
1884	,, ,,	West Africa Settlements (British)	5,050		66,518	
		The Gold Coast (British)	15,820		218,892	
		West Africa (foreign)	22,502	43,372	314,298	599,708
1885	,, ,,	West Africa (British)	17,794		212,738	
		,, (foreign)	16,713		194,118	
				34,507		406,856

Gambia Export.

Year.	Articles.	Countries to which exported.	Quantities. Tons.	Quantities. Total.	Value. £	Value. Total.
1879	Ground Nuts	Great Britain	1,732		13,852	
		France	20,452		163,620	
		Windward Coast	599		4,792	
		British West Indies	107		857	
				Tons. 22,890		£ 183,121
1880	,, ,,	Great Britain	481		3,852	
		France	13,343		106,743	
				13,824		110,595
1881	,, ,,	Great Britain	1,416		9,915	
		France	15,170		106,192	
		Windward Coast	143		1,003	
		British West Indies	229		1,602	
				16,958		118,712
1882	,, ,,	Great Britain	3,256		29,306	
		France	16,833		151,496	
		Spain	267		2,399	
		Holland	2,399		21,587	
		America	273		2,457	
		Italy	1,057		9,510	
		Windward Coast	1,439		12,946	
				25,524		229,701

1883	,,	,,	Great Britain	4,178		34,502	
			France	16,707		119,202	
			Italy	1,292		9,505	
			America	157		1,321	
			Madeira	635		5,000	
			Goree	107		634	
					23,076		170,164
1884	,,	,,	Great Britain	761		6,851	
			France	13,364		100,793	
			Italy	3,033		23,945	
			Madeira	547		4,298	
			Teneriffe	387		2,705	
			Grand Canary	3		27	
			America	307		2,766	
					18,402		141,385
1885	,,	,,	Great Britain	263		2,245	
			France	9,305		64,243	
			Italy	854		6,151	
			America	437		3,174	
			Gibraltar	284		2,243	
			Madeira	1,175		8,891	
			Goree	34		160	
			Etc.	00·5	Tons.	5	
					12,352·5		87,112

which is said to be the richest and most fluid oil known, yielding on pressure 80 per cent. Of the Dika nut it is stated, "Another remarkable production is the Dika almond, which on strong pressure yields from 65 to 70 per cent. of grease resembling the butter-cocoa, fusible at 122° F., and fitted for the manufacture of soap."

And of the Niko nut I give the following analysis by Mr. I. A. Voeleker, which I have taken from Kew Report 1881:—

Oil (of a yellow colour, readily drying into a thick varnish-like mass)	59·43
Albuminous compounds (containing ·75 nitrogen)	4·69
Sugar, gum, mucilage, &c.	29·75
Woody fibre (cellulose)	3·60
Mineral matter (ash)	·94
Moisture	1·59
	100·00

I may here remind my readers of the seed of the Shea butter tree (*Butyrospermum Parkii*), and the butter or tallow tree of Sierra Leone (*Pentadesma butyracea*), and of the physic (*jatropha curcas*) and castor-oil (*Ricinus communis*) nuts.

The chief centre of the ground-nut crushing industry is Marseilles: and at Harbourg, Bordeaux, Dunkirk, Nantes, Caen, there are important mills.

The finest ground-nut oil is used as a substitute for and mixture with olive: it is also used in Holland in the manufacture of butterine: the next qualities are good for lubricating and engine oils, while the inferior

qualities are used in the manufacture of soap and for lighting. The nut is also used in confectionery.

From the West Coast of Africa (Niger and places to windward of Sierra Leone being somewhat exceptions) this nut is exported in the shell: from the South-West Coast, shelled or decorticated.

From the countries to windward of Sierra Leone —inclusive of and chiefly from Senegal and Gambia— there is exported the bulk of this commodity.

I am advised that in Cajor of Senegambia is generally grown the finest nut: next come Rufisque, Saloum and upper Gambia: from the lower Gambia, Casamance, Boulama, Rio Nunez and the interjacent rivers as far as Sierra Leone, go inferior nuts.

Kernels that have properly matured, large and heavy, clean and fresh, are of most value to the crushers, and therefore command the higher price.

The extended culture of ground-nuts, not only in India and North America, but also in South America, East and South Africa, and Spain, has affected sensibly this West African staple product; as also have rash and short-sightedly premature gatherings of crop, variability of seasons, and intertribal wars.

In verbal illustration of the foregoing, I would mention, as I have been informed by Monsieur Bohn, that in the year 1876 the port of Marseilles received:

From W. C. Africa	about 40,000 tons	(in shell).
,, S. America, Spain, India.	700 ,,	,,
,, Mozambique and Congo	3,325 ,,	(shelled).
,, India	11,000 ,,	,,

At the same port, for 1885, the receipts were:

From W. C. Africa	about 35,000	tons (in shell).
,, S. America and Spain	1,500 ,,	,,
,, Mozambique and Congo	8,180 ,,	,,
,, India	62,000 ,,	,,

While in the first eleven months of 1886 there were received into Marseilles:

From W. C. Africa (50 per cent. of which came from Senegal) . . .	about 12,600	tons (in shell).
,, S. America and Spain	255 ,,	,,
,, Mozambique and Congo	1,100 ,,	(shelled).
,, India	68,000 ,,	,,

In the year 1880 there was the most prosperous season on the West Coast of Africa for this commodity, when the receipts in Marseilles alone reached 72,000 tons.

Detailed particulars will be found on pages 52–3 of the export trade from the Gambia in the ground nut, which in Senegambia and Her Majesty's settlements adjoining forms the chief and principal article of export—the local commercial idol—and accordingly deserves more notice here than to be allowed to be generally absorbed, as is the case in the general Table of nuts and kernels imported into the United Kingdom.

Writing on the staples of Africa to Mr. Martin (British Colonies) in 1842 or 1843, Mr. Mathew Foster, to whom I have elsewhere alluded by quotation, conveyed on the *Arachis hypogæa*: "I have

lately been attempting to obtain other oils from the Coast, and it was only yesterday I received from the hands of the oil presser the result of my most recent experiment on the ground nut, which I am happy to say is encouraging. I send you a sample of oil extracted from them. They are from the Gambia." And he went on in the same letter to say, on the kernel of the *Elais guineensis:* "I lately received from Cape Coast a quantity of the palm nut from which the palm oil is previously obtained, for the purpose of examining the kernels to see whether they would not yield an oil worth extracting. I send you a sample of the nuts, and one of the candles made from the stearine obtained from them."

Here we have proof that, although the palm-oil industry has existed since 1790, if not before, yet the valuable palm kernel on the Gold Coast did not attract attention until 1842 or 1843, when also the ground-nut industry, at least in the Gambia, had its birth.

Then, in proof of how little may mar or promote trade in West Africa, I may relate here particulars of an incident to which, if it has not owed its birth, yet the palm kernel trade of the Gold Coast owes indeed much of its youth and manhood.

After the Proclamation of the Abolition of Slavery in 1874 (towards its end), my old friend Sir George Strahan, then Governor of the Gold Coast Colony, now of Hong Kong, made a tour of inspection through Aquapim, Croboe, and the Valley of the Volta. His

attention was attracted to large heaps, in numbers, of rotting palm-nuts which presented themselves, in the kingdom of Croboe, continually to our gaze. I may here remark upon the cause, which was to the effect that the cracking of the nut had been proclaimed against by the fetishmen, and their reason for the prohibition was that it gave small-pox. At a large public meeting which Sir George Strahan held at Odumasseh, in Croboe, he pronounced to the king, chiefs, and people against the stupid absurdity of the edict of the fetish, pointed out the riches that were being allowed to rot at their very doors, and expressed the wish that the king should remove the blindness from the eyes of his people in this matter. His wishes were promptly attended to, for that very evening, and for some time after, a gong was beaten throughout Croboe to the effect that henceforth palm kernel nuts could be cracked, and that the kernels could be taken to the traders and merchants.

The following Tables of exports in palm kernels for the past seven years from the Gold Coast and the other West African Colonies will show the extent to which this industry has grown (pp. 59, 64).

The old and respected firm of W. B. Hutton and Sons, then established in London—now in Liverpool and Manchester—was the first to import regularly (about 1848) kernels into the United Kingdom, after which several years passed by before crushers would use them.

Year.	Article.	Countries to which exported.	Quantities. Tons.	Value. £	Total. £
1879	Palm kernel . . .	Great Britain	11,666 3 0 14	141,315	
		France	9,562 16 0 9	98,251	
		Germany	6,611 10 0 0	79,879	
					319,445
1880	,, . . .	Great Britain	15,100 12 0 11	172,187	
		France	3,689 4 1 17	37,091	
		Germany	10,841 16 0 4	136,468	
					345,746
1881	,, . . .	Great Britain	7,457 7 3 3	83,131	
		France	4,286 17 3 4	45,932	
		Germany	8,477 0 0 0	87,884	
		America	300 0 0 0	2,700	
		Brazil	280 2 1 14	1,988	
					221,635
1882	,, . . .	Great Britain	13,680 4 1 26	133,691	
		France	2,522 10 3 8	24,215	
		Germany	11,400 10 2 5	94,108	
		Brazil	385 0 0 0	3,850	
		America	603 10 0 0	5,331	
					261,195
1883	,, . . .	Great Britain	11,725 8 0 1	125,200	
		France	2,352 16 2 12	25,090	
		Germany	11,742 7 0 16	128,012	
					278,302
1884	,, . . .	Great Britain	7,835 2 2 19	80,261	
		France	533 5 2 19	6,621	
		Germany	21,070 7 2 2	236,898	
*		Brazil	333 15 2 0	3,566	
					327,346

* 1885 not received.

GOLD COAST.

Year.	Article.	Countries to which exported.	Quantities.				Value.	
			Tons.				£	Total. £
1879	Palm kernel	United Kingdom	5,192	0	0	0	43,913	
		Germany	811	0	0	0	7,598	
		Hamburg	22	0	0	0	164	
		France	17	0	0	0	128	
		America	175	0	0	0	1,313	
								53,116
1880	,,	United Kingdom	9,511	16	3	6	82,320	
		U. S. America	2	2	1	19	20	
		Germany	1,804	14	2	9	18,067	
		France	71	13	0	0	654	
		Holland	57	5	0	0	605	
								101,666
1881	,,	United Kingdom	4,752	9	3	6	35,285	
		Germany	1,497	4	0	27	11,961	
		France	35	0	0	0	236	
		Assine	3	11	1	20	26	
								47,508

1882	,,	Assine	10	0	0	0	90	
		France	238	8	0	24	696	
		Germany	606	14	1	26	6,175	
		Grand Bassam	43	6	2	15	72	
		United Kingdom	6,947	3	3	23	41,059	
		U. S. America	309	17	1	11	2,225	
								50,317
1883	,,	France	496	3	3	9	4,262	
		Germany	2,188	17	2	25	17,871	
		Grand Bassam	36	15	0	0	248	
		United Kingdom	4,706	14	0	12	39,163	
								61,544
1884	,,	Brazil	333	15	2	0	3,566	
		France	882	5	2	19	7,530	
		Germany	24,229	4	0	8	266,843	
		United Kingdom	13,256	13	3	17	125,937	
								403,876*
1885	,,	United Kingdom	8,952	9	2	18	79,744	
		France	5,040	0	1	15	51,879	
		Germany	20,502	19	0	25	191,526	
		Portugal	675	19	3	19	6,871	
		U. S. America	459	19	3	8	3,612	
		Kotonu	165	0	0	0	1,485	
								335,117*

* Includes Lagos exports.

Year.	Article.	Countries to which exported.	Quantities.	Value.	
			Bushels.	£	Total. £
1879	Palm kernel	Great Britain	157,419	18,141	
		France	353,063	95,228	
		Windward Coast	2,075	413	
		Leeward Coast	701	210	
					113,992
1880	,,	Great Britain	54,586	16,180	
		France	282,498	82,564	
		Germany	25,399	7,640	
		Windward Coast	3,835	838	
					107,222
1881	,,	Great Britain	79,874	20,319	
		France	270,079	74,291	
		Germany	38,962	10,331	
					104,941
1882	,,	Great Britain	75,352	18,033	
		,,	cwts. 78,517 1 21	34,561	
		France	bush. 35,254	7,330	
		,,	cwts. 57,109 2 13	24,887	
		Germany	bush. 39,069	9,189	
		,,	cwts. 15,188 2 6	7,128	
		Windward Coast	122 1 2	35	

			83,547	3 13	27,127	
1883	,,	France	76,835	2 22	32,099	
		Germany	51,387	1 18	22,145	
		Windward Coast	1,306	2 2	208	
						81,579
1884	,,	Great Britain	97,893	3 2	42,380	
		France	41,217	1 5	22,900	
		Germany	54,492	0 10	2,884	
		Windward Coast	108	3 24	47	
		America	420	3 27	167	
						68,378
1885	,,	Great Britain	62,558	2 14	26,813	
		France	136,631	1 11	49,391	
		Germany	1,092	3 9	443	
		America	210	3 10	82	
		Windward Coast	2,152	0 2	74	
						76,803

GAMBIA.

Year.	Article.	Countries to which exported.	Quantities.				Value.	
			Tons.				£	Total. £
1879	Palm kernel . . .	France	40	17	3	14	382	382
1880	,, . . .	Great Britain	28	0	2	13	262	
		France	200	11	1	19	1,872	2,134
1881	,, . . .	Great Britain	42	9	1	7	339	
		France	25	7	0	7	207	
		Windward, including Goree, Senegal, Cape de Verde .	41	0	0	0	328	874
1882	,, . . .	Great Britain	18	9	3	13	337	
		France	325	17	3	20	772	
		Italy	11	0	0	0	132	
		Windward	2	14	3	0	3	1,244
1883	,, . . .	Great Britain	25	2	0	12	235	
		France	117	1	0	6	989	1,224
1884	,, . . .	Great Britain	23	9	0	21	235	
		France	63	15	1	10	582	
		Teneriffe	31	13	3	0	318	1,135
1885	,, . . .	Great Britain		246	0	9	123	
		France		3,995	1	15	1,971	
		Leeward Coast		232	0	13	107	2,201

These nuts are cracked one by one by the natives, by means of manual labour and the use of a rough stone (what a loss of time and labour!). At various times kernel-breaking machines have been introduced into West Africa, but have so far not been appreciated.

As is understood, but should be better known, the value of kernels depends on their cleanliness, freedom from adulteration or soaking, freshness, and consequent richness.

I am informed that the best kernels come from the Oil Rivers and Lagos: the worst from ports to windward.

Sandy beaches and sandy hills and banks adjacent to and along the sea edge represent conditions of site essential to and favourable for the growth of the cocoa-nut tree. Such sites to a vast extent exist along the Bight of Benin and Biafra, where groves of this tree are to be seen flourishing; yet the copra industry is but little known, and comparatively undeveloped, and in the Gold Coast and Lagos Colonies there is offered a ready and rich field of fairly large promise.

Copra, worth now about £14 per ton, properly dried yields over 60 per cent. of oil and under 40 per cent. meal. Its oil brings in £26 per ton.

The extent of copra and beni-seed industries and exports may be estimated from the following statistics, pages 66, 67, 68, 69, for five years: they are capable of considerable and profitable extension.

The development of the growth of the cocoa-nut

Year.	Article.	From what Colony.	Direction of Export.	Quantities.	Total.	Value.	Total.
1881	Beni-seed .	Sierra Leone .	United Kingdom.	bush. 285		£ 136	£
			France . . .	27,154		3,521	3,657
					27,439		
1882	,,	,, .	United Kingdom.	bush. 2,233		663	
				cwt. 782 1 19		416	
			France . . .	bush. 24,129		4,337	
				cwt. 7,434 3 24		4,527	
			Windward Coast.	127 1 9		58	
							10,001
1883	,,	,, .	United Kingdom.	cwt. 3,502 2 23		1,749	
			France . . .	16,056 3 25		7,301	
			Germany . . .	119 0 13		60	
			Windward Coast.	1,437 2 28		610	
					21,116 2 3		9,720
1884	,,	,, .	United Kingdom.	cwt. 1,590 1 21		851	
			France . . .	6,920 0 3		2,913	
			America . . .	54 3 8		12	
					8,565 1 4		3,776
1885	,,	,, .	United Kingdom.	cwt. 347 1 23		46	
			France . . .	6,111 0 26		2,008	
					6,458 2 21		2,054

Year.	Article.	From what Colony.	Direction of Export.	Quantities.		Value.	
				Tons.	Total.	£	Total.
1881	Beni-seed .	Lagos . . .	United Kingdom.	3 5 3 6		32	
			America . . .	2 10 0 0		22	
			Germany . . .	3 15 2 21		34	£ 88
1882	,, .	,, . . .	United Kingdom.	192 15 2 2	9 11 1 27	1,789	
					192 15 2 2		1,789
1883	,, .	,, . . .	United Kingdom.	402 13 0 25		3,760	
			France . . .	20 0 0 0		170	
			Germany . . .	67 16 1 22		665	
					490 9 2 19		4,595
1884	,, .	,, . . .	United Kingdom.	132 13 1 14		1,092	
			Germany . . .	33 6 3 17		279	
					166 0 1 3		1,371
1881	Beni-seed .	Gold Coast . .	United Kingdom.	0 0 1 24		3	
1882	...	...	... ...	...		...	
1883	...	...	... ...	...		...	
1884	,, .	,, . .	Germany . . .	36 6 3 17		279	
			United Kingdom.	132 13 1 4		1,092	
					169 0 0 21		1,371
1885	,, .	,, . .	United Kingdom.	17 15 3 14		168	
			France . . .	1 8 1 10		12	
			Germany . . .	5 12 1 10		49	
					24 16 2 6		229

Year.	Article.	From what Colony.	Direction of Export.	Quantities.	Value.
					s.
1881	Beni-seed .	Gambia . . .	France	120 lbs.	12
1882	,, .	,, . . .	,, ...	21 bush.	82
1883	,, .	,, . . .	,, ...	250 lbs.	40
			United Kingdom . .	185 ,,	22
1884	...	...	... ...	...	...
1885	,, .	,, . . .	France	159 ,,	15

(As regards output as compared with what should be the annual yield, how farcical seem the foregoing illustrations.)

				Tons.	Total.	£	Total.
1881	Copra . .	Gold Coast . .	United Kingdom . .	79	79	756	£ 756
1882	,, . .	,, . .	United Kingdom . .	32	32	292	292
1883	,, . .	,, . .	France	1		10	
			Germany	5		15	
			United Kingdom . .	109	115	1,252	1,277
1884	,, . .	,, . .	France	2		3	
			Germany	7		80	
			United Kingdom . .	253	262	1,529	1,612
1885	,, . .	,, . .	United Kingdom . .	57		615	
			France	17		41	
			Germany	12	86	108	764

Year.	Article.	Port.	Country.	Quantities: Bags.	Quantities: Total.	Value: £	Value: Total. £
1881	Copra . .	Sierra Leone .	United Kingdom . .	63		40	
			France	7		5	
					70		45
1882	,, . .	,, ,, .	United Kingdom . .	2		3	
			France	1,871		74	
			Gambia	2		1	
			Goree	8		2	
					1,883		80
1883	,, . .	,, ,, .	United Kingdom . .	87		49	
			Germany	10		2	
			Gambia	6		1	
			Goree	9		11	
					112		63
1884	,, . .	,, ,, .	United Kingdom . .	13		13	
			France	2,564		366	
					2,577		379
1885	,, . .	,, ,, .	France	40		31	
			,, ...	1,872 lbs.		10	
							41

(For same years export from Gambia has been *nil.*)

Year.	Article.	Port.	Country.	Quantities: Tons.	Quantities: Total.	Value: £	Value: Total. £
1881	Copra . .	Lagos . . .	United Kingdom . .	10		152	
			Germany	9		133	
					19		285
1882	,, . .	,, . . .	United Kingdom . .	2		27	
					2		27
1883	,, . .	,, . . .	United Kingdom . .	4		61	
					4		61
1884	,, . .	,, . . .	United Kingdom . .	2½		37	
					2½		£37
*							

* 1885 not received.

proceeds in the Lagos Colony in the hands of the Government, whose lead has been followed to some extent by the natives. Such efforts, with appreciable later commercial advantages, should be followed up by the establishment of Botanic Stations, Model Farms, or Nursery-gardens.

The conditions of soil on the strips of land that lie for hundreds of miles along West Africa between the inland waters (lagoons) that run parallel to the coast-line and the sea are so favourable to this growth that there should be in time a large export trade in copra and coir. It has much astonished me to find that a large and important firm in West Africa, with extensive crushing mills in Germany, should have to establish in Fiji for copra, knowing as I do that there is annually available along West Africa an abundant harvest sufficient for a considerable export.

For the benefit of those whom it may concern, I would remark that in the Gold Coast and Lagos Colonies nuts should in quantity be procured at $\frac{3}{8}d.$ each; and, with an estimate that it would take, say, 4,000 to 6,000 nuts to yield a ton of oil of value in the home market £26, we have a purchase outlay for material of £6 5*s.* to £9 7*s.* 6*d.* against the home price. The freight may be put down at 30*s.* to 40*s.* additional. Thus for manufacture, other incidental expenses and profit, there is left a margin of £15 to £18 in round numbers on each ton of oil. And here I take no account of the value of the coir.

In the Portuguese Possessions the ground-nut is largely cultivated. Monteiro, in his 'Angola and the Congo,' describes the industry as follows :—

"The native name for it is 'mpinda' or 'ginguba,' and it is cultivated in the greatest abundance at a few miles inland from the coast, where the comparatively arid country is succeeded by better ground and climate. It requires a rich soil for its cultivation, and it is chiefly grown therefore in the bottoms of valleys or in the vicinity of rivers and marshes."

* * * * *

"The greater part of the several thousand tons of nuts that at present constitute the season's crop in this part of the country is grown in the Mbamba country, lying parallel with the coast at a distance of from thirty to eighty miles inland, or at the first and second elevation."

So as to attract attention, I give here from Cameron's 'Across Africa' his account of the Mpafu tree of Tropical Africa, which is described in Kew Report, 1880, as an oil-producing tree of great value :—

"On this march (through the Uguhha country W. of Lake Tanganika, long. 29° 30′) I first saw the 'mpafu,' from which the scented oil is obtained. It is a magnificent tree, often thirty feet and more in circumference, and rising to eighty or a hundred feet before spreading and forming a head, the branches of which are immense. The oil is obtained by soaking the fruit, which has some resemblance to an olive,

for a few days in large pits of water, and when the oil collects on the surface it is skimmed off. It is usually of a reddish colour, very pure and clear, with an agreeable smell. Under the bark are great masses of scented gum, used by the natives in fumigating themselves."

This tree, or something closely allied to it, is, according to Dr. Welwitsch, to be found in West Africa.

The tiger nut, the tuber of the *Cyperus esculentus*, is well known in West Africa, and might be grown to any required extent. It is called by the French *souchet comestible* or *Amande de terre*, and is used as food in the south of Europe. It is used in West Africa symbolically as love messages, &c. On the Gold Coast it is eaten raw by the natives: it is also cooked (boiled down), with a result something like to custard flavoured with chocolate.

According to Dr. Royle, these tubers when roasted have been proposed as a substitute for coffee and cocoa. Indeed the idea has also occurred to myself, both as regards the tiger and ground (*arachis*) nuts.

The adulteration of produce, especially palm oil and palm kernels, has for some time and does form a peg on which the members of the mercantile world in those parts hang their hat of discontent—and naturally, so long as they act as they are accustomed to do.

Representations have been repeatedly made in the Gold Coast and Lagos Colonies on the adulteration of palm oil by the addition of water and agidi (ground

Indian corn boiled). It was the opinion that penal legislation that existed was and is sufficient to reach offenders and offences of the kind complained against.

Notwithstanding, at Lagos in 1879, the mercantile agents aimed at being empowered by further legislation to proceed against persons found in the act of adulteration, or in mere possession of adulterated kernels, without the necessity of having to wait, as the law stood and required, and I think stands, for the completion of a fraud by such possessors.

One can understand the irritation caused by the soaking of palm kernels, almost under the eyes of the intended purchasers, and by the prospective loss of 15 per cent. in consequence ; but the keen and short-sighted competition, and the reckless and dishonest credit that prevail amongst buyers, are assisting the adulterators of oil and kernels.

In my opinion the remedy was and is in a great measure in the hands of the merchants and agents themselves, who for instance in the matter of the purchase of palm kernels, if they combined together, which they will never be got effectually to do—and perhaps it is as well—could remove almost entirely the evil complained of by their purchasing by measure, as is done elsewhere on the Coast, instead of by weight, as now. The object, viz. increased weight, on account of which adulteration is resorted to, being thus removed, there would be no further reason for its continuance.

OIL-PRODUCING SEEDS.

No.	English Name.	French Name.	Scientific Name.	Field of Supply.	Price per cent. kilos raw material.
					francs.
1	Ground nut (in shell)	Arachides	*Arachis hypogea*	Rufisque, Senegambia	31
	,, ,,	,,	,, ,,	Gambia	25
	,, ,,	,,	,, ,,	Between Gambia and Sierra Leone	22
	Ground nut (shelled)	,, décortiquees		India (Coromandel)	22
2	Rape seed	Colza	*Brassica Napus oleifera*	India (Calcutta, Kurrachee)	26
3	Cocoa-nut	Coprah	*Cocos nucifera*	Singapore, Fiji	37·50
4	Cotton seed	Coton	*Gossypium herbaceum*	North America, Egypt	21
5	Linseed	Lins	*Linum usitatissimum*	India (Bombay)	25
6	Palm kernel	Palmistes	*Elais guineensis*	Lagos, Gold Coast	27
	,,	,,	,,	Sierra Leone	25
7	Poppy seed	Parots	*Papaver somniferum*	India (Calcutta)	22
8	Purgeira seed	Pulgheres	*Jatropha curcas*	Cape Verde Islands	18·50
9	Castor-oil seed	Ricins	*Ricinus communis*	India (Bombay, Coromandel)	21·50
10	Beni-seed	Sésames	*Sesamum indicum*	Levant	40
	,,	,,	,, ,,	W. C. Africa	30/31
	,,	Gingelly or Jeel seeds	,, ,,	Bombay (Kurrachee)	31
	,,	Gingelly seed	,, ,,	India (Coromandel)	25
11	Niko seed		*Parinarium sp.*	Liberia	
12	M'poga seed		,, ,,	Gaboon	
13	Dika almond		*Irvingia Barteri* (*Mangofera gabonensis*, from resemblance to mango)	W. Tropical Africa	

One kilogramme = 2·205 lbs. Avoirdupois.

Oils.			
Yield in Oil per cent. kilos raw material.	Price for each per cent. kilos of Oil produced.	Uses to which put.	Principal Markets.
31	1st pressure 120	Substitute for butter	Rotterdam, Bordeaux, Marseilles, Nantes, London, Dunkirk.
	2nd ,, 100 3rd ,, 75	,, for salad oil	Marseilles, Bordeaux.
30	1st ,, 95	,, ,,	Marseilles, Bordeaux, Dunkirk, Genoa.
	2nd ,, 80 3rd ,, 70	,, for cooking oil	Marseilles, Bordeaux.
30	1st ,, 70 2nd ,, 60 3rd ,, 50	Lighting and cooking. Soap manufacture	Marseilles, Hamburg.
36/37	48/46	Lubricating, soap manufacture	Marseilles, Antwerp, Nantes.
40	57	Burning	Dunkirk, Antwerp, Hull, London.
62/63	57	Soap and candle manufacture	Marseilles, Hamburg, Liverpool, Lisbon.
20	1st pressure 110 2nd ,, 80	Cooking and lighting	Hull, Marseilles.
37/38	54/55	Paint	Hull, London, Marseilles.
45	58	Soap manufacture	Marseilles, Hamburg, Liverpool, Rotterdam, Nantes.
41/42	58	,,	
42/43	1st pressure 60 2nd ,, 47	Substitute for salad oil Soap manufacture	Marseilles, Dunkirk.
35	47	,,	Marseilles.
42/44	56/52	Dyeing, medicine, lubricating	Marseilles, Genoa.
50	1st pressure 95/100 2nd ,, 75 3rd ,, 50	Substitute for olive Soap manufacture	Marseilles, Genoa, Bordeaux.
48	1st ,, 75/70 2nd ,, 60 3rd ,, 50	Substitute for olive Soap manufacture	Marseilles.
46/47	1st ,, 75 2nd ,, 60 3rd ,, 50	Substitute for olive Soap manufacture	Marseilles, Genoa, Bordeax, Nantes.
46/47	1st ,, 52 2nd ,, 3rd ,, 49	Lighting Soap manufacture	Marseilles, Nantes.
120/160/		Fit for soap manufacture	
130/140			

One kilogramme = 2·205 lbs. Avoirdupois.

So far there does not exist any tax on palm oil or oil-producing nuts and kernels on their import into the United Kingdom: such immunity also is enjoyed on their export from British Possessions, West Africa, with the exception of the Gambia, where is levied a duty of 6*s.* 8*d.* per ton of 2,240 lbs. net weight on ground nuts exported; and of Sierra Leone, where is charged 1*d.* per imperial gallon on palm oil, 2*d.* per cwt. on palm kernels, beni-seed, and decorticated ground-nuts, and 3*d.* on last-mentioned in shell.

For the information and guidance of cultivators and commercial men, there is given a Table of the principal oil-yielding seeds (with purposes to which put) that find their way to the markets of European and American countries. I also show whence they come, their yield and value. For much of this information I am indebted to Herr Heldbek of the German house of Gaiser, Hamburg; and to Monsieur Bohn, the enterprising Managing Director at Marseilles of the Compagnie du Sénégal et de la côte occidentale d'Afrique. (See Tables, pp. 74, 75.)

The foregoing Return is divided, it will be observed, into two parts. The first relates exclusively to the seeds: the second to the oil therefrom.

I understand that the price of oil extracted from the same seeds (I would mention ground-nut and beni-seed) varies according to the pressure: the first yielding the best, a fine bright oil which admits of its competing with ordinary olive oil, with which it is not

unfrequently mixed; the second and third pressures yield an inferior quality.

The last column in the first Return shows the present price of the seeds per each hundred kilos (or two cwts.): the first column in the second shows the yield percentage from each hundred kilos of seed: while the second embodies the price for each hundred kilos of oil produced, which varies according to the pressures.

IV.

RUBBER. — Rubber has for some time taken a prominent place among the exports of the French and Portuguese Possessions on this Coast, to the shame of our English Colonies, with the exception of Sierra Leone, where a trade in this article has shown marked progress, increasing in value from £37,796 in 1878, to £126,806 in 1882.

As the statement of trade already referred to includes, as far as the West African Settlements are concerned, the following particulars as made up of exports from Gambia and Sierra Leone (which is deceptive, the former Settlements having only begun a trade in rubber in 1882), I accordingly furnish separately the Gambia rubber export after the following return of what has been received as the export trade in the same article from the West African Settlements, composed of Sierra Leone and Gambia, for eight years ended and inclusive of 1885 :—

Article.	Year.	Quantities.	Value.
		cwts.	£
Caoutchouc (*See note* (*), *p.* 79.)	1878	4,910	37,796
	1879	3,808	31,524
	1880	7,104	84,815
	1881	9,000	96,634
	1882	11,207	126,806
	1883	11,353	131,001
	1884	12,698	127,283
	1885	6,979	62,384

The exports from the Settlements on the Gambia to Europe and America for the same period have been (their distribution will be found at page 93) :—

Article.	Year.	Quantities.	Value.
			£
Caoutchouc.	1878	...	...
	1879	...	...
	1880	...	...
	1881	...	...
	1882	2 pkts. 273 lbs.	114
	1883	52,003 lbs.	6,048
	1884	257,285 ,,	23,142
	1885	42,179 ,,	2,671†

In 1883 there were imported into the Gambia from the Windward Coast 141 lbs. of rubber, at a value of £11 ; and from the Leeward Coast 6,422 lbs., at a value of £341. The exports direct from the Gambia in the same article for 1883 were, to Great Britain, 41,755 lbs., valued locally at £5,107 ; to France, 4,453 lbs., valued locally at £361 ; and to Goree, 5,800 lbs., valued locally at £580. In 1884, there were imported into the Gambia—from Windward Coast, 3,120 lbs., valued at £189 ; from Sierra Leone, 98,560 lbs., valued at £9,680 ; and from Leeward Coast, 1,675 lbs., valued at £134. These exceptionally heavy imports swelled correspondingly the exports for that year.

I am unable at present to give botanically the

* Annual Statement, 1885, of the Trade of the United Kingdom with Foreign Countries and British Possessions.

† Imports into Gambia 1885 were from Goree 921 lbs. = £60, and from Windward Coast 1,736 lbs. = £87.

names of the trees from which Gambia rubbers are obtained. It will be however something to record the names by which they are known in the country, for such information will give a clue for following up the matter, and for securing specimens of leaf, flower, and fruit of each tree, to admit of its classification scientifically.

There seems to be in the vicinity of the Gambia, so far known, two kinds of rubber—the one white elastic, and very like in substance, as also in bark wood and in fruit (according to description), to the rubber obtained from the *Landolphia owariensis* of the Gold Coast, called in Yoruba "ibo."

The tree producing this is called in Volof "tawl," and in Mandingo "pholey."

The second kind of rubber is obtained from a tree called in Volof "maddah," and in Mandingo "cabbah": is much inferior in quality.

It is generally considered locally that the first comparatively high price per pound, viz. 2*s*., paid at the Gambia caused such a run to be made for its collection, that quantity not quality seemed to have been, and seems to be, the order of the day.

The result has been that the quality so deteriorated that the price considerably fell, and the natives who collected rubber were disappointed—a sad issue, and one that should be avoided in the development of fresh industries in West Africa—the sequence of the, however praiseworthy as a stimulant, yet short-

sighted commercial policy resorted to at the beginning of this industry. Fluctuations in the industry and a bad article have been the consequences, which we must hope are but temporary and removable. Competition and rivalry are so rife among commercial houses, that it seems merely a case of every one for himself.

Notwithstanding, rubber has been within my knowledge refused at Bathurst, and had to be taken to and was accepted by French trading branches of the same Firm outside the River Gambia, where bulk, not profit of business, was seemingly aimed at. The best Gambia rubber, viz. "tawl," when clean, is now worth in European markets from 1*s.* 8*d.* upwards per lb. The local price at which it is purchased is 1*s.* 4*d.* to 1*s.* 6*d.* per lb. The inferior kind, viz. "maddah," hovers as to price around 1*s.* per lb.

The process of collecting, as regards the reckless tapping of the trees at the Gambia, is somewhat similar to practice elsewhere, either by wounding by direct and deep incisions, or by slicing the bark to any depth, or by removing wholesale lengths of the vine. As the juice exudes, salt water (sea-water weakened to a known strength by the addition of fresh water) is sprinkled on the same from a bottle (of glass, or a gourd—"calabash") by experienced hands, with the result of bringing about rapid coagulation, and subsequent rolling off in a ball (as twine) of the coagulated matter. Where sea-water is not available, a solution—one part salt, and three parts water—is

made from the salt of commerce, which when it has to be resorted to would render in countries in West Africa the collection of rubber more difficult and more expensive ; for, as I have said elsewhere, the sale of salt acts as a barometer of the state of the intertribal relations of the Interior : it is often used as currency, or means of barter, showing its importance. With petty warfare proceeding in the Interior—a normal condition of things—and with roads blocked, or rather trade routes obstructed, as a sequence, the trade in this much-coveted article (salt) is small, as compared with its disposal in peaceful times.

Again, it is found that rubber-yielding vines have to be sometimes sought beyond Governmental jurisdiction—due to reckless deforestation in part of our Colonies—where the industry has at times to be pursued under great difficulties, represented by jealousy entertained by owners of soil and forests against intruding and sometimes inconsiderate collectors or hunters, usually experienced and alien hands, who indeed run great personal dangers associated with loss of collection, the distinction between "meum" and "tuum" having been temporarily overlooked : indeed such collectors have not always right on their side, for they as often as not trespass without leave or license from owners of soil.

In their own interests the collectors should be careful, and make it a golden rule to respect the legitimate rights of others, to put on the market as

clean an article as they can, to avoid mixing juices which should be kept separate and distinct, devoid of bark, mud, stone, or other extraneous matter ; and for their own credit, as well as for the general interest, they should avoid adulteration, and the use towards such an end of the articles mentioned.

Grand fields in the Gold Coast and Lagos Colonies for the extended general development of this industry attracted my attention and surprise in 1882, and my action will be now best explained by here repeating what I then wrote on the subject to the Local Press, which I give verbatim, and by following it up by the result :—

"*To the Editor of the* 'Lagos Times.'

"SIR,—The importance to the commercial world, apart from the scientific interest that must attach to the development of its economic botany,—of which so little seems known of this Colony,—induces me to address you in the hope that, through the medium of the Local Press, and thus through the exercise of the influence of such as are interested in the future of West Africa, the Natives of the country may be enlightened to a sense of their own wealth, as also to an interest in its acquisition, and that thus fresh exports may be developed to the general advantage of the Colony, and of European and other markets.

"I mean in this letter to confine myself to a few remarks having for their object a move towards the

development of the rubber trade, now remarkable by its absence as regards the Gold Coast Colony.*

"The importance of the encouragement of the promotion of fresh industries other than, I may say, the main and sole one of palm-oil, apart from the economic advantages of rubber in connection with the many and useful purposes to which it is now applied, must be my apology.

"In June last, I had collected some specimens of the tree *Landolphia owariensis*, which I forwarded to the Royal Gardens, Kew. This tree is no doubt to be found everywhere in the Colony; but I can personally bear testimony to the fact that it grows extensively in the countries of Akim, Aquapim and Croboe.

"I may remark that the present commercial sources of African *Caoutchouc* belong principally to the genus *Landolphia.*

"*Landolphia owariensis*, the species from which specimens I allude to were obtained, is a climbing plant with a stem four to six inches in diameter near the ground, but dividing above, climbing along stems and branches of neighbouring trees, supporting itself by a kind of tendril formed of the flower-stalk after the fruit has fallen.

"The fruit is about the size of an ordinary orange, perhaps a little smaller, with a reddish-brown woody

* Prior to 1886 Lagos formed part of this Colony, under Charter of 24 July, 1874.

shell, and an agreeable, sweetish acid pulp; I am informed monkeys are partial to it.

"The rubber is extracted by tapping the stem and branches. This operation is simple. Slices of the rough bark are cut off the surface of the trunk and branches, and also just enough of the true bark until the juice starts out in drops. Great care should be taken not to injure the bark by removing it too deeply.

"The incisions should be from 3 to 10 inches in length and from $\frac{1}{2}$ to $\frac{1}{4}$ inch in breadth. The cuttings ought to be made on only one side of the tree. The method of making the balls of rubber, which may average two inches in diameter, is as follows :—

"A quantity of milk is dabbed upon the fore-arm of the operator, and being peeled off, forms a nucleus. This is applied to one after another of the fresh cuts, and being turned with a rotary motion, the coagulated milk is wound off like silk from a cocoon; for the coagulation is so great, that not only is every particle cleanly removed from the cuttings, but also a large quantity of semi-coagulated milk is drawn out from beneath the uncut bark, and during the process a break in the thread rarely occurs.

"By working hard, a person can collect 5 lbs. of rubber per diem; although the average is only half that amount.

"This one process of collection was described by Mr. F. Holmwood, the Vice-Consul at Zanzibar, who

remarks that, owing to the destruction of trees by the reckless manner in which they were incised for the collection of juice in some districts, the supply has altogether ceased.

"Consul Smith, of Carthagena, also calls attention to the wasteful custom in Columbia, United States of America, rubber-hunters have of cutting down, instead of tapping, every tree from which they extract the rubber; the consequence being that all the trees near some river to which he alludes have been long since destroyed, and the hunters have now to go several days' journey before they can find the rubber. This issue should be impressed on the mind of collectors on the West Coast.

"The exports in this article from the district Mungao and Kilka in 1880 exceeded 1,000 tons, where since the last season the price has risen from £140 to £250 per ton.

"Consul O'Neill, in his Report for 1880 on the Trade of Mozambique, states: 'It is curious to note the marvellously rapid development of the india-rubber industry. In 1873 only £443 worth passed through the Customs House at Mozambique. In 1876 it reached the value of £22,198, and in 1879 it exceeded £50,000. It would seem now to have reached its climax, whilst the present method of collecting this produce prevails, and until communications with the Interior are properly opened up; for the careless cutting of trees by the untaught hands of the Natives

has resulted in the destruction of enormous tracts of india-rubber forest near the Coast.'

"Sir John Kirk of that Coast has stated: 'The plants are certainly not easily killed by the process of collection, as I have seen hundreds in full life so thickly scarred with the cuts, that nearly two-thirds of the bark must have been stripped from the trees.'

"Under a proper system of cultivation it is evident, therefore, that the plant may be more easily preserved than other rubber-yielding trees that are being introduced, and, there is reason to think, will prove of rapid growth. We know, moreover, that it will endure a considerable drought, and that one of the species will flourish in a light sandy soil.

"Mr. Thisselton Dyer, C.M.G., Assistant-Director of the Royal Gardens, Kew, in reporting on the Specimens of Rubber sent to England by me, has been good enough to convey: '*Landolphia owariensis.*—White-rubber. This is the best rubber vine of Western Africa. The rubber, if properly collected, might be sold to almost any extent in the London market.'

"In the prices current for African produce for August, 1882, rubber is quoted at 2*s.* 9*d.* per lb.

"I trust the foregoing may be deemed sufficiently interesting and important to induce you and your readers to do what you can towards the adoption of

measures, having for their object the addition of one more to the industries of the Colony.

"I have the honour to be, Sir,
"Your obedient servant,
"ALFRED MOLONEY,
"*Administrator, Gold Coast Colony.*
"September, 1882."

I have been enabled to secure the Export Returns since date of my letter in September, 1882, from the Gold Coast and Lagos, which show that, while in 1882 and in previous years the export in this commodity was nil, there were, according to the Blue Books, exported in 1883 from the Gold Coast to the United Kingdom 25 tons 17 cwt. 9 lbs. of rubber, valued at £2,371 12*s.*; and in 1884 the export amounted to 99 tons 18 cwt. 2 qrs. 11 lbs., valued at £13,619 17*s.* 7*d.*, with the following distribution, viz.: 13 cwt. 1 qr. 6 lbs. to Germany; 96 tons 19 cwt. 2 qrs. 26 lbs. to the United Kingdom; and 2 tons 5 cwt. 2 qrs. 7 lbs. to the United States of America.

In 1884 a small quantity was imported into the Gold Coast from Assine, and was valued at £13 5*s.*

For the same years there were no imports into Lagos Colony, and the exports therefrom trifling, and represented altogether by a couple of packages at a valuation of £3.

For 1883, 1884, and 1885, the imports, according

to the Annual Statement 1885 of Trade of United Kingdom, from the Gold Coast were as under :—

Year.	Quantities.	Value.
	Cwts.	£
1883	414	4,618
1884	1,552	13,139
1885	4,636	35,471

It will therefrom be observed that in 1885 this industry increased to a value of £35,471.

Further, I learn from many sources that the greatest activity prevails now in rivalry among rubber-hunters and collectors. Further, experienced hands from Sierra Leone and elsewhere have established at certain centres in the Colony as instructors, at so much for so many lessons in the art of best collecting and dealing with the juice of rubber-producing trees.

And as of interest and moment I here quote an extract from a Report of Mr. Thompson, late an Assistant-Inspector of the Gold Coast Constabulary, who in January of 1883 visited the country of Wassaw of that Colony :—

" Mr. J. A. Dawson of Cape Coast is here engaged in the manufacture of india-rubber. He pays the natives *9d.* per quart for the juice of the rubber vine, and with the assistance of one man boils and dries it, obtaining about twelve hundredweight of india-rubber per week.

" He sent a consignment to England in September

last, which realised 2*s.* 11*d.* per pound. The white-rubber vine (probably the *Landolphia owariensis*) grows in profusion in this part of the country, and the natives are beginning to recognise the juice as a valuable article of commerce. The native name of the white-rubber vine is Pauwee."

The black-rubber vine, known to the natives as "Duah Kurrie," grows in even greater profusion than the white, but its juice is not collected, its value, "if it has any, being unknown. I understand that the substance (I am not sure that it is india-rubber) produced from the black juice has not the same elasticity that the rubber made from the white juice possesses."

Of the French Settlements, rubber is classed among the exports of the Senegambia.

Of the Gaboon, where among other botanical products the rubber vine has abounded and resulted in a flourishing and profitable trade, it is well known that there has been almost an extermination of the trees that produced this valued article of commerce, which has now ceased, I am told, to be included among the exports from that part of West Africa.

How different would it have been had there been some system of conservancy or re-forestation, or even had timely advice been tendered and advantageously followed as to the treatment of the trees and the collection of the rubber. This was a regular case of killing the goose for the golden egg, and adds another instance to those mentioned in my previously quoted

Year.	Article.	Countries whence imported.	Quantities. cwt.	Quantities. Total cwt.	Value. £	Value. Total £
1878	Caoutchouc . .	West Africa, Foreign	11,731		86,752	
		,, British	4,980	16,711	38,343	125,095
1879	,, . .	,, Foreign	14,113		124,610	
		,, British	3,820	17,933	31,614	156,224
1880	,, . .	,, Foreign	22,922		276,741	
		,, British	7,271	30,193	86,669	363,410
1881	,, . .	,, Foreign	21,961		231,838	
		,, British	9,000	30,961	96,634	328,472
1882	,, . .	,, Foreign	21,202		261,556	
		,, British	11,271	32,473	127,730	389,286
1883	,, . .	,, Foreign	24,533		298,670	
		,, British	11,767	36,300	135,619	434,289
1884	,, . .	,, Foreign	19,760		169,130	
		,, British	14,250	34,010	140,422	309,552
1885	,, . .	,, Foreign	18,389		167,762	
		,, British	11,615	30,004	97,855	265,617

letter of the result brought about by the reckless destruction of trees. Further, the mercantile world and the Government of the Gaboon are now obliged to busy themselves with the promotion of the growth of the oil palm (*Elais guineensis*), coffee and cacao, &c.

Blind adherence to one industry is not to be advocated, as was proved, though somewhat late, to the cost of many, in some of our Colonies ; but when we have a good thing we should deal with it kindly and tenderly.

The imports of Caoutchouc, classed under general imports, free of duty into the United Kingdom from the West Coast of Africa, during the eight years ended and inclusive of 1885, have been as shown in table on p. 91.

The rubber industry is in its infancy as regards Her Majesty's Possessions on the Gambia, on the Gold Coast, and at Lagos. Let the sad experience here recorded be a lesson both to buyers and collectors in Colonies named, that we may not have also in them to listen to a tale of woe and to the cry of "spilt milk," in consequence of the cessation of the rubber industry by means of the extermination of the trees. For future use I embody the following table of rubber exported from the Gambia, as the trade there is in its childhood, and its growth should be watched with care and interest :—

Year.	Article.	Countries to which exported.	Quantities.	Value. £	Total. £
1879	Rubber	... ...	Nil	Nil	
1880	,,	... ...	,,	,,	
1881	,,	... ...	,,	,,	
1882	,,	Great Britain . .	2 pkgs., 273 lbs.	114	114
1883	,,	Great Britain . .	41,755 lbs.	5,107	
		France . . .	4,453 ,,	361	
		Goree	5,800 ,,	580	6048
1884*	,,	Great Britain .	95,523 ,,	8,471	
		France . . .	133,548 ,,	12,710	
		Goree	13,802 ,,	999	
		Windward Coast .	13,962 ,,	993	
		America . . .	450 ,,	39	23,212
1885†	,,	Great Britain .	32,380 ,,	2,048	
		France . . .	1,833 ,,	128	
		America . . .	2,238 ,,	132	
		Goree	5,728 ,,	363	2,671

On this article in the Portuguese Possessions of South-Western Africa, Monteiro, in his 'Angola and the Congo,' writes as follows :—

"We now come to one of the most curious products of this interesting country, namely india-rubber, called by the Natives 'Tangandando.' It has been an article exported in considerable quantities north of the River Congo, and knowing that the plant from which it was obtained grew in abundance in the

* During same year there were imported into Gambia—from Windward Coast, 3,120 lbs., valued at £188 16*s.*; from Sierra Leone, 98,560 lbs., valued at £9,680; and from Leeward Coast, 1,675 lbs., valued at £133 15*s.*

† Vide footnote, p. 79.

second region, about sixty miles inland from Ambriz, I distributed a number of pieces of the india-rubber to natives of the Interior, and offered a high price for any that might be brought for sale. In a very short time it began to come in, and the quantity has steadily increased to the present day.

"The plant that produces it is the giant tree-creeper (*Landolphia florida?*), covering the highest trees and growing principally on those near rivers or streams. Its stem is sometimes as thick as a man's thigh, and in the dense woods at Quiballa I have seen a considerable extent of forest festooned down to the ground from tree to tree in all directions, with its thick stems like great hawsers; above, the trees were nearly hidden by its large bright dark-green leaves, and studded with beautiful bunches of pure white star-like flowers most sweetly scented.

"Its fruit is the size of a large orange, of a yellow colour when ripe, and perfectly round, with a hard brittle shell. Inside it is full of a soft reddish pulp, in which the seeds are contained. This pulp is of very agreeable acid flavour, and is much liked by the Natives. The ripe fruit when cleaned out is employed by them to contain small quantities of oil, etc.

"Every part of this creeper exudes a milky juice when cut or wounded, but, unlike the india-rubber tree of America, this milky sap will not run into a vessel placed to receive it, as it dries so quickly as to form a ridge on the wound or cut, which stops its

further flow. The blacks collect it therefore by making long cuts in the bark with a knife, and as the milky juice gushes out it is wiped off continually with their fingers, and smeared on their arms, shoulders and breast, until a thick covering is formed. This is peeled off their bodies and cut into small squares, which are then said to be boiled in water.

"From Ambriz the trade in this india-rubber quickly spread south to the River Quanza, from whence considerable quantities are exported."

By way of comparison with preceding statistics the exports to the United Kingdom of Caoutchouc from the West African Portuguese Possessions have been as follows :—

Article.	Year.	Quantities.	Value.
		Cwts.	£.
Caoutchouc . . .	1878	1,822	15,086
	1879	2,689	32,612
	1880	5,248	70,750
	1881	3,704	46,836
	1882	3,976	56,885
	1883	3,382	48,751
	1884	2,998	29,177
	1885	2,559	24,465

As a rule, rubber juice had better be collected separately, as regards yielding tree, and either allowed to coagulate in layers by evaporation, or be turned into rubber by being poured first into hot water, the heat of which for coagulation must be locally regulated, and be dependent on nature of juice, some coagulating more readily than others. In addition to the *Landolphias*, species of *Ficus* are on the Gold Coast much resorted to now for rubber.

V.

COFFEE.—Liberian Coffee (*Coffea liberica*) has deservedly secured a world-wide reputation, and seems to tend so far to bestow by its introduction for cultivation and export more prospects of wealth to other countries than to its own, and to engage deservedly, as to its worth, the attention and energy of aliens rather than of natives. It is indigenous to the forests of the country embraced within the Republic of Liberia, and indeed beyond ; but of the exports of this article from that State I am unable now to afford statistics.

According to Reports of Kew 1882 and previous years, Liberia coffee has been introduced therefrom with marked success and advantage into Fiji, Grenada, Natal, Queensland, Jamaica, Nilgiris, Sechelles, Mauritius, Ceylon, where (at Kew) the policy of a general and generous distribution of this plant, as of others, is properly advocated and pursued. "Eggs-in-the-basket" policy has had to be set aside.

In a useful pamphlet periodical for October, 1882, entitled the *African Repository*, and published monthly by the American Colonization Society, there will be

found an article referring to an "Elaborate report on Liberia Coffee," by the Honourable J. H. L. Smyth, LL.D., Minister Resident and Consul-General of the United States to Liberia. In this article it is advanced that "the export of coffee from Liberia the last season was a little more than 300,000 lbs. Considering the productiveness of the Liberian variety, the fertile soil and genial climate, one would naturally be surprised to see so small a quantity of coffee produced for exportation, but it must be remembered that coffee production in Liberia is in its infancy, and the people are poor."

The Annual Reports on the Progress and Cultivation of the Royal Gardens at Kew contain most interesting accounts of the distribution and growth of Liberian coffee, and on its history and cultivation. There was also published on the same subject in 1881, in Jamaica, an able and useful Paper, entitled "Notes on Liberian Coffee, &c.," by D. Morris, Esq., the then Director of Public Gardens and Plantations in that Island.

Mr. H. C. Creswick speaks, after ten years' experience of Liberian Coffee, as follows :—

"That Liberian Coffee possesses merits as yet unknown to the trade at large, and that if successfully cultivated will in the future be a dangerous rival even to that of Eastern growth. It is also evident from the various lists made, that greater fragrancy, more mellow flavour, are obtainable when the bean has been

matured by age. The general verdict of the gentlemen brought together at this time appears to be that Liberian coffee promises to play a most important part in coffee culture, and will be well to the front in competition with all other descriptions, as soon as the general taste becomes educated for fuller bodied though less delicate flavour than now produced from Ceylon and East Indian Plantation coffee."

I have quoted the foregoing from Mr. Morris's Report alluded to. That gentleman adds :—

"The information given in the last two sections of his Paper as regards the yield of Liberian coffee trees and the commercial value of the produce, will doubtless lead to the conclusion that this coffee possesses characteristics which according to the circumstances of a country may be utilised to an extent now unthought of. In the first place, the fact that this coffee will grow on the plains, where the preliminary expenses in the acquisition and clearing of land are naturally much lower than on the hills, where labour is cheaper and where the difficulties and expenses of transport would be avoided, gives Liberian coffee an advantage not only over its congener the Arabian coffee, but also over almost any cultivation requiring the same capital and attention.

The prolific yield of this coffee is also a characteristic much dwelt upon. . . . There can be therefore no doubt that in Liberia the coffee yields, according to the nature of the cultivation, at the rate of from 8 to

20 cwts. per acre. Mr. Agar, who had many opportunities of forming an opinion, "is confident that trees properly cultivated would give 6 to 8 pounds each, or from 22 to 30 cwts. per acre of 400 trees." That this is not confined to the coffee when growing in its native country, but is maintained under other conditions of soil and climate, may be seen in reports which have reached us from Ceylon and other colonies."

Another peculiarity of the Liberian coffee is dwelt upon, which if found generally applicable to it will greatly increase its value. The tree is mentioned as possessing the habit of sending its "strong tap roots far into the ground," and this characteristic it is believed will enable the Liberian coffee to live and bear fruits in seasons of protracted drought, which prevents the setting of blossom on the ordinary coffee at low elevation."

After assuming that Liberian coffee should sell generally at 90*s.* per cwt., Mr. Morris continues:— "From its adaptability to cultivation in the plains, from its more robust and prolific character, and from the generally more economic treatment to which it is amenable, it is quite possible that its cultivation will prove even more remunerative than the high-priced varieties of Arabian coffee."

Then on the subject of the West Indian blight, that has proved so fatal to coffee cultivation (*Coffea arabica*) in the West Indian Islands and Brazil, it

would appear that in these parts the Liberian coffee can withstand its effects with comparative impunity.

I here subjoin data collected in 1876, which has been kindly placed at my disposal by James Irvine, Esq., of the Exchange, Liverpool, which will be found to embody very desirable information on the conditions of circumstances surrounding the cultivation of Liberian coffee in its home—Liberia:

Q. Does the Liberian coffee grow well in the immediate neighbourhood of the sea; or is it desirable it should be planted at some distance from it?

A. The Liberian coffee grows equally well in the immediate neighbourhood of the sea, and at considerable distances from it. Under like conditions of soil and cultivation, trees near the sea-shore in Monrovia are about the same as those at Careysburg, and other places thirty miles distant. The wild coffee, from which the cultivated comes, is found at even still greater distances in the Interior. Our nearest trees are a hundred yards from the sea. At Bassa and Sinou, we are told trees grow well still nearer to the sea.

Q. What is the general temperature, and what the elevation above the sea-level under which the Liberian coffee thrives best?

A. Lowest temperature observed at Monrovia near the sea, 62° Fahrenheit, at 7 o'clock A.M. in the month of January, during the prevalence of the Harmattan winds. Highest temperature observed 91° Fahrenheit

These are exceptional cases. The general temperature ranges from 72° to 87° in the shade. In the country, at the furthest point where coffee is cultivated by the settlers, there is a difference of one or two degrees lower, owing principally to the rise of the land.

Along the coast, the coffee-tree thrives at only a few feet (say 10) above sea-level. At Careysburg and at Mount Coffee it succeeds as well at an elevation of 550 feet.

Q. Will the plant grow well on level ground, or does it succeed better on slopes?

A. The coffee-tree grows as well on level ground as on slopes, with this precaution: care should be taken that, on slopes, the rich mould or surface soil be not washed away; and on level ground, that the water does not stand. For while the leaves of the coffee-tree delight in frequent refreshing showers, the roots are averse to standing water.

Q. Is it necessary for its successful cultivation that it be planted on land from which the forest has been recently removed, or will it thrive equally well in ordinary soil?

A. Virgin forest soil is considered best for the coffee-tree, simply because it contains sufficient plant-food, and saves the expense of manuring for several years. Ordinary soil will answer as well, provided it contains sufficient plant-food, or otherwise can get a sufficiency of manure. The soil should be of loose texture; the tree will not thrive in stiff clay soils.

Q. Are distinct varieties of the plant recognised, and if so, to which variety is the preference given as yielding the most profitable crop?

A. There is a distinct variety, coming sooner into bearing (18 months), and giving a smaller berry. But the larger variety is preferred, as yielding a superior coffee, and a larger crop. The larger berry varies somewhat under changed conditions of soil. The same berry which is very large in the moist lowlands becomes a little smaller, but of finer flavour, in the dry rocky hills or uplands.

Q. Does the same plantation generally contain plants bearing berries of tolerably uniform size, or do some of the trees produce large, and others much smaller berries, or do the berries from the same tree vary much in size?

A. The trees on a plantation differ in the size of their berries. Besides, while many contain berries of a uniform size, others will contain berries of various sizes. We are not prepared to say to what extent high cultivation would remedy this. In planting nurseries with seed of a uniform size, we have not been able to obtain plants of a uniform size.

Q. Does the coffee grow best when fully exposed to the sun, or is a slight shading preferable; and how are the amount and quality of crop affected by these two systems of cultivation respectively?

A. The coffee-tree does not produce well under shade, either in the quantity or the quality of the

crop. When the trees are not large enough to shade the ground with their branches and fallen leaves, they should be *mulched* in the dry season ; that is, their roots should be covered with dried grass, straw, shavings, or anything capable of shading them. But the leaves and branches should have the influence of the sun, to elaborate a due proportion of sap into fruit-buds. The Liberia coffee being indigenous, when well established does not suffer from our tropical sun. MULCHING in the dry season is generally required for very young trees on dry hilly slopes.

Q. In planting are the trees put in so close together as eventually to quite cover the ground with their foliage, or are they planted so as always to leave some portion of the ground visible between them?

A. Both methods of planting are adopted. Some trees are planted close (six to eight feet), while others are planted at greater distances (ten to twelve feet). When trees are planted close, so that they meet, they thrive and bear well, provided their leaves and branches have the influence of the sun. There is also this advantage: By shading the ground they prevent the grass from growing, and thus save the expense of weeding. But it is very inconvenient to pass among them for the purpose of gathering the crop, pruning, manuring, &c., &c. Even at the distance of twelve feet, if the trees are topped and kept down, they will eventually meet.

Q. At what age does the tree commence to give a crop?

A. The smaller variety referred to above begins to bear at eighteen months; but the ordinary time for the larger variety is in the third year. Some plants of this kind, however, have been known to bear sooner. The first crop is generally only a few berries; but the tree goes on increasing until it becomes capable of yielding twenty pounds—we have heard of trees giving twenty-four pounds each; these are very old trees—more generally depends upon cultivation than upon age.

Q. To what height does the tree eventually grow, and are the trees in the best plantations allowed to reach their full height, or are they kept low for the convenience of gathering the ripe berries, or for other reasons connected with cultivation?

A. The tree grows to a height of twenty feet or more. We have seen one more than thirty feet in height, this was in the woods near an old plantation. Some cultivators top their trees, others let them grow up *ad libitum.* Our trees are topped at a height of five feet. Trees that are topped are more conveniently picked, and, other things being equal, give a larger crop. When the trees grow up tall, moreover, they are frequently injured by climbing with ladders, and pulling down the limbs, &c.; and as the tree ripens its crop and blossoms for the next year at the same time, much of the blossoms and young fruit is rubbed

off the trees, whereas the low trees are picked by standing on the ground.

Q. What, if any, is the system of manuring adopted in the plantations?

A. Manuring is not done extensively, owing principally to the fact that most of the plantations are young, although there are some that need manure. We use the coffee pulp mixed with cattle manure, also decomposed vegetable matter, wood ashes, the "compost heap," the earth from the hills made by the white ants (termites), &c., &c. The coffee-tree delights in nitrogenous manures. We find surface-manuring best for the coffee-tree, as the fibrous roots or feeders keep always near the surface.

Q. Are the plantations kept up permanently, or are they supposed to be cultivable profitably for only a certain limited period?

A. We have no very old plantations; but we believe the plantations can be kept up permanently, or, at least, for a great number of years. With us, the coffee-plant is not a shrub, it is a forest tree. There are trees here forty years old, flourishing in all the vigour and verdure of youth, and bending down under their weight of berries. We have seen a few of these old trees, when cut down, shoot up more rapidly and more vigorously than when first planted from the seed.

Q. It is said that the Liberian coffee-tree is liable to have its leaves attacked by a disease which discolours them, and causes them to fall prematurely.

Is this disease common in the plantation? And is it believed to do much injury to the trees, or to reduce the amount of crop, or affect its quality, and have any successful attempts been made to get rid of this disease, or to mitigate its injuriousness?

A. Last year some of the trees on different plantations were affected with what was said to be the disease—*Hemileia vastatrix.* The leaves of the trees turned yellow (although want of cultivation will cause the same phenomenon); there was a tendency in some of the upper branches to decay, and dry up the berries before they could ripen. This may have happened before, but we observed it only last year. Occasionally the bark of a tree will decay, partially or wholly—when wholly it causes the death of the tree. Occasionally a borer will attack a tree. We have as yet observed nothing that would cause serious losses in coffee growing in Liberia; we rather think that the yellow appearance in some of the trees was owing to the want of cultivation. Some of the trees supposed to be diseased were as full of berries as the other trees.

An interesting summary, the results of inquiries generally on coffee disease, will be found in Annual Report for 1877 on the Royal Gardens at Kew. As regards these inquiries, set on foot through the Colonial Office at the suggestion of the Director of the Royal Gardens in February, 1874, on the subject of the causes of coffee-leaf and tree diseases, it may be well to embody here the Report, dated the year

after, thereon of the then Superintendent of the Basel Mission as regards the Aquapim range of hills, from twelve to sixteen hundred feet high, and lying back from the coast line some sixteen or seventeen miles inland, which seemed then, and seems still, with one or two exceptions, the locality in the Gold Coast Colony where the coffee-tree has been cultivated.

"The coffee-leaf disease is not observed in Akwapen (Aquapim), and is not likely to infect the coffee-trees in this part, as the soil is mixed with much mineral substances, in particular iron-ore, which are used against this disease.

The two enemies of the coffee-tree here are, as already known :—

1. The coffee-bug, which, however, is doing no great harm.

2. The coffee-bore, of which there are two species or kinds—

a. One looks white grey, and is more in the upper part of the tree (stem) ;

b. The other is reddish, and bores itself into the roots of the tree and destroy it.

The greater part of our coffee-trees suffer from this disease : these insects are coming from the surrounding forest, and nothing effective can be done against them.

This is the notice of our gardener, Mr. A. Paterol."

In July, 1882, whilst on the Gold Coast, I placed myself in communication with Mr. Rottmann, the efficient Secretary of that praiseworthy and well-

deserving Body, the Basel Mission—who have done so much in an industrial sense for the elevation of the native, and for the consequent advantage generally of the West African commercial world—on the subject of the coffee industry, which has existed to a limited extent for many years on the Aquapim Hills. He was good enough to inform me that the Aquapim coffee is of West Indian origin, the seed being introduced from Jamaica in 1843—doubtless *Coffea arabica.*

The object of the Mission was to promote imitation on the part of the natives, and thereby bring about a profitable industry for them. I fear the aims of the Mission were not realised to the extent hoped for. Indifference to the needed care that should be extended, and disappointment at prices received, as compared with what were expected, were the consequences. Further, the limited means of the Mission against the heavy expenses that were incurred from the introduction of European overseers with their families, and the limited production with a proportionate monetary return, did not admit of the continuance of European supervision, and necessitated the handing over to the natives at low rentals of the Mission farms.

To this issue there has been fortunately some different results, for I am reminded of a case which was brought to my notice where, in 1881, coffee was grown, on the small plantation of a native near Nsatsi on the Aquapim Hills, to the extent of five hundredweight. This crop was cleaned, and packed by manual

labour, and exported to Hamburg, with the result of a return at the rate of between 1*s.* to 1*s.* 1*d.* per lb., which speaks well for the native's labour, and points to what can be done on those hills.

Coffee can within my own experience be grown in British Combo, Gambia, and in other parts of that Settlement.

From Sierra Leone (*Coffea stenophylla*) and the Gold Coast (*Coffea arabica?*) there is a small free export of native growth in this commodity, which should have by this time outstripped in quantity the export from the Portuguese Possessions further south.

In former years there was an encouraging export in this article from Sierra Leone, the hills of which are admirably suited for its growth. Why has it not developed?

As regards the Gold Coast, apart from my remarks on the coffee movement on the Aquapim Hills, there was in years gone by a healthy plantation of some seventy acres in extent at Napoleon, near Cape Coast, covered by some 3,500 trees of encouraging promise: whence I have also had at times fruit of the *Citrus aurantium*, that was also naturalised, but allowed since to run to nature.

Again, in the times of the Danes on the Gold Coast, they established inland behind Christiansborg a coffee plantation which was said to produce excellent results.

In the Island of Lagos I introduced, through the generosity of Herr Vohsen of Sierra Leone, plants

of the *Coffea liberica*, and left them thriving in the gardens to Government House, as also in Kokomaiko.

Among the natural products of Senegal and its dependencies are mentioned "Rio Nunez" and "Rio Pongo" coffees, which are the names by which they are known in the trade. The former grows wild in Fouta Djalon, and in the country of the Sousous. According to a report of Dr. Corre from which information has been extracted, "The tree which bears this coffee grows to a height of thirty to forty feet in the middle of almost impenetrable forest, half choked by tropical climbers, and devoid, as far as its upper part, of branches which form a summit which is sparingly covered; also the crop is obtained generally by cutting down the trees when the fruit is ripe."

"According to this process," said Dr. Corre, "coffee-trees will not take long to disappear, if they are not multiplied through means of culture. This variety, when it grows in the open air, has the appearance of our poplars; its produce has incomparable flavour; in Foulah it is called 'legal-cofé,' and the 'grain-cofé;' in Sousou it is named 'houri-coff' (*legal* and *houri* signify 'tree'). The price of this coffee has been returned at from 300 to 350 francs the 100 kilogramme."

A similar coffee to foregoing is, I understand, to be found in Rio Pongo: hence name given.

I here particularly call attention to the existence, in the country named Fouta Djalon, laved by the waters of the Upper Gambia River, of coffee in its

wild state—a field ready for development and easy of approach. Yet, strange though it may seem, coffee is, and has been, noticeable by its absence from the exports of one of the oldest possessions of the Crown, viz., the Settlements on the Gambia.

Attempts on a large scale at coffee plantation in different parts of the French Possessions, to wit, at Assine by M. Orndier, and the Gaboon, principally at Sibange, proceed; but these plantations are not yet, I learn, in a state to be reported upon.

With regard to the Portuguese Possessions, Mr. Monteiro, in his 'Angola and the River Congo,' says :—"The trade in coffee is almost entirely restricted to Ambriz, and it comes principally from the district of Encoge, a considerable quantity also being brought from the Dembos country, and from Cazengo to the interior of Loanda, from which latter place the trade is shut out by the stupid and short-sighted policy of high custom-house duties on goods, and other restrictions on trade, of the Portuguese authorities. Very little of the coffee produced in the provinces of Encoge and Dembos is cultivated; it is the product of coffee-trees growing spontaneously in the virgin forests of the second elevation. The natives, of course, have no machinery of any kind to separate the berry from the pod, these being dried in the sun, and then broken in a wooden mortar, and the husks separated by winnowing in the open air.

"The great forests in the slopes of the chains of

mountains and valleys of the country about Golungo Alto and the Dembos are also full of coffee-trees growing wild, and they are gradually being cleared of bush or underwood by the natives, so as to enable them to collect the berry. I did not hear anywhere that they had taken to planting coffee, nor are they likely to do so as long as they can find it growing wild. As far as has been ascertained, wild coffee is only found growing in the forests of the country of the second elevation from the coast, nor does it grow well in the littoral region, where air is much too dry; it is a plant requiring a moist heat, and the shade of large trees; and a certain amount of elevation above the level of the sea may possibly have something to do with its proper growth.

"The future production of coffee on the whole West Coast of Africa might be simply unlimited as far as extent of ground eminently suitable for its cultivation is concerned; it becomes only a question of time and labour."

The West African trade for four years in this article with the United Kingdom is represented in the following table :—

Year.	Article.	Whence.	Quantity.	Value.
			Cwts.	£
1882	Coffee . . .	W. A., Foreign	25,338	41,538
1883	,, . . .	,,	26,871	46,922
1884	,, . . .	,,	35,194	64,463
1885	,, . . .	,,	34,927	55,828

For most of the foregoing we are indebted to the Portuguese Possessions, as will be explained in the under-given statistics for like years :—

Article.	Year.	Quantity.	Value.
		Cwts.	£
Coffee . . .	1882	24,215	39,316
	1883	26,522	45,947
	1884	34,924	63,952
	1885	31,669	50,873

Since 1872 there has been a tax on this import into the United Kingdom of 14*s.* per cwt. on raw coffee ; and on kiln dried, roasted or ground, of 2*d.* per lb.

Maybe it is providential that coffee should take the lead as an agricultural industry in West Africa, to be thus instrumental in a measure in paying back in the coin, I may say, in which or on account of which her sons were sold in the past. Africa's children were sought for and condemned to slavery—to play the part of beasts of burden—to labour and toil in the coffee plantations* of the East so as to gratify, with little or no trouble or cost to the consumers, the appetites of the slave-hunters and masters of plantations. By coffee also, maybe, in return, the country is to be opened up. Where coffee formerly flourished by means of slave labour, it has almost died the death of slavery ; and to some of these very parts, West Africa, forgiving and unmindful of the past, furnishes, through the instru-

* I omit mention of the cane fields of the West.

mentality of the bean of Liberia, the West African native State and welcome home of the former slaves and children of slaves of the New World, the seed of renovation in this product, but, by means of free labour. The prospect of its development looks promising elsewhere, and should, in its native land; but for local success—and for a continuance of success with beneficial results of some duration—perseverance, exertion, energy, and care, with introduced capital, must be prominent factors.

In thus dwelling on this subject, I have with much pleasure come across, in the 'Heart of Africa,' the following expression of experience of that celebrated and able traveller, Dr. Schweinfurth.

"But nowhere in the world has slavery been so thoroughly engrafted and so widely disseminated as in Africa; the earliest mariners who circumnavigated its coasts found a system of kidnapping everywhere established on a firm basis, and extending in its business relations far into the interior of the continent; the idea arose, how advantageously the owners of land in the distant East might cull the cost of products of their soil by the hands of slaves; and the kernel of a single plant, the coffee-berry, became the means of uniting the remotest lands, and had the effect of throwing a large portion of the human race into subjection to their fellows, whilst Christian nations became the patrons and the propagators of the disgraceful traffic. It has therefore happened in the

natural course of things that philanthropists have first applied their energies to the slave trade in the West; the East has still to tarry for an enlightenment which is destined in the fulness of time to gladden a future chapter of history."

I must not close this chapter without briefly mentioning the *Cassia occidentalis* (the *benta-maré* of the Volofs, and known generally as such in Senegambia and Gambia, which finds its way to Europe for purposes of adulteration with the genuine article), "negro coffee," although said to be a native of the East and West Indies—the seed of which was, according to the 'Treasury of Botany,' found by Livingstone to be used by the natives of Central Africa as coffee: it is also used similarly in Mauritius. If an alien originally, the plant has now become naturalized in West Tropical Africa, where it thrives in wild and "stinking" luxuriance. It is considered among the natives as "senna," and used as such.

On the *Cassias occidentalis* and *tora*, Professor Attfield, Ph.D., F.R.S., &c., reported as follows—vide *Indian Agriculturist*, 1st September, 1882:

"Neither the seeds of the *Cassia occidentalis* nor those of the *Cassia tora* contain theine. Neither contain the principle somewhat analogous with theine, viz. theobromine. Each variety was submitted to two distinct processes—either of which process readily extracts theine from coffee, &c., but no trace of theine was detected: indeed neither variety yields

any one of the class of chemical substances (alkaloids) to which theine belongs.

"The seeds of the *Cassia occidentalis* affords in 100 parts—

Mucilaginous matter, that is soluble gum or arabica, and insoluble gum or bassorin, with some legumin	38·2
Celluloid matter or fibre	30·7
Fat	5·1
Other organic matter, including a little sugar and starch, a good deal of reddish-brown colouring matter, and some insoluble albumenoid matter	11·5
Water	9·6
Mineral matter, similar to that of most vegetable substances	4·9
	100·0

"A qualitative analysis of the seeds of the *Cassia tora* showed that they resembled in composition the seeds of *Cassia occidentalis.*

"The roasted seeds resemble coffee in odour and flavour; an infusion of the ground roasted seeds can scarcely be distinguished in taste, aroma or appearance from infusion of coffee.

"The foregoing investigations enable me to give the opinion that *Cassia tora,* or 'Cassofee,' is not analogous to true coffee, because it does not contain theine, 'sometimes termed caffeine,' or any similar principle.

"Cassofee is equivalent to 'fig coffee,' 'date coffee,' 'chicory,' &c. Such substances when torrefied, parched or roasted, have their gum, sugar, starch, &c., converted into dark brown coloured matters having

a pleasant odour and aroma : indeed coffee itself after roasting owes its sensible properties to the same matters. Theine is practically flavourless.

"I am of opinion that the two Cassias cannot be considered in any way injurious to health."

For any more detailed information on the indigenous coffee of West Africa generally, and its distribution, I must invite the attention of my readers to Oliver's 'Flora of Tropical Africa,' and to W. P. Hiern's paper on the African Species of the Genus Coffea : Transactions of the Linnean Society, April, 1876.

VI.

GUMS * (using the vulgar and general term for them, including gums, resins fossilized and unfossilized), especially fossil "gums," should play a much more important part in the exports of the West Coast. The following table shows the quantity of this article of commerce imported from British West Africa during the five years ended and inclusive of 1885 :—

Year.	Articles.	Countries whence imported.	Quantities.	Value.
			cwts.	£
1881	Gum unenumerated	West Coast of Africa, British	6,057	20,601
1882	,, ,,	,, ,,	7,131	20,573
1883	,, ,,	,, ,,	8,494	26,596
1884	,, ,,	,, ,,	7,321	20,995
1885	,, ,,	,, ,,	7,641	22,177

The gums and resins known in the trade with average values are :—

"Senegal" (Acacias of various species) 90*s.* per cwt.
Sierra Leone (*Copaifera Guibourtiana*), natural 6*d.* to 10*d.* [per lb.
,, ,, ,, cleaned 1*s.* to 1*s.* 6*d.* [per lb.

* Gum is soluble in water or swells in it ; the best and most useful gum dissolves entirely, forming an adhesive mucilage; resin in essential oil, boiling fixed oils, also in ether and chloroform. Many are soluble in alcohol ; but a few, such as copal and amber, either not at all soluble in alcohol or only partially.

Accra (*Copaifera?*) . . .	natural	50*s.* per cwt.
„ „ . . .	cleaned	100*s.* „
Congo (1)	natural	80*s.* „
„ (2)	natural	50*s.* „
„ (2)	cleaned	100*s.* „
Angola, round red . . .	natural	80*s.* to 100*s.* [per cwt.
„ flat	natural	80*s.* to 100*s.* [per cwt.
„ white	natural	60*s.* „
„ „	cleaned	100*s.* „
Benguela	natural	85*s.* to 105*s.* [per cwt.
„	cleaned	240*s.* to 320*s.* [per cwt.

Gaboon—as red Angola; of which it is considered to be a variety.

From the Catalogue of the Products of the French Colonies, exhibited at the Paris Show of 1878, I extract as follows (in translation):—

SENEGAL GUMS (gums proper).—The commerce of gum is one of the chief resources of Senegal; about three million kilogrammes* are exported annually. The harvest, which begins in November with the winds of the desert, and after the periodical inundations, is made from several species of Acacia, principally the Acacias Verek, Neboued, albida, Adansonii, &c., &c. The first gum, called *Bas du fleuve*, is generally found buried, in the moist soil, by Moorish slaves sent to seek for it; it loses greatly in weight and value by drying, and is generally covered by a light layer of sand. The gums of the second

* 1 kilogramme = 2·205 lbs. avoirdupois.

season, allowed to dry thoroughly on the trees and taken direct to the points where steamers touch, are exempt from these defects. Lastly, from the Upper Senegal, a gum is received which the annual burning of forests renders extremely friable ; its price is from 40 to 50 francs the 100 kilogrammes.

The principal places of supply are on the right bank of the Senegal—(1) the country of the Moors, Braknas, and Trazas, who encamp annually near the gum forests which their slaves cultivate; (2) the country of Galam ; (3) Bondou and the Bambouck (Upper Gambia). Gum is also procured from Oualo, Cayor, and Djolof, situated on the left bank.

The commerce for gum in France is carried on mostly at Bordeaux, where the sorting is undertaken by several houses ; this picking comprehends the following category: *Gomme blanche*, for drugs, pharmacy, distillation, confectionery, delicate dressing, lace, and linen. *Gomme petite blanche*, for drugs, pharmacy, confectionery, distillation, fine dressing, lace, and linen. *Gomme blonde*, for drugs, pharmacy, confectionery, distillation, fine dressing, impression on tissue. *Gomme petite blonde*, for drugs, pharmacy, confectionery, distillation, ordinary dressing, impression on tissues, sticking labels, envelopes, matches, &c. *Gomme 2° blonde*, for drugs, pharmacy, confectionery, dressings, impressions on tissues, sticking, matches. *Gomme gros grabeaux*, for drugs, confectionery, ordinary dressings of cotton tissues, sticking labels, envelopes, &c.

Gomme "moyens grabeaux," for drugs, confectionery, ordinary dressing, sticking labels, envelopes, &c. *Gomme "menus grabeaux,"* for drugs, confectionery, ordinary dressing, sticking labels, envelopes, ink, &c. *Gomme fabrique,* used a great deal in a Russian industry for dressings of tissues, wool, and cotton. *Gomme (half white) "grabeaux tries,"* for drugs, pharmacy, confectionery and distillery. *Gomme friable blanche,* for drugs, pharmacy, confectionery and distillery. *Gomme friable blonde,* for drugs, pharmacy, confectionery and distillery. *Gomme petite fabrique,* for ordinary dressing of cotton tissues, sticking. *Gomme poussière,* for ordinary dressing, impressions on ordinary tissues, ink and blacking. *Gomme "marrons et bois,"* for sticking, ink and blacking. *Gomme "boules naturelles,"* for drugs, pharmacy, dressing the silks from Lyons. *Gomme bdellium,* for pharmacy.

According to Messrs. Guillemin, Perrottet & Leprieur, the Acacia Verek is found (so far) generally over Senegambia, but most abundantly to the north of the right bank of the River Senegal, where exist the forests, historically known, yielding gum, traversed each year by the Moors (Braknas, Darmankos, &c.) for the collection of this commodity. This rich harvest used generally to fall into the hands of the English commercial houses at Portendic before that port was given over to the French in 1857. In the time of Adanson, towards the middle of the 18th century, the quantity of gum sold at the different

markets of Senegal (exclusive of Portendic trade?) was about 30,000 quintals (cwts.): in 1827 the quantity similarly exported from Senegal to France increased to 613,504 kilogrammes : the annual export has now reached some 3,000,000 kilogrammes. The commerce in this article varies with the conditions of the atmosphere, and has been affected from time to time by the partial destruction by fire of the forests of gum-trees accidentally caused by the Moors in their efforts to burn the dry scrub in the neighbourhood of such forests. The gum Verek is identical with the true gum arabic of Arabia; its gathering is effected in the month of December, viz. two months after the cessation of the "Rains," which fall from July to October. The Moors employ in its collection their unfortunate captives of war, whom they make slaves.

For any more detailed particulars that may be required concerning the gums exported from the French Possession, Senegambia, I would request that reference be made to 'Flore de Sénégambie,' by Messrs Guillemin, Perrottet & Richard, and to the appended list of economic plants, p. 269.

From the Gold Coast the export of gum (fossilized resin) to the United Kingdom—indeed, to the European market—is trifling compared with what it should be. The United States attract the bulk of the trade, which in this article also seems in that direction to be increasing, as will be observed from the following return, pp. 124–5.

Resin abounds on the Gold Coast behind Accra and in Aquapim, the Akims, and Croboes, also in Appolonia; and its greater development requires attention, and the friendly defeat of the prejudices of the natives.

From the Colony of Lagos there has been no export trade in this article, which I will prove to be somewhat surprising.

I have had some correspondence and personal interviews during one of my stays in England with Mr. Ingham Clark, a gentleman who has much experience, and takes deep interest in the "gum" of commerce. I learnt that *Accra copal* (fossilized resin) is not much sought after in the trade, as sufficient attention has not been turned to promote its development into a regular export and steady supply, as has been done in the cases of Zanzibar, Animi, Sierra Leone copal, and the Kauri gum of New Zealand; further, that the last-mentioned gums are properly sorted, cleaned and washed when put on the market, so that the varnish manufacturers can suit their tastes and pockets. It would seem that there has been an improvement in the imports of Accra copal, which had been for some time chiefly an inferior quality—"dusty, drossy, full of bark, the gum opaque and acidy. The latter fault is much against Accra."

Such conditions of import are not favourable to a ready sale; in fact, manufacturers fight shy of "Accra," which, on the contrary, if collected clean, like a

Year.	Articles.	Countries to which exported.	Quantities.		Value.	
			lbs.	Total. lbs.	£	Total. £
1878	Gum Copal.	Great Britain	1,904		18	
		America	9,390		140	
				11,294		158
			packages.			
		Great Britain	10		239	
1879	,,	America	25		530	
			lbs.			
		Germany	200		6	
				packages.lbs. 35 & 200		775
		Great Britain	12,304		328	
1880	,,	America	115,424		1,606	
		Germany	740		6	
				lbs. 128,468		1,940
		Great Britain	54,781		983	
1881	,,	America	171,011		3,047	
		Germany	912		11	
				226,704		4,041

1882	,,	Germany	23,580		305	
		United Kingdom	206,502		3,202	
		U. S. America	227,094		4,354	
				457,176		7,861
1883	,,	Germany	9,112		64	
		Grand Bassam	552		9	
		United Kingdom	17,143		232	
		U. S. America	17,138		235	
				43,945		540
1884	,,	Germany	23,580		305	
		United Kingdom	206,502		3,202	
		U. S. America	227,094		4,354	
				457,176		7,861
1885	,,	United Kingdom	14,854		253	
		France	56		1	
		U. S. America	55,710		1,219	
				70,620		1,473

specimen I presented to the Kew Museum, should command as much as Angola copal.

Next, however, to ANGOLA, BENGUELA, SENEGAL and SIERRA LEONE comes ACCRA copal, which is sold after cleaning at the rate of about £90 per ton. And from the Congo have come consignments which have not realized as had been expected, "because they were principally *new* soft gums, and probably had been gathered from the *surface* instead of below the ground where the earlier resin had accumulated."

It should present itself to the minds of local promoters of a fresh industry, and to exporters, that an article such as gum should present a fair, attractive exterior; that its appearance should take ; that this can be best effected by clean and careful collection of this commodity, devoid of bark, earth, and other matter, which when in mixture can be removed locally by scraping and washing, with an issue to the interested of having, in addition to heavier account sales, to pay freight only on good marketable stuff, and not on a mixture of rubbish.

It will best suit my purpose and that of my readers to afford instruction for proper cleaning of these commodities, which if attended to will result in more profit to the collectors and more satisfaction to the buyers. I am enabled to do so through the practical experience of Mr. Ingham Clark, who has been good enough to inform me that old resins (fossilized) like "Accra" and "Benguela" require a fairly strong solu-

tion of potash, in order that the dirty coating may be touched ; for newer resins (unfossilized), such as Sierra Leone "copal," "ogea," &c., a solution of English soda will suffice : to them potash would be injurious. It is recommended that new resins should be subject to a rough sifting and *rousing* in common soda-and-water (if lukewarm, so much the better) : they should afterwards be washed in cold clean water, to remove any exterior effect caused by the soda. Such a course will improve the appearance and *value* considerably.

I have failed to ascertain that any gum has reached the English market from the Gambia. The article is not mentioned among the exports from that Settlement, although, on either side of that grand navigable river, viz. in the Settlement of Sierra Leone and in Senegambia, a considerable export trade is effected. It is as well to mention this fact, for the statistics of the Board of Trade on imports of this article into the United Kingdom from the West Africa Settlements (Gambia and Sierra Leone) are as follows :—

Article.	Year.	Quantities.	Value.
		cwts.	£
Gum of all sorts	1881	6,140	20,958
	1882	5,350	16,515
	1883	8,329	26,216
	1884	7,064	20,310
	1885	7,471	21,860

On enquiry, I find no one has of late years turned his attention to the development in the Gambia of a

gum trade, although there presents itself prominently the tree "Santang" (name in Mandingo and Volof both for tree and gum). The natives use it for disinfecting purposes and medicinally. This tree abounds, and is much resorted to by canoe-builders and other woodworkers. It is being treated as I found the "Ogea" in the Colony of Lagos. The merciless axe and fire attack it right and left, with the objects in addition to foregoing of securing potash for the indigo-dyeing industry, or manure for the land. Botanically the Santang is very like the "Ogea," and will prove to be, I fancy, a Daniellia (?) also.

Then the Gambia mahogany, *Khaya senegalensis*, yields a gum, a specimen of which I succeeded in sending to the Forestry Exhibition of 1884. Next, the banks of the Gambia are here and there studded with acacias, which are ignored, and yield the gum industry of Senegambia.

Again, I satisfied myself, by securing specimens, which were shewn also in the late Exhibition, that the Acacia Verek (*Acacia arabica* or *Acacia Senegal*)—known in trade as the Soudan gum, for which there is at present a large demand—with other gum-yielding Acacias, is to be found somewhat extensively flanking to some considerable length and depth the many arms of the Gambia River.

Why cannot such Acacias be similarly utilized in that Colony through the medium of the Gambia River, which permeates such a vast and rich extent of

country? Let business men turn their attention to my remarks. Why do they not get down some of the gum-hunters of the Senegal and explore our own fields? The result would, I am confident, be beneficial and profitable.

Then further south, beyond the field of "Accra" copal, comes that of the "Ogea" gum, from which we should have a very valuable addition in this direction. In April, 1883, I reported from Lagos to Kew Gardens that the tree from which this gum was obtained—the favourite habitat of which is swamp-land—was called in Yoruba "Ogea" (indeed the gum is so named), and was mercilessly treated, natives attaching no value to it. The gum was and is used by the natives for fires and for light. Women used it powdered on the body as a perfume. The tree, as is the case with many trees of a like resinous nature, is bored by a grub, which would seem to be a provision of nature, for by means of the boring exudes the juice—later gum.

In a Paper read before the Society on the 21st June, 1883, Mr. Dyer called attention to the above, and from his paper I have extracted as follows:—

"Professor Oliver reported upon the specimen that the tree was a *Daniellia*, though the material was scarcely adequate for fixing the species. But it seemed not to be *Daniellia thurifera* (Bennett, in 'Pharm. Journal,' 1855, xiv., p. 252), the frankincense tree of Sierra Leone; nor was it identified with *D. oblonga*, collected in Fernando Po by Barter. The

product is apparently too unfamiliar to commercial men to enable any positive opinion to be expressed as to whether Ogea will be useful to the manufacturer or not. But it is thought not to be without promise for the purpose of varnish-making."

In July, 1883, Mr. Ingham Clark had tested in his laboratory the "ogea" (specimens of which for the purpose I supplied to him), when it was found to answer somewhat to the peculiarities of Accra copal, containing a fair amount of acid and essential oil, and having a melting point of about 420° Fah. He was of the opinion that it would require a heat of 600° Fah. to "run" it, viz. to melt it sufficiently liquid to enter into complete union with linseed oil.

The laboratory report was as follows :

"This gum has all the character and appearance of that known in the market as 'Accra' copal, the sample submitted for testing being of an inferior character, dirty and dusty. It gave a melting point of 420°, which in itself is excellent ; but being of a dry nature, requires at least 600° Fah. to fuse ; and being strong in a characteristic acid, melts dark in colour, which would affect materially its value commercially."

Mr. Ingham Clark has since informed me that with better care in selecting and roughly cleaning, or even sifting, a better result might be obtained, as "ogea" was a hard fossilized resin, and therefore should be of a considerable value.

The tree blossoms about June, and fruits in July ;

it abounds in the Yoruba country, and might be cultivated to any extent. I have been assured by Mr. Ingham Clark that he entertains in anticipation no reason why "ogea" should not realize—if there be brought about a steady, reliable and clean supply of the commodity—from £90 to £120 a ton: let it follow the example set by rubber on the Gold Coast.

Here we have at hand a tree yielding resin procurable in such form, as also in the form of a fossilized resin, from the ground; the transformation being doubtless attributable to some chemical action—brought about by the contact of the droppings with its surroundings—helped by age.

The species to which Accra copal belongs has so far not got beyond suspicion—some Copaifera.

Writing on some specimens of Inhambane gum—native name "Stakate," and "Staka," Zulu name "Inthlaka"—received in 1882 from Mr. H. G. O'Neill, H. M. Consul for Mozambique, the Director of Kew described them as consisting in part of water-worn pebbles, very much resembling the Accra copal.

The species was fixed as *Copaifera Gorskiana*, Benth. "The identification," says Mr. Dyer, "is the more interesting on account of the resemblance of Inhambane to Accra copal." The latter has long been suspected to be produced by a species of Copaifera.

"Sierra Leone copal is ascertained to be derived from *Copaifera Guibourtiana*, Benth. Students of tropical African botany are familiar with the occurrence of the

same genera, and even species, on both the East and West Coasts. *Landolphia florida*, one of the African rubber vines, is a striking example of this wide distribution."

I am informed by Mr. Ingham Clark that Sierra Leone copal, on account of its *pale* colour—almost white—is most largely used; and that the trees are now *cut* for this gum, the trade becoming, as in Senegambia, a season one. He is of the opinion that this fact is affecting the *practical* value of Sierra Leone copal, as, not being fossilized, it is very tender, and must be sparingly used in the making of first-class varnishes. It is sold in the United Kingdom, after having been subjected at the port of shipment to a rough washing.

This article is also found among the exports from the French Settlements of Assine and Gaboon, as also in the exports from the Portuguese Possessions below the Congo, as will be readily judged by the market names of "ANGOLA" and "BENGUELA," which are the most valuable of the West African resins. The quantity that has found its way from the Portuguese Possessions into the United Kingdom from 1881 to 1885 stands as under:—

Article.	1881.	1882.	1883.	1884.	1885.
Sale .	£161	£989	£1,924	£2,321	£2,360
Gum of all sorts	35 cwt.	270 cwt.	612 cwt.	965 cwt.	968 cwt.

On the red and white gum of the Portuguese Possessions in West Africa I extract as follows, from Monteiro's 'Angola and the Congo':—

"The red gum copal called 'maquata' by the natives is of the finest quality, and is almost entirely the product of the Mossulo country. It is known to exist north, in the vicinity of Mangue Grande, but it is 'fetish' for the natives to dig it; and consequently they will not bring it for trade, and even refuse to tell the exact place where it is found; but there can be no doubt about it, as they formerly traded in it with the white men.

"Until about the year 1858 it was a principal article of export from Ambriz; vessels being loaded with it, chiefly to America, but with the American War the trade ceased, and it has never since attained anything like its former magnitude.

"It is obtained from a part of Angola where white men are not permitted by the natives to penetrate, and I have consequently not been an actual observer of the locality in which it occurs: but by all the accounts received from intelligent natives it is found below the surface of a highly ferruginous hard clay or soil, at a depth of a few inches to a couple of feet, and is said to be found in irregular masses, chiefly flat in shape, and from small knobs to pieces weighing several pounds.

"These are all carefully chopped into small nearly uniform pieces, the object of this being to enable the

natives to sell it by measure, the measures being little 'quindas' or open baskets. The natives of the country where it is obtained not only bring it to the Coast for barter, but also sell it to the Coast natives, who go with goods to purchase it from them.

"The blacks of the gum country are so indolent that they will only dig for the gum during and after the last and heaviest rains, about March, April, and May—and these and June and July are the months when it almosts all makes its appearance; and they will only allow a certain quantity to leave the country, for fear that its price on the Coast may fall; hence only a few tons of this beautiful gum are now obtained, where some years ago hundreds were bought.

"It is said by the natives that no trees grow on or near the places where the gum copal is found, and that even grass grows very sparingly. The very small quantities of red earth and sand sometimes attached to the gum shew it to be so highly ferruginous, that I should imagine such was really the case.

"The white Angola gum is said to be the product of a tree growing near rivers and water, a little to the interior of the Coast. I have never had an opportunity of seeing the tree myself. However, a grand field along this Coast and inland exists for the development on a much larger scale of this important and valuable article of commerce."

On the Angola and Benguela gums Mr. Ingham Clark has remarked as follows:—

"'BENGUELA' is a fine bright, pale, irregular-shaped copal, having a high melting point. It must be a very old gum, and has the nearest resemblance to the Zanzibar Animi of all the West African copals. It sells here for about £8 per cwt. after a rough washing.

"Angola copals are of two kinds, red and white. They are both exceedingly hard old gums, the red having a bright outside colouring, proceeding probably from the soil in which it has lain so long; it sells here for about £6 to £7 per cwt. The white kind contains frequently quantities of impurities, such as leaves and thick matter, which are so imbedded in the resin that it discolours in melting, and this affects materially its value. In a rough state unpicked, but simply roughly washed and sifted, it sells for £45 to £60 per ton—a portion after picking and cleaning here realizing 1*s.* to 1*s.* 4*d.* per lb."

VII.

WEST African dye-woods are chiefly represented or known in the trade as camwood (*Baphia nitida*), barwood, and redwood. In the Gaboon and that quarter I think red sandal-wood is synonymous. The dye-woods that have reached the United Kingdom between 1878 and 1885 are embodied, as to quantity and value, in the following table :—

Year.	Articles.	Countries whence imported.	Quantities.	Value.
			Tons.	£
1878	Dye-woods unenumerated	West Coast of Africa, Foreign. . . .	2,995	15,408
1879	,, ,,	No separate heading.		
1880	,, ,,	W. C. A., not particularly designated .	1,444	12,029
1881	,, ,,	,, ,, . .	2,593	15,451
1882	,, ,,	,, ,, . .	1,893	18,732
1883	,, ,,	W. A., British . .	90	1,231
		,, Portuguese .	1,580	13,113
1884	,, ,,	W. A., not particularly designated .	2,274	12,749
		W. A., British . .	1,053	8,354
1885	,, ,,	W. A., not particularly designated .	1,053	8,354

Liberia, the Oil Rivers, and the Gaboon at present, I think I am right in saying, offer the most prolific field for camwood, barwood, and ebony. The last-

mentioned, as indeed the others, is to be found in the Gambia and on the Gold Coast.

The foregoing Return must not be viewed as representing the total export trade, for there is a considerable trade done direct with France, Germany, and America. From the Gaboon it has been reckoned that of sandal-wood and ebony 40,000 tons are yearly exported under French, English, and American flags. An estimate of imports under this head annually into Hamburg has been given as 300 tons.

I am indebted to Mr. G. S. Saunders—of considerable timber experience—of 106, Fenchurch Street, for some interesting information on barwood and camwood, which I give as received:—

"Barwood" used to be freely imported with ebony, but the demand for it has much fallen off in consequence of the increased use of dyes produced from the coal-tar refuse; and although occasionally this wood is used for turnery purposes, by far the largest proportion of it is consumed in dyeing.

"Like ebony, barwood is also imported in billets, only much smaller, split out from large logs, two to two and a half feet in length, and frequently not more than an average of 500 pieces to the ton, or four to five pounds per piece. It is a porous, light wood, long in the fibre, and when first cut, of a bright orange red; but on exposure this red darkens to a deep brown. Price varies from £2 10*s.* to £4 per ton.

"Camwood is also imported much less than before, from the same reason as that which has stopped barwood; but it still comes in in small quantities, mostly from the ports north and south (in the neighbourhood) of Sierra Leone, such as Sherbro, Monrovia, &c. This wood used to come in short logs, fifteen to twenty-four inches long and five to twelve in diameter; but latterly the greater part of what has come forward is in rooty, badly-shaped pieces, fit for nothing but to cut up for dyeing purposes. Formerly it was in great request for high-class fancy turning, as the straight clear logs I before mentioned were of smooth, even, firm, close grain; but of course roots are of no use for such a purpose.

"The colour when quite freshly cut is a pale yellowish pink, which soon deepens into orange, and then to a good red. This however in time darkens until it is almost black. This wood fetches a good price; some was sold recently at £29 per ton."

I addressed, on the same subject, Messrs. Gardner & Sons, the widely-known timber importers of New London Street, Mark Lane, and they were kind enough to convey thus:—

"Black ebony without sap, and usually cleft without heart centre, averaging all the way from two hundred to forty pieces to the ton, is worth here from £4 10*s.* to £13 per ton, according to sizes, colour, and freedom from defects.

"Camwood, for dyeing purposes, is worth about

£35 per ton." The price must, however, depend on its condition and demand.

"Barwood, also for dyeing purposes, in small cleft pieces brings from £2 15*s.* to £4 10*s.* per ton, according to demand; present value being £3 15*s.* to £4 2*s.* 6*d.* per ton.

"There may be other woods from that portion of Africa, which would possess a commercial value if imported, but they are not known to us."

Botanists—at least some—give out that camwood and barwood are obtained from the *Baphia nitida*. The different colouring given in description, the great difference of prices per ton, would make one inclined to differ, or to question whether accurate and reliable information has reached us.

I see the French give to barwood the name *Pterocarpus angolensis;* and to camwood, *Baphia laurifolia.*

If, however, it has been satisfactorily proved that *Baphia nitida* is the tree; why then is it not allowed to age? or why are the natives so shortsighted as not to promote the export of camwood, with a pecuniary return ten times as much as is obtained for barwood? I don't think it has been yet clearly explained what botanically is barwood and what camwood.

Camwood is used for dyeing light browns, as in tweeds; and in Sheffield barwood is used for knife handles.

Redwood comes chiefly from Old Calabar, gives a stronger colour than barwood, and is worth a little more.

VIII.

COTTON.—Cotton is to be found wild all along this Coast. In some places it is cultivated, but rather for local use than for export. The low prices for the past few years—in fact, since the American War—realised in the European markets for West African cotton have militated against the demand for the article, and consequently there has not been the same attention turned to its development as might be expected from what should prove to be a rich and extensive field for supply.

Again, intertribal wars, slave-hunting, and cattle-lifting raids—the present curses of West Africa, and the main obstacles now against its development and opening up—have much to account for as regards the backwardness of the cultivation of cotton, indeed of other articles, the quantities of which might otherwise multiply themselves.

The high prices obtained for cotton during the American War proved a great incentive to the native growers and native buyers, especially in the cotton-growing country of Crepee bordering the Upper Volta and its neighbours on the Gold Coast, and in the Yoruba country behind Lagos. Great exertions were then put forth by merchants, and cotton gins

and other machinery were introduced. It was somewhat a case of "making hay while the sun shone." The death of the American War, the consequent return to cheap rates there, of supply and purchase that prevailed before its outbreak, the proportionately low prices offered locally, the devastating cruel raids in 1868–9 of the Ashantees over the country of the Crepees—the most agricultural people there—and the then blockade of its upper Volta River, stand forth as reasons for the present state of the cotton trade in the Gold Coast Colony.

West African raw cotton (*Gossypium herbaceum ?*) is imported chiefly, first from the Colony of Lagos, secondly from the Portuguese Possessions, and thirdly from the Gold Coast Colony, as will be found in the explanatory tables that follow.

It would appear that the Lagos cotton, the plant of which is indigenous, is brownish in colour, rough and short in style, and therefore does not command the higher prices.

Now, on the contrary, the cotton of the Portuguese Possessions, to wit Angola, is white, silky, and of good length in staple. When properly prepared it is as valuable as American: it is supposed to be naturalized American (*Gossypium barbadense*).

Western Africa, especially our Colonies, has become a home for many alien plants: why should not the best cotton be there naturalized, and thus reduce our demand on foreign markets?

The same reasons, if we substitute Dahomey for Ashantee, and add the intertribal wars now happily approximated to a close by the Government of Lagos, that have gone on for years in the Yoruba Kingdom, and have militated so much against its development and commercial progress, explain the past depression in this industry in the Colony of Lagos.

I was glad to find, in 1885, that a long-established and prominent house of West African notoriety, Messrs. Swanzy, took the lead in the Gold Coast Colony in the matter of the development of the Volta Valley export cotton trade. They had and have a grand inlet and outlet in the Volta River, and deserve every encouragement and success. They intended to utilize the force of the river, and divert some of it towards the working of suitable machinery which they exported to the Gold Coast. Their endeavours find favourable support in the statistics of export in this article from the Gold Coast, inclusive of Lagos, which from 1878 to 1885 were as follows :—

Article.	Year.	Quantities.	Value.
		Cwts.	£
Cotton, raw	1878	3,534	9,810
	1879	646	1,678
	1880	260	691
	1881	1,166	3,223
	1882	3,654	10,672
	1883	4,014	10,395
	1884	5,671	13,926
	1885	2,600	6,166

Of the above, there reached the United Kingdom from the Colony of Lagos and the circumjacent countries :—

Article.	Year.	Quantities.	Value.
			£
Cotton, raw . .	1881	1,093 pkgs.	3,646
	1882	3,000 ,,	8,103
	1883	415,254 cwts.	10,419
	1884	520,414 ,,	11,454
	1885	278,850 ,,	5,797

Against the foregoing, and in addition to local cotton manufactures, there were imported into Lagos from the United Kingdom cotton goods of the undermentioned values :—

1881.	1882.	1883.	1884.	1885.
£ 102,034	£ 188,069	£ 230,680	£ 225,112	£ 193,782

In the French Possessions along this Coast grants of land are given on the condition that cotton is cultivated.

In the vicinity of the Settlements on the Gambia—the export trade from which is at present very small, but could be considerably enlarged—the people of Cayor, Dualo, Fouta and Galåm cultivate somewhat this shrub, while in the kingdom of Bondou plantations are extensive.

The Settlements on the Gambia should be able to

compete with the Gold Coast and Lagos in the matter of cultivation and export trade in this article. If it will pay to buy and ship cotton to European markets from ports thousands of miles further off, it would surely pay to do the same from those Possessions.

From the Gambia and Sierra Leone there has been no export worthy of separate mention in the raw material; but I must not omit to mention that behind the latter and up the Gambia River proceeds an important and extensive manufacture of the cotton of the country, in the shape of rich country cloths, fine specimens of which were seen in the Colonial and Indian Exhibition. The currency of the River Gambia is also represented in this manufacture. I may here add that in the year, viz. 1885, when I left those Settlements there were, in the mercantile houses of Bathurst, country cloths of currency to the value of over £60,000. Such an exceptionally large stock was due to the failures of the crops in ground nuts, and to the unsettled state of the country consequent on the Baddiboo and other wars prevailing.

Superior cloths, on indigo-dyed cotton foundation, of various and quaint patterns in silk and wool, are also made by the Volofs, who have learnt the art from the Moors.

This Gambian industry admitted, in addition to supply for home consumption, of an export in pagns to the value of £480 in 1883, and of £2,742 in 1884.

Again, in such manufactures, a considerable native

industry proceeds around Lagos which should admit, in time, in addition to the supply of local wants, of a considerable export. In 1883 and 1884, against like imports to the value of £1021 and £480, there were sent out free of duty from that Colony to the Windward and Leeward Coasts, and to Brazil, pagns worth £7,403 and £6,822.

The primitive hand-loom in use among the natives is what has come for centuries to them from their ancestors, and is capable of improvement to their advantage. It deserves attention.

The nearer the coast line, the easier is it to procure European stuffs, and hence the same necessity does not exist for an extended cultivation of the cotton shrub ; yet I found that in certain parts, especially in Yoruba and in the Gambia, Mahommedan natives preferred for their tobes the home-made article, viz., the cloth loomed from the cotton thread of the country, which can bear the wear and tear of use for years.

To arrive at some estimate of supply and demand, we must pit against the foregoing statistics the imports from the United Kingdom into West Africa of cotton manufactured, with the direction they take. And we must bear in mind that the largest supply of the raw material for these manufactures reaches the United Kingdom from the United States of America, from plantations the output of which has been dependent in the main on the labour of Negroes freed from the slavery to which they before were condemned. Why

cannot Negroes in their own countries do likewise? Such information is afforded in the following Table :—

COTTON MANUFACTURED, PIECE GOODS PLAIN.

Year.	Countries.	Quantities.	Value.
		Yards.	£
1882	West Africa, Foreign .	14,005,000	127,707
	,, ,, British .	16,612,400	171,485
1883	West Africa, Foreign .	19,535,400	177,660
	,, ,, British .	22,896,200	232,006
1884	West Africa, Foreign .	20,598,200	193,882
	,, ,, British .	21,851,400	222,372
1885	West Africa, Foreign .	16,352,300	142,634
	,, ,, British .	15,082,700	149,581

COTTON MANUFACTURED, PIECE GOODS PRINTED.

Year.	Countries.	Quantities.	Value.
		Yards.	£
1882	West Africa, Foreign .	30,185,100	430,117
	,, ,, British .	22,183,100	325,044
1883	West Africa, Foreign .	41,688,100	604,790
	,, ,, British .	21,999,000	314,429
1884	West Africa, Foreign .	38,211,600	546,590
	,, ,, British .	25,309,900	358,692
1885	West Africa, Foreign .	25,698,100	340,400
	,, ,, British .	16,611,300	221,475

COTTON MANUFACTURED, UNENUMERATED.

Year.	Countries.	Quantities.	Value.
		Yards.	£
1882	West Africa, Foreign .	...	5,438
	,, ,, British .	...	...
1883	West Africa, Foreign .	...	4,871
	,, ,, British .	...	...
1884	West Africa, Foreign .	...	13,440
	,, ,, British .	...	...
1885	West Africa, Foreign .	...	16,786
	,, ,, British .	...	6,282

1883. Piece goods of mixed materials, cotton predominating, to W. A. (British) 220,100 yards, £7,597.

From the Portuguese Possessions the exports for the past eight years in this article have been :—

Article.	Year.	Quantities.	Value.
		Cwts.	£
Cotton, raw . .	1878	..	..
	1879	..	..
	1880	954	2,722
	1881	295	840
	1882	339	854
	1883	..	..
	1884	1,119	2,973
	1885	1,830	4,648

And from West Coast of Africa (not particularly designated) for a like period they were represented as follows :—

Article.	Year.	Quantities.	Value.
		Cwts.	£
Cotton, raw . .	1878	137	395
	1879	72	195
	1880	25	69
	1881	143	420
	1882	90	247

But for the later years no separate mention has been given in view of insignificance of supply.

IX.

CACAO, ETC.—Cinnamon (*Cinnamomum zeylanicum*) and Cacao (*Theobroma cacao*) grow well along this coast—especially is this proved in the neighbourhood of the Gaboon, where the Roman Catholic Mission is doing much good in industrial education in this line.

The British Possessions in West Africa, in the matter of the export of this article therefrom to the United Kingdom, are noticeable by their absence from the 'Annual Statement of the Trade of the United Kingdom, &c.;' whereas particulars of the imports into the mother-country, under 'Cacao from West Africa, Foreign, are included in the following table :—

Year.	Articles.	Countries whence imported.	Quantities.	Value.
			lbs.	£
1885	Cacao	From West Africa, Foreign	202,369	5,027
1884	,,	,, ,, ,,	231,987	5,818
1883	,,	,, ,, ,,	294,040	6,165
1882	,,	,, ,, ,,	188,628	4,173
1881	,,	,, ,, ,,	213,719	4,744
1880	,,	,, ,, ,,	180,500	4,779
1879	,,	,, ,, ,,	146,378	4,999
1878	,,	,, ,, ,,	185,197	5,553

For this supply we are mainly indebted to the Spanish island of Fernando Po, from which the export of cacao for the like period has been as follows: —

Year.	Article.	Whence.	Quantities.	Value.
			lbs.	£
1878	Cacao . .	Fernando Po	...	...
1879	,, . .	,,	...	...
1880	,, . .	,,	103,557	2,742
1881	,, . .	,,	72,473	1,683
1882	,, . .	,,	98,105	2,453
1883	,, . .	,,	255,254	5,407
1884	,, . .	,,	202,925	5,206
1885	,, . .	,,	183,423	4,696

For 1878 and 1879 there has been no special mention of this article among its exports.

Attempts have been and are being made, but on no great scale, to promote the growth in other parts of West Africa. The energetic and enterprising Herr Vohsen is doing so at Sierra Leone, and Mr. J. P. L. Davies at Lagos. May all success attend their efforts! I have myself grown healthy-looking but seemingly barren shrubs in the grounds of Government House, Lagos.

The success in Fernando Po should be an encouragement to stimulate general effort in the direction of spreading in our West African Possessions the growth of this article.

Ginger (*Zingiber officinale*) and pepper (*Habzelia aromatica*, a native of West Africa) appear under

Spices in the Imports from the West Africa Settlements into the United Kingdom, and represent industries of importance to the Native as well as European, and capable of considerable expansion. The local growth of the trade, without considering home consumption, in these articles will be observed from the following table of their export to the United Kingdom, where they are admitted free of duty :—

Articles.	Year.	Quantities.	Value.
		cwts.	£
Ginger	1879	11,951	11,098
	1880	3,142	3,000
	1881	645	742
	1882	4,067	5,004
	1883	4,600	7,847
	1884	6,053	11,971
	1885	8,355	13,351
		lbs.	
Pepper	1879	...	...
	1880	25,726	643
	1881	67,501	1,124
	1882	82,357	2,065
	1883	163,376	4,401
	1884	140,769	3,097
	1885	42,944	712

Although the foregoing statistics appear as to locality under the West African Settlements, yet as neither ginger nor pepper come within the exports from the Gambia, these figures must be deemed to apply exclusively to Sierra Leone, where ginger has been grown for some years, and where pepper has developed into an article of export since 1880. So far pepper plantations do not exist.

In the preparation of ginger, every attention should be extended by the growers to its maturity, cleansing, scraping, and drying. The better and cleaner it is exported, the less must be the cost for freight, and the greater the profit from European markets.

I may remark that the form this pepper takes for export is, after being boiled, dried and ground, similar to what we know as "cayenne": this industry is performed by women and girls.

To show the general demand in and through the United Kingdom for these articles, I give hereunder their quantities and values as imports for the past five years :—

Article.	Year.	Quantities.	Value.
		cwts.	£
Ginger	1881	27,310	...
	1882	25,485	64,409
	1883	38,112	100,314
	1884	50,358	123,100
	1885	82,775*	156,172
		lbs.	
Pepper	1881	20,795,087	...
	1882	24,777,174	582,674
	1883	31,375,589	839,003
	1884	27,876,761	824,374
	1885	31,018,450*	967,781

* Ginger from Foreign countries, 2,052 cwts. ; British Possessions, 80,723 cwts. Pepper from Foreign countries, 63,370 lbs. ; from British Possessions, 30,955,080 lbs.

It will be seen from the above that a considerable demand exists for these commodities: let West Africa

endeavour to compete on a larger scale in the matter of supply.

Doubtless many capsicums to which India is largely indebted for her exports of pepper could be introduced with advantage into West Africa, which can also boast, however, of many species.

In these as in other articles of import into the United Kingdom, there is a considerable transit and re-export trade.

Again, there is and might be supplied in any quantity the *Cubeba Clusii* as a substitute for pepper, when the latter is not sufficient in supply to meet European and other wants.

In the matter of the competition in ginger trade, I would support the foregoing by remarking that while West African ginger from its inferiority realises but, say, 30*s.* per cwt., India gets nearly 40*s.*; while the West Indian ginger, which is the favourite, fetches 60*s.* and more.

There is room, however, for improvement in the growth of this plant, and in its subsequent preparation for the market. Why not introduce West Indian plants?

For instructions on the growth of cacao I must refer my readers to the pamphlet of Mr. D. Morris, entitled "Cacao: how to grow and how to cure it."

X.

WEST AFRICAN INDIGO.—In certain parts—to my own knowledge up the Gambia River and in the Yoruba country behind Lagos—of West Africa, native indigo-dyeing as an industry is of considerable extent. The manufacture of indigo might be developed into a profitable export trade. In 1883 I took to England a sample of Yoruba indigo, which was submitted by Mr. Thisselton Dyer, now Director of the Royal Gardens, Kew, to Dr. Hugo Müller, F.R.S., Foreign Secretary of the Chemical Society, who reported that it was worth from 4*s.* to 4*s.* 6*d.* per pound as compared with fine Bengal, which was worth from 7*s.* to 7*s.* 6*d.* per pound.

My specimen contained a good deal "of earthy matter," and according to Dr. Müller, if this could be eliminated in the local manufacture, the return would be worth more.

There is a great similarity along West Africa in the modes of the manufacture of indigo. Here I do not allude to the heap of decomposed or fermented leaves of indigo-bearing plants mixed with cow-dung,

used extensively everywhere for dyeing, but to the extracted dye material, which so far has had as an industry but little growth in West Africa, and is used mostly for mixture with butter from cow's milk or "Shea" (*Butyrospermum Parkii*) as a pomatum for colouring grey hair. The world's vanity, how general it is!

The process of extracting the dye material is as follows. In a large country pot, earthenware, of some fifteen gallons, a strong extract of the leaves is made, the water covering them until fermentation sets in. The liquid is then strained off and submitted to a mode of aerating by rapid agitation promoted by taking calabashes full of it in quick succession, and allowing contents to flow back from a height of two or three feet into the pot. After a short time precipitation to the bottom of the dye matter in small grains sets in, and when it is concluded that separation has been completed, the water is poured off, and the sediment—indigo—is allowed to set, after which it is mixed with a little gum, when it is made into small shapes, balls, cones, &c. Specimens in this form are obtained from Gambia, Lagos, the Niger, and the Yoruba and Houssa kingdoms.

For purposes of dyeing articles—cotton usually, of country manufacture—the cloth is dipped into the extract unaerated, then freely exposed to the air: repeated dippings and drying fix the colour and make it lasting. Where striped or other designs

are desired, such patterns are secured by hemming up portions on which it is wished that the colour will have less effect: the dye colour is thereby on those parts less deep, and the pattern aimed at secured.

These industries, conducted almost entirely by women, are what they have been for centuries, and have remained, as others, undeveloped by contact with civilizing influences: in fact colonization, civilization, europeanization, or whatever name we may apply to the situation, has resulted in contracting the industrial area of this as of other purely native industries, and consequently has done in this direction also more harm than good.

We have not allowed ourselves to descend to the situations as we found them, nor endeavoured to make the best of them, nor with all honesty turned to their improvement on lines consistent with the conditions and requirements of the People.

Why has foreign competition been such a successful rival generally in our own Colonies?

In indigo-yielding plants our knowledge is indeed very contracted, yet a reference to the list appended of economic plants of West Africa will result in an encouraging show of known specimens in the direction of the commercial development of this important industry.

In imports from our West African Possessions into the United Kingdom, dye-stuffs are included, but

classed as unenumerated. I hereunder afford particulars for the last five years :—

Year.	Article.	Whence.	Quantity.	Value.
			Cwts.	£
1881	Dye-stuffs, &c.	Gold Coast, inclusive of Lagos	18	216
1882	,,	,,	...	...
1883	,,	,,	..	...
1884	,,	,,	230	1150
1885	,,	,,	...	...

From Sierra Leone and Gambia there seems to have been no export. In 1885 from the Portuguese Possessions, 1923 cwts., at a value of £4885, were exported.

XI.

WEST AFRICAN VINE.—I have not touched upon the large imports into West Africa of harmful spirits, wines, liqueurs, &c.; yet West Africa is not without its promise of a development of the grape industry. The grape vine is found wild in various parts.

In a letter at Kew Gardens, which I was allowed to use, from Cape Town, 7th December, 1880, it was conveyed that "a French explorer, M. Lecart, at present on the banks of the Niger, writes that he has discovered a new vine, *Vitis macropus*, which promises to be of great economical value. The fruit is excellent and abundant; the cultivation of the plant very easy; its roots tuberose and perennial. It can be cultivated as easy as the dahlia. He himself had been eating the large grapes of the vine for eight days, and found them excellent; and he suggests that their culture ought to be attempted in all vine-growing countries as a possible remedy against the *phylloxera*."

Under the Order Ampelideae in the appended list of economic plants will be found several species of Vitis of an edible nature, and doubtless capable of culture with advantage.

XII.

As regards the Settlements on the Gambia, and of Sierra Leone, the cola nut (seed of the *Cola acuminata*, Order *Sterculiaceæ*) plays a very important part and an increasing game, as the following statistics of Imports into former and Exports from latter Settlement will show (pp. 158 and 160) :—

COLA IMPORT TO THE GAMBIA.

Year.	Articles.	Countries whence imported.	Quantities.			Value.
			packages.		lbs.	£
1879	Cola Nuts	Windward Coast			375	12
		Leeward Coast			742,580	26,520
1880	,,	Windward Coast	9			79
		Leeward Coast	130	&	578,365	27,391
1881	,,	Leeward Coast	117	&	607,047	29,122
1882	,,	Leeward Coast	94	&	429,196	19,781
1883	,,	Sierra Leone	12	&	690,906	33,108
1884	,,	Sierra Leone & Goree			591,073	30,366
1885	,,	Sierra Leone & Leeward Coast			526,773	23,434

The cola nut has not been grown in the Gambia, so that the foregoing statistics represent, it may be said, the entire trade in this seed within and beyond those Settlements.

Although, according to Messrs Heckel and Schlagdenhauffen, this tree is to be found in all the West Coast of Africa comprised between 10° N. L. and 5° S. L., yet I was much amused, in making myself conversant with the traditions of the Peoples of the Gambia, 13° N. L., and their views, to find a Mandingo account to me for the absence, in his knowledge, of the cola-tree among their Flora, that his countrymen and their neighbours lied too much to admit of its growth there: a country rich in lies proved, according to his lights, barren for the cola. Among the Mandingoes, the credit for the introduction into the world of the cola and calabash (*Lagenaria vulgaris*) is given to one *Awesoo Dekarananee* of tradition; they are supposed to have come into existence together: hence when the natives give a present of cola-seeds, they are invariably enclosed in a calabash.

With reference to Sierra Leone, however, with a considerable Mohammedan population, connected with a wide-spread Interior also largely Mohammedan, there must be a considerable home consumption and Interior trade which do not affect the above statistical return, so that the figures given may be viewed as representing merely the export trade from that Settlement.

The cola-nut tree is to be found all along this coast, viz., at Sierra Leone, Liberia, Gold Coast Colony, Niger, Fernando Po, St. Thomas, Prince's Island, Gaboon, Congo, and the Portuguese Possessions.

COLA EXPORT FROM SIERRA LEONE.

Year.	Articles.	Countries to which exported.	Quantities.		Value.					
			Baskets.	Total.	£	s.	d.	Total.		
1878	Cola Nuts.	Gambia	2,256		25,088	0	0			
		Goree	18		247	0	0			
		Leeward Coast	14	baskets.	149	0	0	£	s.	d.
				2,288				25,484	0	0
			packages.							
1879	,,	Gambia	2,229		21,790	0	0			
		Goree	179		1,718	0	0			
		The Gold Coast	27		238	0	0			
		Windward Coast	11		104	0	0			
		Leeward Coast	1	packages.	10	0	0			
				2,447				23,860	0	0
			packages.							
1880	,,	Gambia	2,194		22,899	0	0			
		Senegal	3		30	0	0			
		Goree	128		1,452	0	0			
		The Gold Coast	3		31	0	0			
		Leeward Coast	3	packages.	10	0	0			
				2,331				24,422	0	0
			baskets.							
1881	,,	Great Britain	3		30	0	0			
		Senegal	33		369	0	0			
		Gambia	1,882		21,175	0	0			
		Goree	537		5,560	0	0			
		Windward Coast	2		25	0	0			
		Leeward Coast	1	baskets.	10	0	0			
				2,458				27,169	0	0

				packages.						
			Senegal	13		160	0	0		
			Gambia	1,851		18,976	0	0		
1882	,,	.	Goree	513		6,304	0	0		
			Windward Coast	7		57	0	0		
			.	3		34	0	0		
			Leeward Coast	1	packages.	16	0	0		
				packages.	2,388				25,547	0 0
			Great Britain	2		22	0	0		
			Senegal	4		72	0	0		
1883	,,	.	Gambia	2,807		27,046	0	0		
			Goree	353		4,499	0	0		
			Windward Coast	6	packages.	22	0	0		
					3,172				31,661	0 0
				baskets.						
			Great Britain	12		44	0	0		
			France	34		161	0	0		
1884	,,	.	Gambia	2,586		29,531	0	0		
			Goree	797		10,147	0	0		
			Windward Coast	31	baskets.	119	0	0		
					3,460				40,002	0 0
				packages.						
			Gambia	2,070		18,365	8	11		
			Goree	985		12,868	8	2		
			Senegal	15		225	0	0		
			Dakar	2		21	0	0		
1885	,,	.	Rufisque	3		35	0	0		
			Windward Coast	110		643	11	0		
			Great Britain	1		20	0	0		
			France	22		40	13	6		
			Leeward Coast	16	packages.	181	10	0		
					3,224				32,400	11 7

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Sufficient interest is not directed to development of this important article of commerce on the Gold Coast, where it abounds in the inland countries, such as Akim, Croboe, in which it is to be found wild. In some parts of that Colony cultivation proceeds to a very limited extent. There is a small local trade in the seed, and an export trade mainly with the Colony of Lagos.

Attention to its development is indeed small compared with what may prove to be the importance and demand for the seed in the future, whether as "Cola-chocolate," "Pick-me-ups," &c., or, in view of the steady spread of Mohammedanism from N. and E. Africa towards the West, to meet the proportionately increasing want by its followers of a stimulant, other than that resulting from the degrading and degenerating use—more frequently than not in excess—of imported spirit, appropriately called the FIRE-WATER of the white man.

It may be well to mention that a considerable export trade in cola is done from Lagos with Brazil, to the extent in value of £2,949 in 1878, and £3,560 in 1882. In 1884, £872; in 1883, £535. As the transport is effected by sailing vessels, which occupy some time in the run across the Atlantic, although, I understand, with varying loss, it gives hope that the more direct trade with Europe in this article, which it is said is likely to develop to an extent for the adulteration of beer in an unintoxicating direction, and other uses can be prosecuted.

The main difficulty is in keeping the cola fresh, which is locally done for the purposes of trade and interior transport by means of large green leaves of particular species of Sterculiaceæ or Ficus, which are used to line and cover the bly (native basket) in which colas are kept. They are also preserved to some small extent in cold water by travellers; but are as likely as not to ferment. By retailers, who incur considerable risk in having to open many times their bly—thus exposing somewhat each time to the atmosphere the seeds—the practice is resorted to of freshening up the withered seeds by packing them in wet chaff. They are thus at times enabled to deceive the buyers. The cola is used much by the natives in the Portuguese Possessions, where it is eaten with a small piece of ginger in the morning, and according to Monteiro—

"A considerable quantity of cola was formerly exported to Rio de Janeiro from Loanda, packed in moist clay or earth to keep it fresh."

This nut was recognised in Niam Niam by Schweinfurth, whose surprise was aroused in seeing it in the Monbuttoo country, where it grows wild and is called by the natives "Nangweh," who are accustomed to chew it in the intervals of their smoking. In Bornou, as a spice it was worth its weight in silver.

On it then Schweinfurth remarked: "I went on to say that it confirmed my impression that the Welle was identical with the river Baghirmy, called the

Shary; and that this nut accordingly came to me like a key to a problem that I was seeking to solve." *

West Africa must therefore not expect a continuance of the enjoyment of a local monopoly in the trade of this much-prized seed; for it must be prepared to expect and receive, as regards home consumption, all invasions from Central and Central-East Africa; and, in the matter of the development of an export trade to European countries or elsewhere, Jamaica would seem to promise to rank among fields of supply and to combat for a place among countries competing, as in Kew Report 1882 will be found from Mr. Morris on that island as follows :—

"This (the cola nut) is very plentifully distributed throughout Jamaica; having, probably like the AKEE (*Bligliia sapida*) and other West African plants, been introduced by slave ships. If necessary, several tons of the nuts could be shipped every year."

Besides, we must bear in mind the result of the very general distribution of the seed for planting purposes that has proceeded and does proceed from the Royal Gardens, Kew, in the direction of Calcutta, Singapore, Ceylon, West Indies, Java, United States of America, Canada, Labuan, &c.

In the *Lancet* of the 8th April, 1882, there will be found an interesting article on Cola, Gourou or Ombémé nut, embodying the result of an analysis of

* 'Heart of Africa.'

the seed by MM. Ed. Heckel and Fr. Schlagdenhauffen, "who have found that they do actually contain more caffein than the best samples of coffee that could be procured, and that this base is altogether free and uncombined—not therefore, as in the coffee-berry, united with an organic base; secondly, that they contain a very appreciable quantity of theobromine,* which assists the action of caffein and possesses similar properties to that base; thirdly, which is an important fact, that they contain a considerable quantity of glycose,† of which cacao presents no trace; fourthly, that the quantity of starch present is three times greater than that contained in theobroma, which explains its nutritive value; fifthly, that there is but little fat, in which respect it differs notably from cacao; and lastly, that they contain a special form of tannin, which approximates caffeo-tannic acid in its composition, and a red colouring matter, very similar to that named Payen cacao-red."

"The physiological examination of this substance has shown that its properties are essentially due to the caffein and theobromine it contains."

"The seeds, it appears, have long been used in Soudan and Western Africa for the relief or cure of diseases of intestine and liver, and especially in cases of atony of the digestive tract; also as a masticatory

* *Theobromine—alkaloid* of *Theobroma cacao*—a plant of same order as cola nut.

† Grape sugar.

or tonic, like the Areca nuts, which are held in such high esteem by the natives of India. Medically they may come to occupy a prominent place by the side of coca and other antimetabolic remedies, to which they would probably prove superior in consequence of the tannin they contain."

From the interesting pamphlet by Messrs. Edward Heckel and Fr. Schlagdenhauffen, under the title 'Des kolas africains au point de vue botanique, chimique et thérapeutique,' published in 1884, for a copy of which I am indebted to Herr Ernst Vohsen, Consul for the German Empire at Sierra Leone, the conclusions arrived at by those gentlemen I give in extenso:

I. La noix de kola contient 2,348 de caféine. La proportion des autres principes constitutifs se trouve inscrite dans le tableau qui résume nos dosages (p. 39).

L'alcaloïde existe dans la graine à l'état libre et peut être enlevé en totalité à l'aide du chloroforme.

II. On peut, au moyen de l'addition successive de chlore et d'ammoniaque, reconnaître $0^{gr}00006$ de caféine en solution aqueuse. En laissant macérer la graine dans l'eau froide, on ne parvient à extraire que le $\frac{1}{11}$ du poids de l'alcaloïde qui y est contenu.

III. La macération de la poudre de noix de kola ne la prive pas de la totalité de son tannin, de sorte que l'on ne peut pas se servir de ce procédé opératoire pour enlever à la substance son âpreté et la transformer en un produit alimentaire agréable.

IV. Les préparations pharmaceutiques de la noix de kola telles que extrait de vin, teinture, n'enlèvent pas à la matière la totalité de son principe actif, en raison de la faible solubilité de la caféine dans les divers véhicules employés à cet effet.

V. La noix de kola torréfiée perd, comme le café, une certaine proportion de son alcaloïde.

VI. Il est facile de déceler la caféine dans les noix fraîches, mais il ne nous a pas été possible de démontrer sa présence dans les feuilles, l'écorce et le bois en raison de la faible quantité de matière (5 gr.) dont nous pouvions disposer pour faire ces essais.

VII. La teneur en caféine de la noix de kola est supérieure à celle des thés de provenances diverses et des cafés commerciaux. La proportion d'alcaloïde est supérieure à celle de la théobromine contenue dans le cacao.

VIII. En comparant la noix de kola avec le café, le thé et le cacao au point de vue de leur richesse en principe azoté, chimiquement défini et cristallisable, c'est à la noix de kola que revient le premier rang.

IX. Les effets physiologiques de la noix de kola sont les mêmes que ceux de la caféine pure.

X. Le kola mâle, ou faux kola, ne contient pas de caféine.

XI. La basicité de la caféine est difficile à démontrer. Les oxydants constituent les meilleurs réactifs de cet alcaloïde ; nous en avons indiqué quelques-uns

qui, jusqu'à present, avaient échappé à l'attention des chimistes.

Malgré les formules rationnelles admises par les chimistes pour la fixation de la constitution de l'alcaloïde, on ne peut, jusqu'à présent, se rendre compte de la manière dont s'effectue sa transformation sous l'influence des divers réactifs.

XII. Le kola vrai est un antidéperditif au plus haut degré et un reconstituant énergique par son amertume et son astringence dans les cas de trouble profonds des organes digestifs. Il prend place en thérapeutique bien au-dessus du maté, de la *cocca* et du *paullinia.*

I would add that a translation of part of the above quoted Pamphlet, taken from the 'Pharmaceutical Journal,' and some further interesting data appear in Mr. T. Christy's No. 8: 'New Commercial Plants and Drugs'—a series to which I would invite the special attention of planters and consumers. To him I must record my indebtedness for the help he has from time to time afforded me in the consideration of my subject.

XIII.

TOBACCO (according to Humboldt, derived from the Haytian name for the pipe in which it is smoked), as per the following table (p. 170), which affords statistics between the United Kingdom and West Africa, exclusive of the direct trade in this commodity from United States of America, Brazil, Germany, as also from the Canaries, is only remarkable by its import into West Africa, where, if the plant be not indigenous, it has certainly become a naturalised African product, and in consequence deserves every attention locally.

These statistics only embrace particulars of European trade, both foreign and British. There is, however, a large direct trade done in this article regularly between Germany, Brazil and the United States of America, and West Africa.

It must not be overlooked that for the steady supply in the direction of our Colonies of unmanufactured tobacco, the United Kingdom is mainly dependent on foreign countries, represented chiefly by the United States of America (from which is obtained *Nicotiana tabacum*, &c.), Japan, Holland, and

FROM THE UNITED KINGDOM.

Year.	Articles.	Countries to which exported.	Quantities. lbs.	Quantities. Total.	Value. £	Value. Total.
1878	Tobacco, unmanufactured. . .	West Coast of Africa, Foreign .	2,684,046		81,269	
	,, ,,	,, ,, ,, British . .	636,204	3,320,250	16,378	97,647
1879	,, ,,	,, ,, ,, Foreign .	2,024,423		78,171	
		,, ,, ,, British . .	335,260	3,359,683	8,715	86,886
1880	,, ,,	,, ,, ,, Foreign .	3,134,006		79,230	
		,, ,, ,, British . .	302,388	3,436,394	7,622	86,852
1881	,, ,,	,, ,, ,, Foreign .	3,064,952		77,617	
		,, ,, ,, British . .	222,166	3,287,118	5,390	83,007
1882	,, ,,	,, ,, ,, Foreign .	3,266,329		95,354	
		,, ,, ,, British . .	335,521	3,601,850	13,657	109,011
1883	,, ,,	,, ,, ,, Foreign .	3,672,122		109,674	
		,, ,, ,, British . .	500,307	4,172,429	12,334	122,008
1884	,, ,,	,, ,, ,, Foreign .	2,550,461		72,190	
		,, ,, ,, British . .	525,331	3,075,792	13,333	85,523
1885	,, ,,	,, ,, ,, Foreign .	2,929,990		83,844	
		,, ,, ,, British . .	716,562	3,646,552	18,901	102,745

Java (outcome of Negro work again), Turkey, China and Germany.

In most of our Possessions tobacco will thrive, develop and refine in course of culture. India and the West Indies have put forth endeavours of rich promise: West Africa is ready to do likewise: why should we not further extend the development of this industry, and reduce thus our dependence on foreign countries?

Since 1878 there has been in the United Kingdom an import duty of 3*s.* 6*d.* per lb. on every 100 lbs. of manufactured tobacco containing 10 lbs. or more of moisture: and on a like quantity, containing less moisture, 3*s.* 10*d.* per lb.

There will be found at the end of this chapter (pp. 178, 179), the imports for four years of the above article as regards each British Settlement on the West Coast, and the main directions of supply.

I have seen species of this plant in an uncultivated and uncared-for state in the interior districts of the Gold Coast, and Lagos Colonies, as also in the West African Settlements, where the natives prefer for smoking the imported cured tobacco.

Mention of a like nature is made in an interesting paper, 'On the District of Akém in West Africa,' read in 1876 before the Royal Geographical Society of England by Captain J. Shaw Hay, at present Administrator of the Gambia, who says, "The tobacco plant grows wild in rank luxuriance untended

and unused, the natives purchasing from the Coast for their own consumption supplies of the prepared leaf sent from America."

It is the experience of the Rev. F. Ch. Dieterle of the Basel Mission, which prosecuted on the Aquapim Hills of the Gold Coast for a certain time a tobacco industry, that "if any one would try to grow tobacco in great quantity he must take care not to plant it too soon in the year, for if the leaves get ripe for gathering during the first or second rainy season, many will get rotten on the stalk, as the ribs of the leaves are too watery, so it is advisable to sow the seed not before June, so that the tobacco may be ripe for plucking at the end of the second rainy season and at the beginning of the harmattan, that is, in November and December."

On the growth of tobacco in the vicinity of the Upper Gambia and Upper Niger, the late Winwood Reade addressed the Director of Kew Gardens as follows in December 1869 :—

"I enclose in this letter a flower of the native tobacco (*Nicotiana rustica*). It is grown only in the interior—never, that I am aware of, near the coast. This may be owing to either of two reasons—

"1. Difference of soil. Wherever I have seen this tobacco, the vegetation has points of difference and contrast with that near the coast. For instance, the palm-oil tree does not grow on the same soil with this tobacco. It is a higher and drier locality.

"2. But it must be remarked that American tobacco is preferred to this country tobacco (called 'tankera'), and that may account for its not being grown near the coast. This 'tankera' is cultivated. It is grown in Fonta Djallon, Wassalow, in fact along the Upper Niger from its source, or very near it, to Sego. This, to my knowledge. But its area is probably immense. Mixed with potash it is used as snuff, sometimes smoked.

"I should mention that snuff of alien manufacture is not cared for nor much used by the natives, although they make their own from imported leaf tobacco. In the Gambia, the ground dried leaf is mixed with ashes (alkali) called Kata, made from the BANANA or PLANTAIN. Snuff appears to be extensively used both by males and females, but it is used in the mouth instead of in the nose; it is not, however, swallowed.

"In view of the many small available cultivators among the natives who could ill afford and not well, at present, understand waiting for a return, and who might be encouraged in tobacco growth and cultivation, it would seem to be more advisable for the general trade and for themselves if the crop could be disposed of in its green state to any speculating Company or Firm, on whom might devolve with pecuniary advantage the preparation of the raw material for the local and other markets."

In the Canary Islands, where the tobacco industry had to be resorted to after the cochineal pined, it was

encouraged in its infancy by the Spanish Government by the promise of the purchase of the tobacco grown in those islands. Prospects held out do not seem to have been realised to the extent anticipated, and hopes are now entertained of the increase and improvement of the industry by the purchase locally in green state of the crops. On the subject Vice-Consul Miller wrote on the Trade and Commerce in 1881 of Los Palmas :—

"Tobacco is another product which is progressing by slow degrees, and the quality is gradually improving." The best way to increase the culture of this article, observes Mr. Miller, is to buy it in its green state from the growers, so that the small producers who cannot afford to wait the time required for its preparedness may thus have an opportunity of converting it into cash as soon as they cut the leaf, for which purpose a drying-house is being constructed.

A tobacco industry, in an unmanufactured and a manufactured sense, proceeds somewhat in Fernando Po, where seed has been imported from the Canaries, and has been found to answer. Twisted tobacco is there prepared by those who have been transported from Cuba. The want of proper drying-houses seems there also to be felt.

In Bentley and Trimen, 'Medicinal Plants,' p. 191, vol. iii., it will be found stated of the habitat of the *Nicotiana tabacum* :—"There is no doubt that the tobacco is a native of some part of South or Central

America, but the precise country of its origin cannot now be determined. Martius considered it introduced in Brazil, and it is nowhere known in a truly wild state."

These views are supported by the experience in the tropical part of the continent of Dr. Schweinfurth, who in his 'Heart of Africa' states: "It is a great indication of the foreign origin of this plant* that there is not a tribe from the Niger to the Nile which has a native word of their own to denote it."

He further has stated: "Its introduction and growth found its way into the Old World since the discovery of America."

Virginia tobacco, he found, in Niam-niam, "called Eh Tobboo, its name betraying its American origin."

In his conclusions I find Dr. Schweinfurth is also, so far as I have been able to gather, supported along the West Coast.

The following information on the names in different West African languages and dialects by which tobacco is known may be here inserted with interest. In Mandingo, *tabah;* in Bambara, a dialect of Mandingo, smoking tobacco is called *tambudakha* or *didakha*, while that used for snuff, *sira* or *doli;* in Sérère or Kasink, *tabaka;* in Sarakholé or Soninke, *tankoror;* in Jola, *abaka;* in Manjago, *tobako;* in Laobé, *tankoro;* in Foulah (Peul or Phoul, &c.) its people

* Two kinds, the Virginian tobacco (*Nicotiana tabacum*) and the common (*N. rustica*).

and the Toucoleurs plant it and call it *taukoror*, while imported (or white man's) tobacco they designate *seemay;* in the Asante and Fante language, *taba;* in Houssa it is called *taba;* in Yoruba, *taba*—in which African tobacco is styled *akira*, and that from Brazil, *dzuku*.

We may fairly conclude that the introduction into West Africa of the tobacco, as of other plants, such as corn (*Zea mays*), ground-nut (*Arachis hypogæa*, &c.), was a sequence of the past slavery, carried along the return stream of that horrid traffic, from the New into the Old World—a small return indeed for the cruelties and deprivations perpetrated on Africa.

A return direct import from Brazil and the United States now proceeds in an article which slave-hunting introduced into the African Continent, where it is perhaps instinctively treated with contempt, for its cultivation has been generally ignored, with few exceptions; and the growth from the hands of the descendants of the Negroes who were robbed from Africa and condemned to promote the future of the two Americas in the room of their aborigines, who also were so basely treated by Southern Europe, is to this day preferred.

The imports from the United Kingdom of unmanufactured tobacco into our West African Colonies may be known from the following:—

Colonies.	Year.	Quantities.	Value.
		lbs.	£
W. A. Settlements (Gambia and Sierra Leone)	1881	47,474	1,179
	1882	151,811	3,601
	1883	236,802	5,855
	1884	96,849	2,375
	1885	18,465	459
Gold Coast, including (to end of 1885) Lagos	1881	174,786	4,281
	1882	383,710	10,056
	1883	263,505	6,479
	1884	428,482	10,958
	1885	698,097	18,442

According to their Blue Books for the years given, the imports of unmanufactured tobacco into the Colonies mentioned will be afforded respectively in the following tabular statement (pp. 178–9):—

Year.	Article.	Colony to which Exported.	Total.	Whence mainly.	Quantities.	Value.	Remarks.
			lbs.		lbs.	£ s. d.	
1882	Tobacco unmanufactured.	Lagos . .	732,723	Germany . . .	151,168	4,231 0 0	Nearly 70 per cent. direct from Germany, Brazil, and U.S. America.
				Brazil	164,207	3,521 0 0	
				U.S. America . .	182,890	3,649 0 0	
1883	,,	,, . .	573,637	Germany . . .	62,562	1,668 0 0	Over 50 per cent. direct from Germany, Brazil, and U.S. America.
				Brazil	158,660	4,488 0 0	
				U.S. America, &c. .	101,954	2,098 0 0	
1884	,,	,, . .	741,626	Germany . . .	68,284	1,824 0 0	Over 50 per cent. direct from Germany, Brazil, and U.S. America.
				Brazil	175,426	3,574 0 0	
				U.S. America, &c. .	161,249	3,628 0 0	
1882	,,	Gold Coast .	514,119	Germany . . .	30,788	1,411 0 0	Over 80 per cent. direct from U.S. America and Germany.
				U.S. America . .	385,977	12,196 0 0	
1883	,,	,, .	420,919	Germany . . .	66,136	1,913 0 0	Over 81 per cent. direct from Germany and U.S. America.
				Brazil	...	...	
				U.S. America . .	276,175	8,569 0 0	
1884	,,	,, .	1,768,014	Germany . . .	115,694	3,338 0 0	Nearly 76 per cent. direct from U.S. America, Germany, Brazil.
				Brazil	579,876	11,663 0 0	
				U.S. America, &c. .	636,120	18,198 0 0	
1882	,,	Sierra Leone.	1,480,883	U.S. America . .	1,369,306	18,305 0 0	Over 90 per cent. from U.S. America.
1883	,,	,, ,, .	1,289,365	Germany . . .	44,216	737 0 0	Nearly 90 per cent. direct from Germany, U.S. America, and Liberia.
				U.S. America . .	1,041,079	17,351 0 0	
				*Liberia, &c.	61,200	1,020 0 0	

1884	,,	,, ,, .	1,840,109	{Germany . . .	41,71	70 o o	Nearly all from U.S. America.
				{U.S. America . .	1,608,599	26,809 o o	
1882	,,	Gambia . .	221,066	{U.S. America . .	132,896	3,459 o o	Over 60 per cent. direct from U.S. America.
				{Windward Coast* .	82,042	2,391 o o	
1883	,,	,, . .	562,674	{France	62,295	1,039 o o	{Over 60 per cent. direct from France, Brazil viâ Goree, Germany, and U.S. America.
				{Goree (French) . .	133,280	2,221 o o	
				{Germany . . .	34,771	1,159 o o	
				{U.S. America, &c. .	110,605	1,844 o o	
1884	,,	,, . .	309,807	{France	43,301	722 o o	Over 85 per cent. direct from France, Brazil viâ Goree, U.S. America.
				{Goree	87,136	1,452 o o	
				{U.S. America, &c. .	132,683	2,212 o o	
1885	,,	†Lagos . .		(Included	in Gold	Coast Colony	Statistics.)
1885	,,	†Gold Coast .	1,735,841	{U.S. America . .	488,246	14,232 3 10	{Nearly 65 per cent. from these countries.
				{Germany . . .	108,035	3,606 10 4	
				{Brazil	527,752	11,825 19 11	
1885	,,	†Sierra Leone.	1,026,806	U.S. America . .	973,304	24,333 o o	{Nearly all from U.S. America.
1885	,,	†Gambia . .	181,416	U.S. America . .	70,525	1,763 o o	{Nearly 40 per cent. from U.S. America.

N 2

* Doubtless Brazilian tobacco.

† These Colonies charge taxes as follows on such imports:—Gold Coast Colony, 6*d.* per lb.; Lagos Colony, 2*d.* per lb.; Sierra Leone, 6*d.* per lb.; Gambia, 2*d.* per lb.

XIV.

NEXT, turning to the subject of Fibres, West Africa presents, even from our very limited knowledge of its economic botany, a rich field for development.

Take the Baobab tree (*Adansonia digitata*), or Monkey-bread, so plentiful along Western Tropical Africa. The banks of the River Gambia are studded with it: its weird-like headless form is to be seen there by thousands. The natives use its bark as fibre, its pounded fresh green leaves as *lalo*, and its fruit they eat, while the seeds thereof are used medicinally.

In the Kew Report, 1876, the Director of the Royal Gardens records that "paper manufacturers speak with one consent of the magnificent qualities of the bark of this tree. The only drawback to its use is the apparent impossibility of introducing it into the English market in sufficiently large quantities to make it commercially important. Notwithstanding what is stated of the slowness of its growth, I am still of opinion that more might be done in promoting its cultivation in India and other tropical countries."

Its cultivation need not for some years have to be

resorted to in Gambia and other parts of West Africa; the baobab grows in wild and weird luxuriance; and the few shipments of its fibre that have been effected from the former satisfactorily rewarded, in a monetary sense, the exporters.

There are also the so-called Aloes of West Africa, of the order Amarylledaceæ, among which are mentioned as recorded, according to the 'Flora Nigritiana,' "the *Hæmanthus multiflorus*, Mart. and Nodd, from Sierra Leone; *H. cruentatus*, Schum and Thonn, from Guinea, very probably the same species; *Crinum purpurascens*, Herb, from Fernando Po; *C. Broussoneti*, Herb, and *C. distichum*, Herb, from Sierra Leone; *C. petiolatum spectabile*, Herb, from St. Thomas; *Amaryllis nivea* and *A. trigona*, Schum and Thonn, from Guinea, both evidently *Crina*, and possibly the same as some of Herbert's species; and lastly, *Gethyllis pilosa*, Schum and Thonn, which from the description must be a *Curculigo*, or some allied plant."

Then in the fibre-yielding Dracænas and Aloes (Liliaceæ) there is a grand field for development. According to the 'Flora Nigritiana,' the published West Tropical African species are—*Urginea Senegalensis*, Kunth, Senegal; *Chlorophytum inornatum*, Ker, and *C. orchidastrum*, Lindl., Sierra Leone; *Allium Guineense*, Schum and Thonn, *Ornithogatum ensifolium*, Schum and Thonn, *Aloe picta*, Thunb. and *Sanseviera Guineensis*, Willd., all from Guinea.

Dracæna fragrans, Ker, from Sierra Leone and Guinea; *D. ovata*, Ker, from Sierra Leone, and *Dianella triandra*, Afz., from Sierra Leone.

I must briefly allude to the Screwpine family (Pandanaceæ), which is extensive in West Africa, but of which seemingly little is known. The epidermis from the leaves is much used, as is the case with many palms, for mats and like work.

Of this family I may mention the *Fanjahnee* (Mandingo) of the Gambia, or the self-fire-consuming tree, as the natives consider it, and as its vernacular name implies. This tree favours much the *Pandanus utilis*, and is to be found in the neighbourhood of fresh water. I have seen it in quantities in the Upper Gambia. The natives assert that the fruit when matured bursts, spontaneous combustion follows, and the result is fire desolation to the site. No Mandingo would have such a tree in his compound, viewing it as more treacherous than a fire-stick.

It is open for consideration whether jute cultivation might not also, with monetary advantage, be undertaken successfully in our Possessions. The low-lying lands that are to be found bordering the vast inland waterways along the West Coast offer suitable and rich sites.

In Kew Report for 1881 will be found the following from a commercial report, by Mr. Victor Drummond to the Foreign Office, April 7, 1881:—

"It is now about ten years since the American

Department of Agriculture became at all interested in the subject of growing Indian jute upon American soil. Seed was distributed in 1870, and experiments conducted in the Southern States. The result has shown that the plant can be profitably grown 'wherever in the Southern States there is a hot, damp climate, and a moist soil of sandy clay or alluvial mould,'"—conditions to be found at all the low-lying sites bordering or adjacent to inland waterways in West Africa.

Tiliaceæ is represented by Professor Oliver as an extensive Order, especially abundant in the Tropics. "The bark in many of these plants is very fibrous; even in the herbaceous species the fibre is important, as in the case of 'jute,' the product of some species of *Corchorus*. The same fibrous character is present to a notable extent in the fruit of some species. Many of them abound in mucilaginous juice."—Oliver's 'Flora of Tropical Africa,' vol. i., p. 240.

And on the *Corchorus olitorius* of this Order he says: "Wild or cultivated as a pot herb in every part of Tropical Africa, and also widely diffused throughout the Tropics, extending even into Australia. It varies considerably in stature, form of leaf, hairiness, &c. The valuable fibre known as *jute* is derived from this and allied species."

In the consideration of the question of the development of a more extended fibre export, I have been enlightened much by the Report of the Commercial

Conferences held in the Imperial Court of the Indian Section of the Colonial and Indian Exhibition (1886), and endeavour here to apply to West Africa the experience gained therefrom, in the hope of bringing about there such developments as have been deemed worthy of attention in India and elsewhere.

In the Conferences referred to, special notice (extracts follow, lettered *A*, *B*, *C*, *D*) was directed to the fibres suitable for textile purposes of the following :—

A. Sida rhombifolia. (Found from Senegambia to the Congo. "A very variable plant, widely diffused throughout the Tropics."—Oliver's 'Tropical Africa.')

B. Hibiscus canuabiuus. ("Cultivated for the sake of its fibre in most parts of Africa."—Oliver.)

B. Hibiscus esculentus. (*Okra*—commonly grown in West Africa as an article of food ; might be developed to any extent.)

C. Bauhiuia Vahlii. (According to Oliver, the Bauhinia is a large Tropical genus ; and of the *B. articulata :* "the bark yields a tough fibre.")

D. Eriodeudrou anfractuosum. (Found from Senegambia to the Congo : the silk cotton tree : large imports into Holland, Belgium, Germany, from the Dutch Indies, proceed in this article, called *kapok*, for filling beds, mattresses, upholstery generally—uses which have prevailed from time immemorial among the natives of West Africa.)

D. Cochlospernum Gossypium. (A genus found generally along West Africa.)

D. Calotropis gigantea. (The Order is said to widely inhabit the Tropics.)

a. "A very strong opinion was pronounced in favour of its substitution for many of the finer purposes to which *Jute* has been applied in recent years. The samples shown were only three or four feet long, while jute may often be found as much as fifteen feet. It was thought that if under cultivation *Sida* could be made to approximate nearer to jute in this respect, a very great future would open for it immediately. The fibre could be produced on the same field and by the same cultivators as jute, and for the same, or nearly the same, price."

b. "Were pronounced superior to sunn-hemp (*Crotalaria juncea*"—a large genus spread throughout the Tropical Regions of both hemispheres, with its head-quarters in Tropical Africa.—Oliver's 'Tropical Africa.')

c. "When bleached it is found to be a bright silky and woolly character, highly adaptable for admixture with wool. The length of the fibre would seem to render it valuable and economical for many purposes for which cotton is at present employed. In point of chemical features, it stands amongst vegetable fibres almost by itself, since, unlike cotton, it may be bleached and dyed by the same processes as are applied to wool. It is therefore eminently suitable for admixture with wool, but it loses in weight very considerably if treated with alkalis like cotton."

"Mr. Routledge said he had seen this fibre bleached and spun in the usual manner with admirable result, and expressed a strong opinion in favour of this extensive climber coming into European Commerce.

d. "For the purposes of upholstery, the *kapok* or the floss or hairs from the seeds of *Eriodendron anfractuosum*, and from the floss of *Cochlospermum Gossypium*, were viewed as hopeful, the latter particularly so, provided the supply could be uniform and large, and the article cheap. It was, however, the floss of *Calotropis gigantea* which seemed to be of most interest." In the advocacy of the experimental cultivation of the last-mentioned it was said: "The supply from the wild plant is too irregular to be depended upon, and hence it was thought that, if it could be cultivated on semi-waste lands at a moderate rate, by this process, a uniform supply could be maintained. Should this anticipation be realised, the fibre would be largely employed in place of cotton and for new purposes."

And for Paper-making, "the only Indian fibres that seemed hopeful were bamboo (*Bambusa*) (grown extensively on the Gambia), plantain (*Musa paradisiaca*) (groves by the mile may be seen on the Gold Coast), jute,* and *sunn* waste,* and the long stems of the Bauhinia creeper.*

"The practical result of the Conference may be briefly stated to be, that fibres that are good enough

* Vide my remarks on fibres suitable for textile purposes.

for textiles are too good for paper-making. Bamboo has been tried, and may be viewed in as forward a position as it is possible to press a new material: the gentlemen who attended the Conference argued that the Government had not concentrated its energies in developing the *plaintain* and *Bauhinia* fibres."

It was argued that it was "essential that information should be afforded respecting the quantity available, and the probable cost of any proposed new fibre." And it was stated "to be indispensably necessary in a fibre intended for paper to reduce the bulk to a minimum, so as to lessen the cost of freight to Europe, provided that this reduction did not entail any elaborate or costly process. Simple methods for doing so are known, such, for example, as beating to remove dirt, and hydraulic baling of the fibre into conveniently-sized packages."

On the fibres of the West African Colonies in the late Exhibition Messrs. Cross and Bevan, Consulting Chemists—whose analysing capabilities are now well known—4, New Court, Lincoln's Inn, London, W.C., to whom I stand much indebted for their courtesy and ready and generous help, say:—

"In these sections we found specimens of very interesting nature. The textiles of native production are extremely ingenious and tasteful in their combinations of colour. From amongst the raw fibrous

materials the following were selected for special investigation :—

"(*A*) Bast. Exhibited in the Gambia Section, but not further described. Used by the natives for a number of purposes. The fibre itself, when isolated, closely resembled jute in appearance ; while from specimens showing the bast *in situ* (a stick stripped, the fibre remaining attached so as to form a species of whip), it appeared to be closely allied to the West Indian Mahoe. The following determinations were made :—

Moisture		11·0 per cent.
Hydrolysis (*a*)		8·4 per cent.
Cellulose		74·5 ,,
Nitration		121·0 ,,
Ultimate fibres.	Length . . .	1–3·5 mm.
	Diameter . .	0·02 mm.

This fibre is very similar in composition, chemical and structural, to jute, and is capable of similar applications. From the specimens, it was to be concluded that they were obtained from a perennial, from the main stem, or more probably the branches. In regard to a probable commercial future for this fibre, the most favourable conditions of growth of the plant should be first determined. Questions of this nature are outside our province, but it scarcely needs to be mentioned that the authorities at Kew are always ready to advise and assist in the necessary investigations.

"(*B*) A fibrous Bark, in the Gold Coast Section. A bale of this was exhibited by Dr. J. F. Easmon, of Accra, with a request that it should be put through a paper-making trial.

"In external appearance it was not unlike the Adansonia, except in being comparatively free from medullary matter. The following determinations were made :—

Moisture	11·0 per cent.
Ash	7·6 ,,
Cellulose	66·5 ,,
Ultimate fibres. Length . . .	10-15 mm.

Not only in the relatively high yield of cellulose, but in the exceptionally great length of the ultimate fibres, this material is such as to command the attention of paper-makers. It only remains to add that the substance is easily treated, and that the resulting pulp bleaches under the ordinary treatment to a high colour.

(*C*) "'Grass,' epidermal strips of the leaves of *Raphia vinifera*. Exhibited by Mr. A. Sibthorpe in the Sierra Leone Section, with specimens of straw plait illustrating its more usual application by the natives.*

* A further examination of this substance comparatively with the Raffia, imported from Madagascar, which still commands a high price amongst gardeners and nurserymen, showed that it was so closely similar as to be applicable to precisely the same uses, and such an application would of course take precedence of that above indicated. This fibrous material is well worthy of further attention.

This specimen also proved itself on analysis to be worth the attention of paper-makers. The following determinations were made :—

Moisture	9·8 per cent.
Ash	2·7 per cent.
Cellulose	60·8 ,,
Ultimate fibres. Length . . .	1·5–2·5 mm.

"It is needless to say that the raw material is particularly clean; in length of fibre, but more especially in yield of cellulose, it is superior to Esparto; it only remains, therefore, to determine the cost of production, and if within the limit, to introduce this raw material into European commerce.

"Notwithstanding that, as is to be judged from appearances, but little attention has been bestowed upon the fibre exhibits in this section, results have been obtained which should stimulate inquiry into the undeveloped resources of these Colonies, in the department of miscellaneous fibres.

"In extension, we may say, the supply of good clean basts, such as the Adansonia, and more especially the one investigated, should be much increased: the demand would rise in proportion. Higher prices will be realised in proportion to freedom from Cellular (medullary) matter. The strips in the fresh state, if beaten, especially after a preliminary steep, could be greatly improved in this respect, and the yield of Cellulose (bleached fibre) to our paper-

makers rendered sufficiently high as to come into competition with the highest class of paper-making materials. We believe that it is only the low yield which prevents an extended use of Adansonia. We should estimate the value of such products between £6 and £12 a ton; but careful preparation might secure even higher prices."

Reporting on the *Sida rhombifolia* exhibited in the Queensland Section of the Colonial and Indian Exhibition, Messrs. Cross and Bevan remark :—

"This contains some very fine specimens of Jute, and also of the fibre of *Sida rhombifolia*, the latter being especially noteworthy. These fibres are similar in their main characteristics; but while they may be classed together, the *Sida* is unquestionably superior. This is shown, first, by comparison of chemical composition, the results of analyses of the raw fibres being as follows :—

	Jute.	Sida.
Moisture	10·3	10·7
Ash	1·2	0·6
Hydrolysis (*a*) . . .	15·0	6·6
Hydrolysis (*b*) . . .	18·0	12·2
Cellulose	75·0	83·0
Mercerising . . .	16·0	6·6
Nitration	125·0	137·0
Acid purification . .	1·0	0·1
Carbon percentage . .	46·5	45·0

"The Cellulose in either case is obtained in the form of ultimate fibres of the normal type, the average length being 2 mm. in both, the diameter 0,015 mm.

"Secondly: *Sida* shows superiority in point of uniformity, fineness and divisibility of the fibre bundles, and further in softness and in the colour of the raw fibre, and also in capacity for bleaching: the dyeing capacity of the fibres is about equal. It is interesting to note that the distinctions in favour of *Sida* are closely correlated with the above results of analysis.

"The net result of the comparison is, that while belonging with *Jute* to the lower grade of textile fibres, *Sida* is much to be preferred, and should certainly displace *Jute*, more especially in the higher uses to which this fibre is put.

"The *Jute* class of fibres includes this, as well as the Hibiscus order. More care is requisite in preparing these as all other textiles, and probably also the growth in the wild state may be found to produce a low quality of fibre; at least we may safely assert that cultivation would raise the quality. The processes of extraction are simple, requiring only manual labour. A preliminary steep of two to three days' duration will be necessary. Information on these points will be found in any of the standard works on fibres. We should recommend Spon's 'Encyclopædia,' Article 'Fibrous Plants,' as especially good.

"Prices in this group vary from £12 to £22 for textile fibres. To command a good price they must be clean—free from bark and cellular tissue—of good colour and length (three to eight feet).

"The root-ends should be cut off and supplied for paper-making."

So as to guard against rash adventure in the way of thoughtless speculation, I cannot do better than conclude this chapter with some general remarks by Messrs. Cross and Bevan, in case that ill-considered attention should be turned to Monocotyledonous fibres :—

"In recommending any of the following fibres (Penquin, *Bromelia P.; Sanseviera z., Agave K., Gri-Gri, Acrocomia sclerocarpa*) to the attention of West Indian cultivators, this question (the superiority in yield of Phormium) must be taken next in order; after which there comes the question of the process of obtaining the fibre, together with those of supply and transport. Assuming a satisfactory decision on these latter points, attention should be confined in each locality to one, or at most two, of those which have been shown to be superior. Much time has been wasted by diffuse investigations in the province of fibres, and the cause lies in the absence of recognition of the precise criteria of value. It is quite certain that the conditions of European markets and manufactures are not such as to encourage any large increase in the *number* of vegetable fibres, more especially of the Monocotyledons. The struggle is severe, and only the fittest survive. There is no necessity for the future that the question of fitness should be left to work itself out. The application of

criteria now well established enables us to make definite selections on the basis of superiority. The authorities in the several islands should decide generally that the growth and preparation of a fibre is desirable, then a particular fibre—the best for each locality—should be selected, and the trade in that fibre thoroughly organised. The importance of an organisation cannot be overestimated, and in support of this we may cite the case of the trade in jute. There are, as we know from the results of investigations, not a few fibres capable of replacing this particular bast, some in fact of the same class being superior in all essentials. Nevertheless the trade in jute holds its own unassailed, and the cause, in so far as it does not reside in intrinsic superiority and commercial fitness, must be sought in the concentration of attention upon this fibre, and the resulting organisation of the trade. These facts deserve to be borne in mind by all who are contemplating the founding of any such enterprise.

"There is a good market for Monocotyledonous paper-making fibres. The preparation involves machinery, but this may be of the simplest kind, as in the preparation of Manila (*Musa T.*) in the Philippines.

"We recommend Mr. Morris's brochure on West Indian fibre-making plants (Jamaica, 1884).

"The fibre from *Musa Paradisiaca* is generally inferior.

"We have generally found the Sanseviera fibres of high quality. Bamboo, which may be taken in this group, we do not think worth attention.

"*Crotalaria juncea* gives a very valuable fibre, which ought to be more extensively used. In this case cultivation and very careful preparation would be necessary.

"Generally speaking, we think the West African Colonies specially adapted to the supply of paper-making basts—a regular supply of which would command extensive application."

In conferring with Messrs. Cross and Bevan, I remarked that in West Africa fibres and grasses, as indeed its general economic botany, must be viewed as comparatively unknown ; and I laid stress on the fact that little could in such direction be done except by the visit or establishment of analytical chemists as a branch of the medical departments—more particularly qualified natives conversant with the languages. Their views may be gathered from the following :—

"We are entirely of your opinion that investigation on the spot by a competent man would lead to immediate practical results. So much depends upon a right selection, and this in turn upon local circumstances, that such a course is the only one to be recommended. A great point is the organisation of the industry : the supply must be certain and regular.

"The matter may also require attention on this

side, in the early days at least; as the manufacturers may need convincing as to the merits of new things.

"We need scarcely say that it is better to err on the side of scepticism than of promises not to be realised, and in selecting a man for the task we should advise one who has had a full share of 'negative' experience."

XV.

Of the Exports from and Imports into Western Africa of wood and timber I have drawn up from official sources the following tables (A and B), for eight years. For those on the spot they would prove of more interest and use had they contained the Colonies and Countries in each case: such data are not offered, and could therefore not be taken advantage of by the writer.

A.—Wood and Timber Exports from Western Africa, 1878 to 1885.

Year.	Articles.	Countries whence imported.	Quantities.	Value.
			Tons.	£
1878	Wood and timber unenumerated.	From the West Coast of Africa, not particularly designated	Nil.	Nil.
1879	,, ,,	,, ,,	,,	,,
1880	,, ,,	,, ,,	1,733	14,892
1881	,, ,,	,, ,,	No	mention.
1882	,, ,,	,, ,,	1,458	10,754
1883	,, ,,	,, ,,	1,441	11,102
1884	,, ,,	,, ,,	1,395	9,980
1885	,, ,,	,, ,,	1,181	9,565

B.—Wood and Timber Imports, the Produce and Manufactures of the United Kingdom, into Western Africa, 1878–1885.

Year.	Articles.	Countries to which exported.			Quantities.	Value.
					Loads.	£
	Wood and Timber : Rough, split, &c. . .	West Africa,		Foreign	784	3,932
1878	Wood manufactured : Staves and empty casks	,,	,,	Foreign	...	81,338
	,, ,, ,,	,,	,,	British	...	21,002
1879	,, ,, ,,	,,	,,	Foreign	...	68,405
	,, ,, ,,	,,	,,	British	...	16,814
	,, ,, ,,	,,	,,	Foreign	...	67,220
1880	,, ,, ,,	,,	,,	British	...	16,506
	Unenumerated . .	,,	,,	Foreign	...	5,748
1881	Wood manufactured : Staves and empty casks	,,	,,	Foreign	...	75,381
	,, ,, ,,	,,	,,	British	...	13,442
	Unenumerated . .	,,	,,	Foreign	...	5,214
1882	Wood manufactured : Staves and empty casks	,,	,,	Foreign	...	86,077
	,, ,, ,,	,,	,,	British	...	18,159
1883	Wood and Timber : Rough, hewn, sawn or split	,,	,,	Foreign	662	2,838
	Wood manufactured : Staves and empty casks	,,	,,	Foreign	...	66,730
	,, ,, ,,	,,	,,	British	...	13,320
1884	Wood and Timber : Rough, hewn, sawn or split	,,	,,	Foreign	346	1,514
	Wood manufactured : Staves and empty casks	,,	,,	Foreign	...	54,245
	,, ,, ,,	,,	,,	British	..	14,761
	Unenumerated . .	,,	,,	Foreign	...	10,127
1885	Wood and Timber : Manufactured : Staves and empty casks	,,	,,	Foreign	...	62,300
	,, ,, ,,	,,	,,	British	...	15,966
	Unenumerated . .	,,	,,	Foreign	...	13,545

Now, on the subject of West Africa timber Export trade, I have made many enquiries, but learn that so far as the United Kingdom is concerned, although considerable business was done some thirty or forty years ago from the Gambia and Sierra Leone, it may be said to have altogether ceased, or to have sunk into the export done in dye-woods and ebony, most of which has been carried to Liverpool by the lines of steamers known as the "British and African" and "African Steamship" Companies, by the Imperial German Mail Steamer line, started in 1882; and by French, Belgian and Dutch steamers that ply now as rivals in that trade, also with certain success.

This allusion to the past will be found supported by a reference to a useful publication in 1852 of a descriptive catalogue of the woods then commonly employed in the United Kingdom for mechanical and ornamental purposes, entitled 'Turning and Mechanical Manipulation, etc.,' by Mr. Charles Holtzapffel.

The same field of vast extent that was found to offer material for a profitable export trade in years past still exists, but conditions of demand and supply have altered, which, with the high West African freight tariff, and a comparative absence (at least in past years) of sea transport competition, have militated so far against its revival.

Of the French Possessions of Senegambia, Gaboon, etc., useful particulars of the specimens of woods

already brought to notice as fit and useful for timber industries and other wood-work will be found respectively at pages 126 and 148 of the 'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1878.'

The principal of such woods, as regards Senegal and Gaboon, have been :—

SENEGAL.

		Vernacular name.
1. Palmaceæ	*Borassus flabelliformis*, L.	Ronier.
	(*æthiopum ?*)	Run.
2. Rubiaceæ	*Nauclea Africana*, Willd	Koos.
3. Anonaceæ	*Uvaria parviflora*, Rich.	Diar.
4. Sterculiaceæ	*Eriodendron caribæum*, Don	Binters.
5. Olacaceæ	*Balanites ægyptiaca*, Del.	Loump.
6. Meliaceæ	*Xylocarpus toulocouna*, Stend.	Toulocouna.
7. Cedrelaceæ	*Khaya senegalensis*	Cailcedra.
8. Anacardiaceæ	*Spondias Birrea*, A. Rich.	M'Birr.
9. Combretaceæ	*Combretum glutinosum*, Periot.	Ratl.
10. Leguminosæ	*Pterocarpa senegalensis*, Stend.	Meon.
11. ,,	*Sterculicra elaphroxylon*	M'Bilor.
12. ,,	*Pterocarpus Adansonii*, DC.	Kino, Vene
	(*erinaceus ?*)	or Wenn.
13. ,,	*Dalbergia melanoxylon*, Guill. et Perr.	Dialambam.
14. ,,	*Tamarindus indica*, L.	Diakar.
15. ,,	*Bauhinia frutescens*, Lam.	
16. ,,	,, *reticulata*, DC.	M'Guiguis.
17. ,,	,, *rufescens*, Lam.	Bei.
18. ,,	*Acacia Adansonii*, Guill. et Perr.	Gonakie.
19. ,,	,, *albicans*, H. B. K.	Kodde.
20. ,,	,, *dc albata*, Link.	
21. ,,	,, *lutea*	Remde.
22. ,,	,, *microphylla*, Willd.	M'debargua.
23. ,,	,, *vera* (*Verek ?*), Willd.	Neb. neb.
24. ,,	*Mimosa polyacantha*, Willd.	Souné.
25. ,,	*Dctarum senegalensis*	Detarr.
26. Sterculiaccæ	*Sterculia cordifolia*	N'dimb.
27. Leguminosæ	*Dialium nitidum*	Solum.
28. Ebcnaceæ	*Diospyros ebenum* (*mespiliformis*, Oliv.).	Ebénc.

GABOON.

		Vernacular Name.
1. Verbenaceæ .	*Vitex cuneata*	Evino.
2. ,, .	*Avicennia africana*, P. Beauv. .	Garigari.
3. Bignoniaceæ .	*Spathodea campanulata* . . .	Thiogo.
4. Sapotaceæ .	*Mimusops*	M'Bimo.
5. Anonaceæ .	*Xylopia æthiopica*	Ogana.
6. Hypericaceæ .	*Haronga madagariensis* . . .	Ogina-gina.
7. Amyridaceæ .	*Bursera*	Ocoumé.
8. Simarubaceæ.	*Irvingia Barteri*	Oba.
9. Chrysobalaneæ	*Chrysobalanus Icaco*, L. . . .	M'Pondo.
10. Leguminosæ .	*Pterocarpus angolensis* . . .	Santal rouge.
11. ,, .	*Pentaclethra macrophylla*, Benth.	Owala.

As regards West African economic botany much interest will be afforded from a perusal in Martin's 'British Colonies,' compiled from the official records of the Colonial Office, and published in 1843, of the particulars of the past trade of our Possessions in West Africa.

The native names according to that work of the different species of timber exported then from Sierra Leone for ship-building and carpenter's work were—

1. Co Tarlosar, or African oak.
2. Tolongah, or brimstone.
3. Bumia, rather scarce.
4. Cooper
5. Kow.
6. Couta.
7. Roth.
8. Wossomah.
9. Jumo.
10. Backam.
11. Toper-canico
12. Mooll (the tree produces vegetable butter.)
13. Sop.
14. Kelill.
15. Cong.
16. African almond.
17. Bombay.
18. Dyewood.
19. Pissaman.
20. Pissaman (no marine animal of any kind attacks it).

21. Black oak.
22. Wismore.
23. African cedar.
28. Arwoora.
29. African mammee apple.
30. Cale.
31. Lowland boxwood.
32. Singa-singa marah.
33. African pine.
34. Highland boxwood.
35. Singuoora.
36. Cabooco.
37. Brimstone.
38. Bessey.
39. African mulberry.
40. Mangrove.

Some of these timbers have been botanically named ; and as to the remainder, the vulgar names should help the enthusiast to follow up and supply, later, material on which completion of classification can be effected.

There follows a list, obtained from Kew, of specimens of woods collected in the River Bagroo in 1861 by Mr. Mann :—

Botanical Names.	Name in Timineh Language.	Nature and Extent.	Circumference of Stem.
			feet.
1. *Oldfieldia africana**		Abundant, timber good.	15
2. *Malortica?*	Kawattia	Abundant	10
3. *Euphorbiaceæ*	Fibarroh	Often seen	12
4. *Omphalocarpum procerum*, P. de Beauv.	Fidroh.	,,	8
5. *Zygia fastigiata*, E. Mey.	Apoon.	Abundant, and fit.	12
6. *Albizzia?*	Apina	,,	10
7. *Cicca?*	Sagga	,,	7
8. *Parinarium excelsum*	Bisp	,,	10
9. *Erythroxylon? Coca*	Wismore	,,	8
10. *Vitex*	Cantong	Often seen	8
11. *Holarrhena Africana*, A. DC.	,,	,,	7

* Sierra Leone "African oak."

It is stated of Sierra Leone woods in Martin's 'British Colonies' that "the grain of several of these woods is very rich, and the furniture made therefrom not only durable but extremely beautiful. In Mr. Forster's elegant mansion at Hampstead there are several articles of furniture made from African mahogany which would vie with the wood of any country in the world; and for ship-building the African teak is now generally and deservedly esteemed."

By way of comparative interest I here give an extract from a return of principal Exports from Sierra Leone between 1827–1835, which I have taken from Martin's Work :—

Articles.	1827.	1828.	1829.	1830.	1831.	1832.	1833.	1834.	1835.
Timber, loads	10,742	1,114			18,983	24,048	1,771	16,951	9,302
Camwood, tons	550	363			592	644	975	911	802
Palm oil, gallons	27,011	75,676			*t.* 364	*c.* 397	*c.* 480	*c.* 592	928
Rice, tons	392	107			200	78½	875	785	558
Copal gum, casks	81				18	96	133	87	197
Ginger and arrowroot						60	290	139	447
Coffee, hghds.		3			5				6

t. stands for tons, *c.* for casks.

The following is an extract from a letter addressed on the 9th January, 1832, by Mr. M. Foster (of the then firm of Foster and Smith, New City Chambers) to the Secretary of State for the Colonies :—

"Within the last twenty years the increase in the trade in palm oil, timber, and beeswax has been very great. Attempts are making in Gambia and else-

where on the Coast to introduce the cultivation of some articles of produce new to the trade of Africa; but these endeavours require time, on account of the unenlightened state of the natives, the very recent abolition of the slave-trade, and its partial continuance by other nations.

"In several cases, however, the natives have proved themselves capable of entertaining new ideas of trade and cultivation more readily than might have been expected. The trade in teak timber for ship-building was unknown in Africa twenty years ago; the annual importation of that article from Sierra Leone at present is from 15,000 to 20,000 tons of British shipping annually.

"Fifteen years ago it was not known that mahogany grew in the Gambia. Since that period several thousand loads of mahogany have been shipped to England from our Settlements on that river; and although the natives would not at first cut and prepare it for shipping, they are now willing to supply any quantity of it which this market may require."

The following information* is afforded on prices of articles mentioned in the markets of the Gambia, 1833. African teak, £3 10*s.* per load; camwood, £12 per ton; mahogany of various kinds at £4 currency or £3 9*s.* 4*d.* sterling. Ebony of very good quality grows abundantly in Saloum River, and partially in Gambia. Dittach, a very hard and durable wood, stands well under

* Martin's 'British Colonies.'

water, and is used in the construction of vessels, &c. In support of past facts as regards the export trade that was carried on from the Gambia, and of my assertion that the same field of supply now presents itself, I will only refer to the list (pp. 206–7) of the representative exhibits that were sent from those Settlements to the Forestry Exhibition, 1884.

Detailed particulars are afforded of some thirty-two different specimens of woods, some of which are very fine indeed, and should commend themselves to the nursing and protecting care of wood dealers and cabinet-makers. The prices given may seem high, but I can advance that the finest of the woods, such as mahogany, rosewood, &c., could be, with inducement and encouragement, purchased at the Gambia at 2*d.* per foot. Dye-woods will be found touched upon briefly in a separate chapter of this work.

Although I give separately, for locality sake, the foregoing, the Gambia Flora may be viewed as identical with that of Senegambia, on which Messrs. Guillemin, Perrottet and Richard wrote, in 1830–1833, their 'Floræ Senegambiæ Tentamen.'

Of course steam may have interfered somewhat with the development, or rather thrown back the immediate necessity for the export development, in an extended sense, of the Gambia timber-floating industry; yet, so as to remove any wrong impression my remarks might without further explanation give

Numerical Order.	Native name, and in what language.	Diameter of tree.	Average height of stem, before branches are reached.	Quantity and locality as to site.	Countries where found.	Local rate.	Order.	Genus.	Remarks.
		feet	feet						
1	Roberobe J Wolo M	4	20	Plentiful, and near river.	Borders of River Gambia.	6*d*. per sq. foot, inch thick.	...	...	Boat and ship timber.
2	Tamba coombah M Nehw J	1½	10	...	...	1*d*. per sq. foot, inch thick.	...	...	Used for ship timber; fruit eaten; good oil; kernel refuse turned into soap.
3	Mangee J Manco M	1½	20 to 40	Plentiful near River Gambia.	...	,,	Combretactæ	Laguncularia	Red mangrove. Used as rafters and firewood.
4	Wolloa M	4	25	Near river.	...	6*d*. per sq. foot, inch thick.	...	...	Dry and wet specimens, used for canoe and ship timbers.
5	Mangeebugan J Jubu M	1½	20 to 40	...	...	1*d*. per sq. foot, inch thick.	Rhizophoreæ	*Avicennia tomentosa*.	Dry and wet specimens, used for canoe and ship timbers; also tool handles.
6	Ere J Coarrao J Hilep J Kaimbo M	4	25 to 35	...	...	..	...	...	Dry and wet specimens.
7	Wene J Kaayno M	4 to 5	40 to 50		...	6*d*. per sq. foot, inch thick.	Leguminosæ	*Pterocarpus erinaceus*.	Gambia rosewood. Ship timbers and cabinet work.
8	Run J Siboh M	1½	40 to 80	...	...	1*d*. per sq. foot, inch thick.	Palmæ	*Borassus æthiopum*.	Used for piles to wharves; rafters; house-posts.
9	Hie J Jallow M	6	30 to 40	Abounded and near river.	...	6*d*. per sq. foot, inch thick.	Meliaceæ	*Khaya senegalensis*.	Gambia mahogany. Used for cabinet work; ship timber and large canoes.
10	Tumbuyere M	4	40 to 45	...	...	,,	...	...	Used for ships' timber and for furniture.
11	Dimba J Dootah M	3	15 to 20	...	...	,,	...	...	Used for ships' timber and for furniture.
12	Hewere J	3	10	Inland, and near river.	Everywhere along banks.	Wood not much.	...	...	Fruit is red; wine made from it by natives.
13	Bare J	5	18 to 20	Inland.	Saloum Goree.	1*d*. per sq. foot, inch thick.	...	...	Small timbers; boat and canoe; fruit made into syrup.

15	Hardar		3	15	...	...	...	...	
16	Hose	J	2	10	Inland and near river.	Borders of River Gambia.	Used sparingly.	...	...	Used for pumps.
17	Sanhalemanar		3	20	...	...	...	...	...	
18	Nebneb and Tarbarangu	J M	5	26 to 30	...	...	...	...	...	Red wood used for tool-handles and mallets; bark used for rope; grows in swampy places.
20	Talle M'baro Dattack	M J	3½	40 to 45	Inland	Adjacent to River Gambia.	6*d.* per sq. foot, inch thick.	...	...	A poisonous tree, used for ordeal purposes: by Jolofs and Mandingoes used for ships' timbers.
21	Kooroolomgo tt	M J	1	8 to 10	Plentiful on waterside.	Northern bank Gambia.	...	...	...	Hard and durable. Employed in making stockades.
22	Koolookulo	M	...	...	...	...	...	...	...	
23	Kererereketto	M	...	...	...	...	...	...	...	Bark used for medicinal purposes.
24	Koonjo	M	...	...	...	...	...	...	...	Leaves and bark used as yellow dye wood used for making alkali.
25	Sinpjang Senjeng	M J	¾	8 to 10	Found inland	Southern side Gambia.	...	...	...	Bark used in manufacture of beehives to keep grass together.
26	Singoeko	M	,,	,,	,,	,,	...	...	...	Root and bark used medicinally.
27	Tambar Tarbar	M J	2	25 to 30	,,	,,	...	...	...	Bark used for aperients, and decoction of leaves for toothache.
28	Kookooho Hallum	M J	...	...	...	...	...	...	...	Native plum-tree.
29	Barno	M	Said	to be	same as	Nebneb	...	...	...	Query ? ebony.
30	Rubber-Taul ,, Pholey	J M	3 to 4 inches	30 to 40	Inland on both sides of River Gambia.	All along River Gambia.	...	Apocynaceæ.	Landolphia ?	Fruits and bark used for tanning. Best rubber-producing.
31	Mampatta		...	...	...	...	...	Rosaceæ	*Parinarium excelsum.*	Rough-skinned plum of Sierra Leone.
32	Ditack	J	...	...	...	...	...	Leguminosæ	*Detarium senegalense.*	

J = Jolof. M = Mandingo.

It may be said that above abound. If there were a big demand, timber trade of Gambia might be reopened to former exports. Good hard and beautiful woods could be supplied locally at 2*d.* per foot.

rise to, and to do justice to local talent, I would mention that although West Africa has ceased—let us hope only temporarily—to form one of the timber Centres as regards export trade in this commodity, a quiet, unnoticed and unpretentious but extensive and important local timber industry proceeds in many directions. I will specially give two. First, let us ask ourselves—or, rather, let commercial agents and merchants in West Africa ask themselves—how produce is brought to them, or how they can send for it, and how their goods get to the native markets. Is and has not the transport been effected by means of the canoes and cutters that have been built and floated by the Negro mechanics, and that are and have been manned by native paddles and sailors? The tonnage of the Gambia carrying power, represented by the local cutter industry alone, is returned at 2,500.

Next, look at the general and extensive improvement in the style of house along the Coast—the marked and growing substitution—whether for comfort and coolness is another question—of frame for mud and wattle houses.

Such a provision (as transport) so essential, and improvements so marked, offer, I contend, results on which the country is to be congratulated.

It has been conveyed to me by Mr. G. S. Saunders that in the absence of any regularly organized system of timber supply such as exists in the teak, mahogany, and South America cedar districts, it would be

impossible to introduce the woods of West Africa into England at anything like a marketable price. This I am open to question: the assertion is not supported by the past trade—and maybe our prices and freights can be lowered to compete with tariffs of other markets. As a rule, timber for import purposes, it may be convenient to know, should, he conveys, be well-grown, clean, straight, free from knots, and well squared. There should also be given diameter—when squared—procurable, and the average length and quantity available of straight timber before getting to the fork or branches.

Timber trade, as others, is very conservative, and it is a difficult thing to supplement or supersede what is already in use and demand.

On West Africa as a field for the production of walking-sticks, I addressed Messrs. Howell & Co., the widely-known manufacturers of such articles, of Old Street, City Road. Those gentlemen were good enough to reply: "We have no doubt that many sticks from the West Coast have occasionally reached us, but they have been in such small quantities that we have not taken note of them, and at the present time we cannot speak positively as to any of our sticks being the product of this region. We should imagine, however, that there must be a large number of woods and shrubs which would be very useful for our manufacturers, and we should be glad of some opportunity of getting samples."

In the commercial transformation now proceeding along West Africa by the general substitution of companies for private enterprise—one of the outcomes, and a healthy one, of a more divided trade and of the gradual disappearance of monopolies—it should be more easy, in the sense of having more available capital, to establish plantations, either as a speculation or as model farms for the enlightenment of the natives —on whom business is built, and in a great measure depends—of the country, both in the direction of the extension of the knowledge and treatment of the products of their countries available for use and of demand.

It has often occurred to me as surprising that efforts of the mercantile world in West Africa, represented in some instances by merchants having a vested and long-standing interest in the place, and by agents of merchants in other cases, should have resulted in so little comparatively towards the promotion of economic botany of that part. I have ventured to ask them individually what they have done in the many years they have been associated with West Africa, and I know of no instance in which any one was able to give what he considered a satisfactory answer. I am aware that there are exceptions in putting forth efforts and in setting noble examples, and to them be all praise and honour—if such should be extended for self-interest, or duty done.

I would here refer to our Colonies, where the

mercantile houses are mainly dependent on imported labour, in the person of the fine Krooboy of the Liberian Republic. There one may see these men in thousands. They are attached by hundreds to certain houses, and for a fixed time—usually two years—when they are sent back to their country and replaced on like terms. These men are fully employed in the busy trade season, which only lasts so many months: for the rest of the year they are comparatively idle, whereas local and absent merchants should satisfy themselves that they had the return they are entitled to for the outlay consequent on the employment of so many hands, and they can best do this by getting grants of land for agricultural purposes, to be worked, by their employees during slack seasons, in cereals and other products of economic value.

View the maintenance alone of such numbers, which has to be provided for by the employers. Whether it be in yams, plantains, rice, or kouskous, the product should and can be the result of an exertion put forth and insisted upon, as I have brought to notice. Acknowledge also the value of such employment as additional lessons for the inculcating of increased energy and instruction. Natives are said to be idle and lazy: then teach them and rear them up as I have suggested. We too have had our idle and nomadic and untutored age.

Next, economic plants of commercial value elsewhere should be introduced: fields would be thus

also ready for the home, care, growth and subsequent distribution of seedlings, and young plants or trees might in the first instance issue from the imaginary (but let us hope it will prove a reality) botanic station, garden or allied institution I later advocate for West Africa.

I cannot find a more fitting place for the insertion of the noble sentiments of Mr. Mathew Foster, expressed some forty years ago :—

"If I am blessed with health and life for a few years longer, I do not despair of increasing the number and value of our African imports. It is the surest method of improving Africa and benefiting the mother country, and it becomes a British merchant to carry his views sometimes beyond the boundary of sordid gain."

From the Gold Coast Colony no specimens of the wood of that part has reached commercially, to any purpose, England, if any other country. Let us hope there is a good time coming, for trees capable of affording good, useful and serviceable timber abound there, as on most parts of that coast line : there, however, transport to the sea offers, with one or two exceptions, a difficulty at present insurmountable.

I may with convenience here insert the names of specimens contributed from behind Accra by me to Kew in 1882–83 :—

Capparis erythrocarpa, Isert.
Hibiscus microphyllus, L.

Grewia pilosa, Lam.
Chailletia flexuosa, Oliv.
Bandeiræa simplicifolia, Benth.
Schotia simplicifolia, Sch. and Thonn.
Bryophyllum calycinum? Salisb.
Luffa ægyptiaca, M.
Passiflora fœtida, L.
Scaevola Lobelia, L.
Ipomoea palmata? F.
Scoparia dulcis, L.

Cleome ciliata, Sch. and Thonn.
Ionidium enneaspermum, Vent.
Sida carpinifolia, L.
Hibiscus micranthus, L.
Indigofera tinctoria, L.
Tephrosia purpurea, Pers.?
Lonchocarpus Barteri, Benth.
Schrankia leptocarpa, DC.
Oxyanthus breviflorus, Benth.
Oldenlandia caffra, E. and Z.
Blumea aurita, DC.
Dæmia angolensis, Dene.
Strychnos?
Ipomœa filicaulis, Bl.
Datura alba, Nees.
Phyllanthus niruroides?

I must not omit to make here special reference to the "Odoom" tree of the Gold Coast—where it is "fetish"—known as "Oroko" in Lagos (*Chlorophora excelsa*). To those Colonies this wood is invaluable, as it can withstand for years not only the weather, but also the attacks of the "white ant." It is used widely for building purposes, as beams, planks, window-framing, shutters, shingles; also in furniture.

I am informed that a shingle roof of this wood lasts fifteen to twenty years.

Then, again, the valley of the upper Volta river is handsomely studded with the graceful West African cycad—*Encephalartos Barteri*—a consignment of which to Europe for distribution as a speculation is worthy of consideration.

On it, the Rev. C. Schönfelt, of the Basel Mission, wrote in 1875 to Sir Joseph Hooker as follows :—

"The first time I saw this tree (in 1865) I was struck with its beauty. Imagine a rocky hill overgrown with newly-sprouting grass, shortly after the yearly burning of it, here and there a Shea-butter tree, but above all this beauty for a palm, not more than four to five feet high, with its erect, dark-green, shiny branches, shooting out of the crevices of the rocks, and you have the native home of my *protégé*. I heard that it is confined to very few places thereabout. It is called by the natives the ghost palm, with the explanation for this term that the oil palm (*Elais guineensis*) was given by God to the living Negro, the ghost palm to the shades (because the living Negro finds no use for it). After 1865, the way to those parts was shut up in consequence of the Ashantee raid, which Sir John Glover opened again by his successful campaign. This enabled me to revisit the upper Volta again as far as Drome, and to bring the tree with me."

Growing specimens can now be seen in the Palm

House, Kew, which I was fortunate to be able to supply from the Gold Coast.

To allow of appreciation of the difficulty of securing information, I was amused by a description of a tree given to me by an influential native near Lagos. I saw suspended round his neck a piece of dark-coloured wood, shaped as a heart, representing a "fetish" symbol, he himself being a "fetishman." Thinking it ebony, I asked the wearer what he knew of it. He replied that it was from a very wonderful tree, which necessarily grew in an isolated position, its influence being so great as to prevent anything from growing near to it. He even added that if a man were to walk under it, and an ant fell from the tree on him, he would instantly become a eunuch—veritable upas tree!!

Of the Colony of Lagos, among the chief component parts of its forests are to be found the following specimens, which were contributed therefrom by me, ably assisted by Dr. Rowland, in 1883, to the Royal Gardens, Kew:—

Tetracera obtusata, Pl. forma.
Monodora tenuifolia, Benth.
Cissampelos Pareira, L.
Gynandropsis pentaphylla, DC.
Ritchiea polypetala, Hook. f.
Ionidium enneaspermum, Vent.
Oncoba glauca, Hook. f.
Carpolobia alba? Don.
Two detached flowers only—apparently of *Allanblackia floribunda*, O.

Sida cordifolia, L.
Abutilon indicum, Don? imperfect.
Hibiscus surattensis, L.
Impatiens Irvingii, Hook. f.
Sterculia tragacantha, Lindl.
Sterculia cordifolia, Cav. (= *Cola*, as this specimen shows).
Acridocarpus Smeathmanni, G. and P.
Aubrya gabonensis, Baill.
Xanthoxylum senegalense, DC.
Irvingia Barteri, Hook. f.
Heisteria parvifolia? in fruit.
Gomphia reticulata, P. de B.
Trichilia Prieureana, A. Juss.
Paullinia pinnata, L.
Blighia sapida, Koen.
Ratonia unijugata, Baker, forma?
Ratonia sp? ♂ fl.
Sorindeia? sp. ♂ fl. only.
Cnestis ferruginea, DC.
Aglæa obliqua, P. de B.
Byrsocarpus coccineus, S. and T.
Crotalaria falcata, V.
Tephrosia Vogelii, Hook. f.
Abrus precatorius, L.
Erythrina senegalensis, DC., forma.
Rhynchosia calycina, G. and P.
Cajanus indicus, Spreng.
Sophora tomentosa, L.
Sophora oligophylla, Baker.
Millettia Thonningii, Baker.
Baphia nitida, Afz.
Ormocarpum verrucosum, P. de B.
Ecastaphyllum Brownei, Pers.
Stylosanthes erecta, P. de B.
Macrolobium? M. Palisoti, Benth.? (imperfect).
Baikiæa insignis, Benth.
Cynometra? cf. *C. Mannii.*
"Apara tree," leaves only : *Pentaclethra macrophylla*, Bth.
Chrysobalanus Icaco, L.

Kalanchoe crenata, Haw.
Combretum racemosum, P. de B.
Combretum mucronatum, Thonn. (Laws.).
Dactylopetalum Barteri, Hk. f.
Eugenia aff. E. calophylloidi.
Eugenia owariensis, P. de B.
Tristemma hirtum, P. de B.
In fruit only : *Dicellandra ?*
Lawsonia alba, Lam.
Cucurbitacea dub.
Mormordica cissoides, Pl.
Telfairia occidentalis, Hook. f.
Adenopus longiflorus, Benth.
Hydrocotyle bonariensis, Lam.
Mussænda Isertiana, DC.
Oldenlandia decumbens, Hiern.
Oldenlandia lancifolia, Schf.
Morinda longiflora, Don (frct.).
Pavetta Baconia, Hiern.
Sabicea calycina ? Benth.
Cremaspora africana, Benth. ? (Buje).
Craterispermum cerinanthum, Hiern.
Ixora radiata, Hiern.
Psychotria nr. *P. longivaginalis ?* Schf.
Rutidea sp. ?
Rutidea rufipilis, Hiern.
Mitracarpum scabrum, Zucc.
Vernonia ambigua, K. and P.
Aspilia latifolia, O. and H. ?
Gynura crepidioides, Benth.
Emilia sagittata, DC.
Senecio gabonicus, O. and H.
Plumbago zeylanica, L.
Strophanthus sarmentosus, DC.
Leafy spray : *Apocynacea ?*
Carpodinus ? Rubber vine.
" Ibo tree." *? Strophanthus :* Leafy sprays.
Dæmia aff. D. angolensi.
Octopleura loeselioides, Benth.

Hewittia bicolor; Wt.
Breweria (*Prevostea africana*, Benth.).
Solanum nigrum, L.
Lankesteria elegans, T. And.
Acanthus (*Cheilopsis*) *montanus*, T. And.
Brillantaisia Vogeliana, Benth.
Rungia grandis, T. And.
Sesamum indicum, L. var.?
Spathodea ? (only leafy branch).
Newbouldia lævis, Seem.
(Injured by mould) *Kigelia ?*
Lantana Camara, L.
Clerodendron volubile ? P. de B.
Clerodendron splendens, Don.
Ocymum viride, W.
Ocymum (cf. *O. menthæfolium*).
Amarantus spinosus, L.
Rivina lævis, L.
Celosia argentea, L.
Cyathula geminata, Moq.
Telanthera maritima, Moq.
Aristolochia triactina, Hook. f.
Loranthus, sp.
Loranthus, sp.
Loranthus (cf. *L. Belvisii*, DC).
Phyllanthus (*Anisonema floribunda*, Baill.).
Uapaca guineensis ? Muell. Arg.
Croton lobatum, L.
Alchornea cordata ? Benth.
Sponia affinis, Pl.
Myrianthus arboreus, P. de B.
Lissochilus macranthus ? Lindl.
Amomum Grana-Paradisi ? L.
Phrynium brachystachys, Koern.
Trachyspermum sp.
Dioscorea (cf. *D. prehensilis*).
Flagellaria indica, L.
Ancilema beninense, Kth.
Commelyna capitata, Benth.

Palisota thyrsiflora, Benth.
Mesanthemum radians, Koern.
Hæmanthus rupestris, Baker.
Crinum giganteum? Andr.
Dracæna, sp. nov. near *D. Perrottetii*, Baker.
Cyperus polystachyus, Rottb.
Streptogyne crinita, P. de B.
Nephrodium subquinquefidum, Hook.
Pteris atrovirens, W.
Pteris quadriaurita, Retz.
Pteris Currori, Hook.
Monstrous condition of *Microdesmis*.

Tetracera alnifolia, W. (*T. senegalensis*, DC).
Tetracera alnifolia, var. *scabra*.
Uvaria Chamæ, P. de B.
Chasmanthera dependens, Hochst.
Ritchiea fragrans, Br. var. *simplicifolia*.
Sauvagesia erecta, L.
Alsodeia brachypetala, Turc. var.
Carpolobia lutea, Don.
Haronga paniculata, Spach, " with red paint-like juice."
Symphonia globulifera, L. f., " Gamboge tree."
Hibiscus Abelmoschus, L.
Houckenya ficifolia, W.
Two leaves of *Bombax?*
Acridocarpus Smeathmanni, G. and P.
Ochna multiflora, DC.
Chailletia pallida, Oliv.
Paullinia pinnata, L.
Leea guineensis, Don (*L. sambucina* of Fl. Trop. Afr.).
An *Eriocælum cauliflorum?* (imperfect).
Deinbollia insignis, Hook. f.?
Agelæa obliqua, P. de B.
Indigofera Anil, L.
Tephrosia Ansellii, Hook. f.
Ecastophyllum Brownii, Pers.
Psophocarpus longipedunculatus, Hassk.
Millettia Thonningii, Baker?

Dalbergia pubescens, Hook. f.
Pterocarpus esculentus, S. and T.
Neptunia oleracea, Lour.
Leaves of *Pentaclethra macrophylla?* Benth.
Albizzia (*A. angolensis?*).
Cynometra (*Hymenostegia*) *Afzelii*, Oliv. (ex descr.)
? Entada africana, G. and P. (or *Tetrapleura Thonningii* Benth.) no fruit.
Griffonia Barteri, Hook. f.
Eugenia nr. *E. calophylloides.*
Dissotis (*Heterotis*) *segregata* (Benth.).
Memecylon Barteri, Hook. f.
Jussiæa diffusa, Forsk.
Jussiæa pilosa? H. B. K. (? as to fruit).
Homalium (nr. *H. africanum*, Benth.).
Barteria nigritana, Hook. f.
Modecca tamnifolia, Pl. (= *M. lobata*, Jacq.).
Modecca? or Triclisia? Barren shoots.
Momordica Charantia, L.
Lagenaria vulgaris, Ser.?
? Luffa sp. ♂ fl.
Crossopteryx Kotschyana, F.
Randia acuminata, Benth.
Randia sp.? (no corolla).
Morinda citrifolia, L.?
Psychotria (*Grumilea*) *articulata* (Hn.)
Mikania scandens, W.
Vernonia amygdalina, Del.
Microglossa petiolaris, DC. (*M. volubilis*, DC.)
Eclipta alba, Hassk.
Ethulia conyzoides, L.
Sphenoclea zeylanica, Gærtn.
Cf. *Chrysophyllum albidum*, Don (leaves).
Holarrhena africana, A. DC.
Orchipeda (*Piptolæna*), sp.
"*Ama Papa*" (Ibo tree), probably Horton's Accra Caoutchouc (in *Carpodinus*, Herb. Kew.).
"*Aboutera*" *Apocynacea; Landolphia?*
Landolphia sp. nov. vel *L. Welwitschii*, var. *Dyer.*

Wrightia parviflora, Benth.
Dœmia angolensis, Dene.
Ipomœa reptans, Poir.
Ipomœa (*Batatas*) *incurva* (Benth.).
Artanema sesamoides, Benth.
Polygonum senegalensis, Meiss. var.? aff. *P. barbato.*
Celosia laxa, S. and T.
Uapaca Heudelotii, Baill.
Alchornea cordifolia, Muell. Arg.?
Mallotus oppositifolius? ♂ v. aff.
Macaranga Heudelotii (Baill.).
Hymenocardia acida, Tul. ♂.
Ficus aff. *F. exasperatæ*, V.
"Gutta-percha, juice in bottle," no fl. nor fruit. (This may be a plant of Barter's, in *Ficus*.)
Chlorophora (*Morus excelsa*, Welw.?).
Thalia geniculata, vel aff.
Anchomanes, leaf only.
Culcasia scandens, Beauv.
Culcasia sp., fragm.
Commelyna (fragm. of *C. nudiflora ?* L.).

In 1861 Mr. Mann made collections of specimens of certain woods at different points on the Coast of West Africa, for the lists of which as follow (pp. 222, 223) I am again a debtor to the Kew Authorities. These contributions have the advantage of locality, and I am glad to be able to embody such information in this work.

Botanical Name.	Extent and Uses.	Circumference of Stem.	Locality.
		feet.	
1. *Lophira alata*, Banks.	Abundant. . .	15	From Niger to Cameroons.
2. *Albizzia altissima*, Hook.	Soft and spongy .	5	,,
3. *Erythrophlœum guineense*, Don.	Abundant, very soft and spongy	7	River Nun.
4. *Chrysobalanus Icaco*, L.	Often seen, good.	5	,,
5. *Mimusops?* . . .	Abundant, fit for bulkheads.	7	,,
6. *Pentadesma butyracea*	Not fit. . . .	7	,,
7. *Rhizophora racemosa*, E. Mey.	Abundant, fit for planks for bulkheads.	6	Bight of Biafra.
8. *Avicennia africana* (white mangrove)	Abundant, soft and spongy.	6	,,
9. *Myristica* ?* . . .	Light, not fit . .	11	,,
10. *Ficus?*	Often seen . .	6	,,
11. *Tabernæmontana* . .	Light, not fit . .	5	Ambas Bay.
12. *Erythrina* sp. . .	Scarce. . . .	7	,,
13. *Leptonychia* . . .	Often seen . .	6	,,
14. *Dorstenia* sp. . .	,, . .	13	,,
15. *Spondias dubia*, Rich.	Scarce. . . .	7	,,
16. *Cynometra* sp. . .	Appears to be good, specimen too small.	8	,,
17. *Hexalobus?* . . .	Often seen, not fit	10	,,
18. *Oncoba glauca*, Hook.	Scarce, appears to be good.	6	,,
19. *Guttifera* . . .	Often seen, appears to be good.	7	,,
20. *Trichelia?* . . .	Abundant, light, not fit.	6	,,
21. *Baphia?*	Scarce, appears to be good.	7	,,

* The wood is split and used by the civilised natives of Fernando Po for covering the sides of their houses.

Botanical Name.	Extent and Uses.	Circumference of Stem.	Locality.
		feet.	
1. *Hypericum angustifolium.*	..	..	Cameroon Mountains.
2. *Lasiosiphon glaucus* .	..	..	,,
3. *Pittosporum Mannii* .	..	..	,,
4. *Myrsine melanophlœos*	..	..	,,
5. *Paratropia alata* . .	..	..	,,
6. *Paratropia Mannii* .	..	..	,,
7. *Nuxia congesta* . .	..	..	,,
8. *Pygeum africanum* .	..	..	,,
9. *Ilex capensis* . . .	..	..	,,
10. *Omphalocarpum procerum*, Beaum.	Scarce, not fit .	7	,,
11. *Morinda lucida*, Benth.	Often seen, hard and good, substitute for African oak.	12	,,
12. *Musanga Smithii*,† Br.	Abundant, not fit.	8	,,
13. *Casearia*	Often seen, not fit	7	,,
14. *Pterocarpus esculentus*	,, ,,	8	,,
15. *Monodora* (near *M. myristica*).	,, ,,	6	,,
16. *Sterculia tragacantha*, Lindl.	,, ,,	7	,,
17. *Cupania*	,, ,,	7	,,
18. *Symphonia globulifera?*	,, ,,	10	,,
19. Cedar	Light, but good .	7	,,
20. *Nauclea stipulata*‡ .	..	..	Corisco Bay.
21. *N. stipulosa* = *Mitragyne macrophlla*, Hiern.	..	..	,,

† Used for same purposes as cork, and called by Europeans on this Coast "cork-wood."

‡ The wood is used by the Negroes for all kinds of carpentry work. The Kroomen use it for forming their canoes.

XVI.

I HAVE alluded to the necessity of reforesting, in parts of West Africa, and I have mentioned the "Casuarina" as a tree likely to answer. I would now add the growth of Eucalypts of Tropical Australia has met at Lagos and in Sierra Leone with a measure of success. They and Melaleucas might with proper care be most advantageously cultivated, under Government control and supervision, for their hygienic properties, as force pumps, to the many swamps at present existing along and within the West African Coast line.

On the more general introduction and growth of Eucalypts and Melaleucas in West Africa, I will here repeat what I embodied in a Circular I issued from the Gambia in 1885:—

The timber denudation and consequent drought and barrenness in some parts of West Africa must engage the attention of any observant person. I ventured to call attention to the subject in a letter addressed to the *Lagos Times* in January, 1883.

See what Parkes says in his 'Practical Hygiene'

on the importance of the effect of vegetation on ground, and especially of the *Eucalyptus globulus* :—

"In hot countries vegetation shades the ground, and makes it cooler. The evaporation from the surface is lessened; but the evaporation from the vegetation is so great as to produce a perceptible lowering effect on the temperature of a place.

"Pettenkofer has calculated that an oak tree, which had 711,592 leaves, had during the summer months (May–October) an evaporation equal to 539.1 centimetres (212 inches), while the rainfall was only 65 centimetres (25.6 inches); so that the evaporation was $8\frac{1}{3}$ times the rainfall: this shows how much water was abstracted from the soil, and how the air must have been moistened and cooled. Observations in Algeria (Gimbert) have shown that the *Eucalyptus globulus* absorbs and evaporates eleven times the rainfall; extremely malarious places being rendered healthy in this way in four or five years.

"Alluvial soils.—Many alluvial soils, especially, as lately pointed out by Wenzel, those most recently formed, give out Malaria, although they are not marshy. It is presumed that the newest alluvium contains more organic matter and salts than the older formations. Many alluvial soils have a flat surface, a bad outfall, and are in the vicinity of streams which may cause great variations in the level of the ground water. Mud Banks also, on the side of large streams, especially if only occasionally covered with

water, may be highly malarious ; and this is the case also with deltas and old estuaries."

Apart from the importance of vegetation in its relations and contact with the ground, and the questions of scarcity and consequent dearness of fire-wood in different places along the West Coast, the effect of timber denudation on water supply is making itself felt at Sierra Leone, Accra, and elsewhere ; as also on the climate generally.

Again what as to fire-wood, if prohibition was imposed on the cutting of the Mangrove so universally resorted to for so necessary an article ; it is a moot question whether in a sanitary sense its cutting and clearance should be allowed.

In Lagos during 1879 I was successful in rearing some specimens of Eucalyptus the seeds of which had been kindly supplied by the Director of the Royal Gardens, Kew. I endeavoured in 1881 to have ascertained the names of the Eucalypts I had reared. This could not then be done with any certainty, as in the case of juvenile plants the foliage is markedly different from that assumed by the adult plants. Steps should, however, be taken in this direction. Geologically it may be said that the Island of St. Mary, Gambia, resembles the Island of Lagos. It occurred to me as highly desirable to make an attempt to introduce also there so ornamental, useful, and beneficial (in a health sense) trees as are the Eucalypts.

In my endeavours at Lagos, I was ably and successfully followed up later by the zealous Dr. J. W. Roland. The result of his good work may be gathered from the following extract from Sir Ferdinand von Mueller's 'Eucalyptographia,' for a copy of which I am indebted to the Government of Victoria :—

"'*E. pruinosa* might prove a good tree for fuel, and perhaps for technical purposes, in any tropical country: it would at all events be as adapted to an equinoctial clime as *E. tereticornis*, *E. resinifera*, *E. acmenoides*, and *E. Baileyana* have shown themselves suited to as well sandy and swampy grounds in Guinea, as observed by Dr. J. W. Roland.'

"Dr. Roland in July, 1881, wrote :—

"'I find that the *E. globulus* is the least likely to succeed, as it requires too much care. But the *E. Baileyana* thrives wonderfully well, also the *E. acmenoides*, and *E. resinifera*. When I left Lagos I had 65 plants growing on a swamp near the town, and I have no doubt they will turn out a great success.'

"On his remarks the Kew authorities dwelt as follows :—Report on Royal Gardens, 1881. 'It cannot be doubted that, apart from their hygienic qualities, these species (which are all natives of the hot parts of Australia) will be found valuable introductions into West Africa if only for their accommodating disposition in respect to the conditions of growth, and for the value of their timber.'

Accordingly I addressed on the subject, in April, 1885, Sir Ferdinand von Mueller, Government Botanist, Melbourne, Victoria, and invited his kind help and co-operation in the matter of the supply of such seeds as he might deem most likely to succeed in Gambia, and generally along West Tropical Africa.

I entertained and expressed doubts whether any species of Eucalyptus had been successfully found to answer in swampy ground somewhat affected by the tide, and consequently by salt water.

Sir Ferdinand Mueller secured and supplied a collection of fresh seeds of such Eucalypts as deserved trial—culture in Gambia as could be procured at the time of the receipt of my letter.

As regards the saline nature of the ground water in many parts of the Gambia, as elsewhere in Western Africa, he remarked "that all Eucalypts are shy to brackish soil, but doubtless many localities in Gambia would still be available for the culture of these important trees."

To provide timber and fuel for places where humidity is saline, Sir Ferdinand continued, "it will be best to choose species of Melaleuca, a few of which will grow in brackish water, for instance *M. Leucadendron, M. ericifolia, M. linearifolia.* Of these I will procure seeds purposely and send them for transmission to the Honourable the Chief Secretary here.

"The Melaleucas, like the Eucalypts, have great

anti-malarian power, hence would also for sanitary purposes be a valuable acquisition to your Colony and other parts of Western Africa. Some other kinds of Eucalyptus seed I hope to send later when fresh procured."

The seeds he was good enough to supply were the following :—

Eucalyptus globulus
„ obliqua
, rostrata
, polyanthema
„ marginata
„ pilularis
melliodora
„ amygdalina
Acacia melanoxylon
„ decurrens

of which a share of each kind was generally distributed among such persons in our West African Colonies as were likely to endeavour to promote growth—with what result remains to be seen. Additional supplies of other kinds were subsequently received, which I left at Lagos for like distribution also.

In their growth my experience at Lagos was that seeds of Eucalypts had best first be sown in boxes, placed in shade, but exposed to the atmosphere, full of rich earth or mould. A sufficiency and not an excess of water is daily required until the young

plants are strong enough even after transplanting to be self-supporting and their roots find water for themselves. I allowed the plants to grow to two and three feet before they were transplanted. Shelter from strong winds is desirable, and almost a necessity, as my trees ran up so rapidly and such striplings that tornadoes blew down two or three, which were consequently lost. When the young trees reached fifteen to twenty feet, I found topping (removing some five and six feet every four or five months) essential and strengthening.

XVII.

It has been truly said that there is a tendency in newly-settled countries to regard the timber as a mere incumbrance to the land, and, as it generally occupies the most fertile soils, the finest timber is usually that first selected for destruction by fire, by ring barking and other rude and wasteful methods in favour with aborigines, settlers, or aliens.

It is notwithstanding a difficult matter, and one that might with reason be viewed as arbitrary, to put in force legislative restraints upon the clearing of the land in young Colonies; and, so as to obviate resort to any legal machinery in the matter, people interested should not look on supinely while timber is disappearing and a country is gradually but markedly becoming treeless, and, apart from their economic advantages, bereft of the shade so essential to health in tropical climates.

My remarks are directed to our West African Possessions with the hope of arresting attention on the part of landowners, and with the aim of their directing sufficient interest towards the modification of the reckless system that at present obtains

generally of denuding the country of its forests, as Locations multiply and Settlements increase, by which large areas have been and are being converted into treeless wastes, taken possession of by rank grasses and undergrowth, and breeding dangerous miasma.

Of the Gold Coast, I am reminded here of the open space that lies for miles behind the coast line of the Accra district, and of the Elmina plain; of the present condition of Lagos and its environs: as also of the former wooded islands and banks of the Gambia.

The open ground, that is now to be seen around Accra and Christiansborg, of the Gold Coast Colony, extending for miles inland and spreading out east and west to some length, has once been covered with forest, which has now for its substitute a plain of rank grass, the monotony of which is broken by the appearance—even there of rare occurrence—of a cassava or calabash farm, a small patch of ground nut for home consumption, or a clump of comparatively unprofitable but picturesque bush. There also, as elsewhere along the West Coast, the difficulty of securing fire-wood is making itself felt, as also its consequent dearness.

Further east, in Lagos, from Ebute-metta inland, the country is also becoming denuded of the profitable timber trees, which have to bow to the sawyer's axe or the fire-wood collector's cutlass. You now travel through miles of open country which was not long

ago covered with forest sheltering many valuable timber trees, and others of doubtless much economic worth, had the botanic recources of the country only been somewhat developed. I may single out as an example the rubber vine.

On an occasion when I had to send to the north of the Colony of Lagos I directed that inquiry should be instituted as to the existence of the *Landolphia owariensis*—the rubber-yielding vine found extensively in the Gold Coast Colony—and that encouragement towards its protection and development, or the proper collection of its juice, should be extended. The people questioned, when they understood the object of the inquiry, said that the country had been full of the tree, but as they knew nothing of its value, it had been cleared away so as to allow of the planting of corn, yam, and beans, and that the vines of the *Landolphia* had been and are being used only for matchet handles.

In view of the market price of rubber—of much demand—namely, from 1*s.* to 4*s.* per lb., dependent on quality and condition—I do not suppose that the expression would be there accepted "Where ignorance is bliss it is a folly to be wise." What has the Island of Lagos to say to such a state of things, with its adult male population of 14,407, of whom 11,049 are represented in the last Census as persons engaged in commerce?

I may repeat the old adage, "A stitch in time saves

nine," and appeal to those interested in the country to bring about, as regards the subject of this chapter, a more healthy condition of things, which can only at present be done by instruction and advice, and by the later strong inducement of giving practical proof of the value of those forests in the shape of a monetary return.

The sawyer, the fire-wood collector and supplier, the farm labourer may not know better; but it surely devolves on their employers to instruct them, and the duty is greater on the proprietors of land who let out the same on lease and can impose their own conditions as to the preservation of forest trees of well-known—or that should be known—valuable timber.

The harm done would not prove to be so great, were some system of conservancy to obtain. Where it has been deemed to have become a necessity to remove partially a valuable forest, why cannot the removers after they have satisfied their wants be got to plant young trees of marketable value, either as to timber or fruit, in the room of those they have used up or wasted; why cannot this be made a condition by owners of wooded land before liberty of action is accorded to those concerned in wood or agricultural industry?

It must be remembered that forests of heavy timber or vines of commercial value are of very slow growth, and means of supply in the distant future should now be taken in hand. It accordingly should be deemed as very expedient to re-plant, at least in

part, the sites from which valuable timber and vines disappear—where a farm is to be deserted either for good, or to lie fallow for so many years, why cannot it be partially re-planted by those who may have enjoyed its use in the past? Surely such a condition could be enforced by agreement between landlord and tenant; as also that certain trees of known value should not be under any circumstances removed. I may mention that I am aware of the superstitious respect that attaches in the Yoruba country to the *Oroko*, *Afon*, *Araba*, *Ashori*, and other large trees, and to the consequent immunity they enjoy from the axe, as also of the understanding that palm trees on allotted sites are preserved and remain the property of the landlord. Notwithstanding he will surely be ready to increase the value of his recognized vested interest by the adoption of my suggestions as they stand, or in some modified, yet advantageous, form.

Let us take time by the forelock. In the older Colonies, such as the Cape of Good Hope, Ceylon, Mauritius, Canada, New Zealand, South Australia, laws and regulations now exist for the conservation of their forests. There it was not that "necessity had no law," but rather law became an absolute necessity, and legal restraints had to be exercised. It was in some instances almost a case of shutting the stable door after the horse had got out.

I have already implied that there is a general

tendency to under-estimate the importance of local action, in the expectation than an unlimited supply of timber will always be obtainable, either on the mush-room principle as to growth, or from other sources. It can be stated without fear of contradiction that in our Possessions on the Coast of Africa the timber is rapidly and visibly diminishing, and that the adoption of steps such as are suggested, or some others, for re-planting and preventing waste, has become worthy of early consideration.

I would next call attention to the wanton periodical burnings—perhaps in some cases in part unavoidable, at least at present, but not restricted even then as they should be—that extend to sites on which trees have been felled for farming purposes, or from which they have disappeared altogether, as also to those where nature is struggling to regain herself as regards forest protection. Where a farm site has to be fired, standing trees and surrounding forests should be protected as much as possible ; and where Nature seems to be recovering herself, as is to be seen at times on the grass plains to which I have alluded, she should be rendered secure from the wanton mischief of those who take more delight in a good blaze—which they usually originate at night—and in their own ignorance, than in interest in the country. Forests attacked indiscriminately and inconsiderately by axe and fire are on the road to a rapid detimbering.

My remarks are not so selfishly directed as to

preclude the hope that their aim may reach the countries bordering on our Colonies where the disposal of land remains in the hands of the respective Kings, supported in each grant by the concurrence of the chiefs and elders. It would be no hardship and would prove highly advantageous to impose as one of the conditions of lease, that in clearances for farm purposes, certain trees of known value should be uninjured, as far as is practicable, either by axe or by fire.

So far as I can now advance, land is worked, on an average, ten years, after which it is deserted for virgin soil. This period is made up as follows:—four or five years continuously to clearance, cultivation and harvest, two or three years to lie fallow, and the balance of time to re-cultivation and fresh harvest, when the land is considered by the people as "worn out."

Without going into the dry detail of Statistics, it must be very evident to most people that forests exert a considerable influence upon the climate and upon the condition of the water supply. How shade is sought for and appreciated even by the brute creation is a fact that presents itself daily in the tropics to any observer. Forests are appropriately called condensing apparatus, and Nature's guards against droughts which have proved such a curse to countries in the past where ignorance was not removed in time, or there was allowed to have its way the

shortsighted greed for a yard or two more ground for the production of cane or some other plant when the price of sugar or some such-like other marketable commodity stood temporarily high—sheer selfish greed of immediate gain.

Humboldt has said, "By felling trees which are adapted to the soil of the sides and summits of mountains, men, in every climate, prepare for future generations two calamities at once, want of fire-wood and scarcity of water."

It has also been said that "Forests precede a population, and deserts follow it."

Of the Cape Colony, South Africa, it has been recorded in 1873, that "the immunity which British Kaffraria enjoys from the droughts so common in South Africa is believed to be due to the influence of the forests."

I may also fittingly quote the following having reference to Mauritius :—

"It is pretty generally believed that the destruction of the forests has had considerable effects upon the climate, and that owing to the same cause, the floods are much more sudden and destructive than formerly. Many streams which have never failed whilst their sources were shaded by the forests are now dried up."

St. Helena also affords a striking example of the effects of forest denudation upon climate. It is stated that "the extirpation of the indigenous trees,

shortly after the first Colonization of the island in 1673, was followed by a succession of severe and destructive droughts, but that since the forest lands were replanted, the island has ceased to suffer from them to anything like the same extent."

It would seem that the lesson of the past has not been sufficient, for, on the result of continued denudation there, Mr. Morris has recorded in his pamphlet on that island thus :—

"Latterly, the island has suffered very severely from drought, numerous springs having been almost dried up. It is probable that such conditions may be repeated, if the process of denudation is not immediately stopped, and if the central ridge, where the chief streams of the island take their rise, is not reclothed with trees. The beds of the streams should also be more shaded by suitable trees to prevent excessive evaporation, and all ponds and reservoirs should be similarly treated."

Next, let landlords be influenced by the suggestions briefly given in this chapter, and let them specially conserve, at least, such belts of wooded land as cover mountains or hills and flank rivers and streams.

The author of 'Akimfoo,' when he wrote "But alas ! the African forest is always green, always wet, always fire-proof," had not experienced the waste that it has been my lot to have witnessed and to witness ; yet how appropriately can the remark "always fire-

proof," with a generous and limited interpretation, be extended to some spots—to wit, the island of Lagos—as regards vegetation, for it in a great measure often serves as nature's fire-screens and extinguishers on occasions of the occurrence of fires there. The foresight in the past of the planter, the late Sir John Glover, who did so much for Lagos, is to be acknowledged with gratitude in the matter of the laying out and planting the streets of that island. How different otherwise would have been the climate, how precarious perhaps the water supply, and how helpless its people would be in times of fire!

The following Return and report thereon by the late Dr. Hart, of the effect of forest denudation at Sierra Leone, which appeared in the *West African Reporter* of the 22nd July, 1882, may be here inserted with telling significance :—

RETURN SHEWING RAINFALL IN THE YEARS 1878 TO 1885.

Year.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Total.
1878	3.01	32.02	101.74	26.37	163.14
1879	5.18	36.88	105.70	20.35	168.11
1880	1.48	32.39	111.76	16.43	162.06
1881	1.04	36.27	95.71	8.80	141.82
1882	1.95	16.90	70.70	19.74	109.29
1883	1.47	27.56	92.31	21.81	143.15
1884	0.67	42.57	83.08	19.58	145.90
1885	1.88	22.93	99.85	17.12	141.78

"It is desirable that the attention of the community be drawn to the facts stated in the above Return,

shewing a remarkable and steady decrease in the amount of rainfall in this district during the last four years. The deficiency last year was apparent to the inhabitants of Freetown when, towards the close of the dry season, difficulty of obtaining water from the usual sources was complained of in your columns, and if this amount be further reduced by one half, as has occurred in the second quarter of this year, the result will be disastrous. The only cause that can be assigned for this decrease is the wholesale destruction of the woods and forests, which are at once the collectors and reservoirs of its water supply. This has occurred in other tropical regions, and when the cause was learned, by fatal experience through famine, the result of drought, then the forests were taken under Government protection and replanted, with the best results, but at great expense. It would be well to take warning from our Eastern allies, profiting by their experience, and put a stop to this unlimited practice of shaving the forest of timber, which at one time formed a valuable item of export; before its effects are brought home to the people by the failure of the water supply,' at present the one redeeming element against the many unhealthy influences at work in the Colony." I have added the statistics for 1883, 1884, and 1885, which point to an improvement in the direction of greater conservancy or more extended planting: perhaps of both.

Mention has been already made of the dearness of

fire-wood at Accra ; let me also point out the scarcity there of water, and the difficulty, especially in the dry season, of procuring it except by those who can pay for it. Miles have at present to be gone over for water. I remember during 1882 that while considerable anxiety was felt at Accra, as regards the vitality of a young plantation, from the absence of rain, there was abundance of it at Cape Coast about seventy-five miles off—which must be attributed to the fact that the suburbs of the latter are still protected by vegetation, and, at a certain depth inland, by forest.

It is well worthy of consideration whether judicious re-clothing with vegetation should not there proceed, and with such an object in view the Assistant-Director of Kew mentioned to me the Casuarina as a tree likely to answer ; it is of much more rapid growth than Eucalypts, can withstand sea-spray or climate affected thereby, and furnishes a fine timber and excellent fire-wood.

I am not now going so far to occupy limited space as to embody any conclusions based on the average annual consumption in each Colony of timber as fire-wood for each house ; nor yet for periodic but regular and growing requirements as regards windows, doors and other carpentry fittings, and their renewal ; nor yet for the local recurring wants in the matter of supply and renovation of boats, canoes, wharves, &c., although there thus might be afforded interesting and startling facts when we knew of the average annual timber

requirements and consequent clearances as compared with our available wooded area, and the future steadily increasing wants.

In dwelling on this subject the people must however look ahead, and, as far as can be done, anticipate the requirements of the future, and not selfishly endeavour to reap all they can in the present, regardless of the legacy to be left to their country and children.

We all have heard and can estimate the great advantages that follow on the opening up of a country by railways. Bearing in mind the references in the preceding two paragraphs, estimate what then would be our timber wants additionally for stations, carriages, sleepers, telegraph poles, their wear and tear, and occasional renewals, creating a timber demand of considerable magnitude.

In the Gold Coast Colony, behind Lagos, and in other parts of that side of Africa there are large tracts of land now almost valueless, I may venture to say, from being in a measure inaccessible. To such land railways would soon give an appreciable value by opening up fresh markets, and allowing of the advance of settlements into their depths at present uninhabited and unknown. Their introduction would be followed up by an increased circulation of money, increased vested capital, and consequently proportionally greater credit of real worth—of much moment to any Colony, much more so to our Possessions in West Africa in view of future opening up—rise

of wages and more employment, growing demand for produce and general commercial stimulus. Look, for example, to the United States of America, and see what the Union Pacific Railroad has done there as regards the country lying between New York and San Francisco, to a great extent waste, tenantless and valueless before it was constructed—now to be seen studded with villages and towns, surrounded by miles of land under cultivation. Railways, like human beings, require wood and water, and, with reference to the future of West Africa in connection with their introduction, already thought of and weighed, advantage of present advice against detimbering should be taken.

The French have in this matter also gone ahead of us, for they have actually laid down a certain portion of a railway road in the kingdom of Bondou, near the upper Gambia, which is being worked, to the astonishment and silent wonder of the natives. It has been described to me as a "ship that walks on land, and that it is well armed." *En passant* I would say how such a step must attract and divert trade—which I fear is the case to our cost on the upper Gambia River. With respect to their pushing and determination to go ahead—to our loss in those parts, I fear, as regards undermining our influence and trade—and on the means adopted towards such an end, I would quote in translation as follows from 'Notices Statistiques sur les Colonies Françaises, 1883':—

"Penetration of Soudan.—The work undertaken by General Faidherbe, with a view to civilising Soudan and opening to commerce those unexplored regions, has been taken up again the last few years and carried on with great activity. From Medina, where our French influence got no further in 1878, our standard was successfully carried to Bafonlabé, to Kita, and lastly this year to Bannuakow, on the Niger. The caravan route is thus protected by a series of posts constructed by Colonel Desbordes during the three expeditions of 1880-81, 1882, 1883. The route has been improved: at the same time works of a railway were undertaken intended some day to join the navigable part of the Niger to that of the Senegal. The first section of this railway from Khay (near Medina) to Bafonlabé, over 135 kilometres, has been decided on by parliament; at the end of the present expedition the traffic will be open over a distance of 16 kilometres, and the working of the ground prepared in a manner to forward for the next expedition the laying of the line."

Nor am I without hope of the future timber industry in store for our Colonies, so far at all events as Lagos and the Gold Coast are concerned, blessed as are those Colonies—the former especially so—with the inestimable advantages of nature's highways in the shape of the network of inland water that permeates the country, extending, with but a slight

and removable break, from the Volta on the westward to the Niger on the eastward ; to the westward of the Volta and behind Appolonia like water advantages offer. I also hope for the revival of the Sierra Leone and Gambia timber-trade.

There again suggests itself the consideration of the substitution of the shingle for the thatch roof, and the consequent additional security to lives and property such a change would bring about in Lagos, as elsewhere. In Sierra Leone and Gambia it is much used. The industry of shingle-making has been now for some years introduced on the Aquapim Hills of the Gold Coast, and has resulted in a growing use of this roofing.

For this result the credit is due to the members of the Basel Mission, who introduced the industry in 1846, first in substitution of the shingle for grass as roofing for their own houses, next for the extension of such an improvement to the people among whom they lived.

The Afram tree is the one used for shingles, as it is easily split, stands well the weather, and is comparatively proof against the white ant (*termes arborum*). Present rate for shingles at sites of manufacture in Aquapim is £1 for 1,000, each being 21″ × 3″. The "odoom" is also used similarly.

An enterprising native gentleman at Lagos, Captain J. P. L. Davies, also introduced there the art, but it never got far, in consequence of want of proper

machinery and of the encouragement that it should have received. Corrugated iron has taken its place, which is not, however, appreciated by the natives, as can be well understood.

The more general extension of this industry should be promoted, and, with the available and local wants, the prospect of a timber industry of no small dimensions, even of a local nature, may be indulged in and viewed as a bright one. Shingles as regards the Gambia and Sierra Leone are imported; why? let wood-workers ask themselves. Let the large import of staves for casks be also considered where such wood as "odoom" ("oroko") is available.

But before we can hope to build what may prove to be *chateaux en Espagne*, the value and worth of the woods of West Africa must be determined, which in view of the circumstances of the Colonies can be only gradually known, and hope in the meantime can but be entertained that the information will be of avail when it has been obtained, and that more than statistics will be forthcoming later, and that we shall not be without the wares the worth of which to the commercial world we had been collecting information with a view to advertise. Here I would invite the contribution, on the part of those who are sufficiently interested and so placed as to admit thereof, especially sawyers and carpenters, of specimen slabs of the timber of such trees as are felled from time to time; and I would lay stress on scented woods.

A slab should represent a complete section of full diameter, with bark on, of the tree from which it is cut, and should be from three to four inches thick. It should be accompanied by specimes of leaf, flower, and fruit. In each Colony some one can doubtless be found who will undertake the necessary arrangements for the supply to Kew Gardens of such specimens, for their classification, and for an estimate of probable worth in a timber sense. The Public Works Department of each Colony offers a ready transit-depot for such contributions.

XVIII.

STEPS then should be persevered in to remove the ignorance of the people as far as possible by putting them in the way of knowing the value of the products of their country, and towards such an end I had begun in 1883 the establishment, at the site of *Kokomaiko* (Lagos), of a nursery garden for the growth of specimens of present known trees and plants of marketable value, such as the Rubber, Kola, Cotton, Shea-butter, Gum, Indigo, Cacoa, &c., so that they might serve on development later as means of instruction to natives of that Colony and of the interior Kingdoms who visit the Government from time to time. It might have been possible, I thought, to conduct this operation in such a manner as to encourage economy, replenishing, and the diffusion of useful and botanical knowledge of commercial importance.

With such a view I invited at the time the co-operation of those who might wish to be helpers by asking them to act as contributors from time to time, as seasons admitted, of seeds, plants, specimens, &c., which would be gladly received by the Government.

But my "castles were in Spain," and my dreams were rudely banished, for I found that Lagos had not proved an exception to the perversity of human nature. My garden drooped, I may say ended with my departure from that Colony—not the victim of climate, for I left it in promising youth; but rather of indifference and neglect—a crying shame. In addition to enlightenment therefrom, what commercial benefit might in a few years have been brought about by the steady distribution of young trees of economic value from such an Institution among the chiefs and people of the many villages that border that network of water which permeates the country in that quarter! Here again, however, we have had the fate of a private hobby.

Towards the regeneration of St. Helena in a botanical commercial sense, what does that practical gentleman, Mr. Morris, say, from whose paper I have already quoted? Why, to use his own words:—

"I look entirely to the soil for the elements necessary to bring prosperity to St. Helena. But the people require to be shown what those resources are: they need to be taught how to use those resources aright, and they require to be encouraged and assisted while so engaged.

"I would recommend in the first instance, that an intelligent and competent gardener be sent to the island to take up the entire question of the revival of the agricultural pursuits, and that if the local Government is unable to support such an officer and a small

staff, that a grant be made for the purpose by the Home Government."

And last, though not least—in support of the necessity that has existed and does exist for the establishment of agricultural training Institutions, whether in the form of botanic stations, Governmental model farms, or for the utilisation in such a way of the spread and established branches of the different Missions by encouragement and pecuniary grant—let me quote from that eminent and earnest promoter of the interests of our Colonies, Sir Joseph Hooker, who thus expressed himself in connection with the Paris Exhibition, 1868, on Technical Education and Knowledge of Forestry :—

"Forestry, a subject so utterly neglected in this country that we are forced to send all candidates for Government appointments in India to France and Germany for instruction, both in theory and practice, holds on the Continent an honourable, and even a distinguished place amongst the branches of a liberal education. In the estimation of an average Briton, forests are of infinitely less importance than the game they shelter, and it is not long since the wanton destruction of a fine young tree was considered a venial offence compared with the snaring of a pheasant or rabbit.

"Wherever the English rule extends, with the single exception of India, the same apathy, or at least inaction, prevails. In South Africa, according to Colonial

botanists' reports, millions of acres have been made desert, and more are being made desert annually, through the destruction of the indigenous forests; in Demerara the useful timber trees have all been removed from accessible regions, and no care and thought given to planting others; from Trinidad we have the same story; in New Zealand there is not now a good Kundi pine to be found near the coast; and I believe that the annals of almost every English Colony would repeat the tale of wilful wanton waste and improvidence.

"On the other hand, in France, Prussia, Switzerland, Austria, and Russia, the forests and waste lands are the subjects of devoted attention on the part of the Government, and Colleges, provided with a complete staff of accomplished professors, train youths of good birth and education to the duties of State foresters. Nor in the case of France is this law confined to the mother country. The Algerian forests are worked with scrupulous solicitude; and the collections of vegetable produce from the French Colonies and New Caledonia, &c., contain specimens which, though not falling technically under class 87, abound in evidence of the forest products being all diligently explored."

Bentham, in his 'Desiderata from Botanical Collectors in Western Tropical Africa,' to be found at the beginning of Hooker's 'Niger Flora,' says on the subject :—

"A first glance at the 'Flora Nigritiana' will show how very imperfect our acquaintance yet remains, not only with the luxuriant wild vegetation of West Tropical Africa, including the herbs or trees which furnish many of its most valuable products, but even with many of the plants in general cultivation there. This circumstance may in a great measure be ascribed to the want of any of those permanent botanical establishments which have afforded us so much useful information on the vegetation of the East and West Indies, and have been the means of effecting so many valuable exchanges of plants respectively cultivated in the two hemispheres. Tropical Africa has never even had a resident botanist, and all our knowledge on the subject has been derived from travellers who have either perished there before their mission has been completed, or have hastened home to avoid the effects of the deadly climate. Much is therefore now to be done by a collector who will carefully note down any authentic particulars he can learn, and any observations that occur to him, relating to the plants of which he preserves specimens."

I have alluded to the employment of Missions. Let me once more acknowledge the great debt Africa and her sons and the commercial world of its West Coast owe to the Basel Mission, begun in 1828, and established since 1842 on the Aquapim Hills and adjoining plains of the Gold Coast. That Mission to my mind went the right way to work as regards the education

of the people in associating with elementary, industrial education. Lay missionaries formed part of the staff, and they opened carpenters', joiners', black and lock-smiths' shops, with a result that the Gold Coast, and what are known as the Oil Rivers, are at this day indebted to their forethought and perseverance for coopers, carpenters, and joiners.

But the efforts of such a body should have been encouraged—which has not been the case—in every way, and followed up by the placing in their hands of as much carpentry, cabinet and other wood-work as could have been done: instead of which, orders have been sent repeatedly, in fact the rule, to England for such manufactures. Where a wooden structure in the shape of a roof, a house, windows, was wanted, the run was towards England, in disregard of the local interests and capabilities, both as to skilled labour and material. Local agents and Government engineers were doubtless saved trouble, but what are they for if it be not to give to their employers the best service? What better service can there be than the advancement and enlightenment of the people? It may be advanced that the people are not capable or competent yet. In view of work and buildings I have seen, the outcome of native talent, I am not prepared to admit such an assertion. Even if it were so, when will they be under the present system?

From what I have learnt on inquiry, I must speak in equally high terms of the industrial work of the

Roman Catholic Missions at Gnasobil, Senegal, and Gaboon.

I wonder it has never occurred to the many societies of workmen along that Coast to subscribe together and send some of their younger members to Europe to qualify for any and every work needed there, or to thus remove any ground, if such exist, for being passed over as I have mentioned. Even towards such an end, Governments might, with advantage to themselves and to the people there, act.

As regards the natives of West Africa, it is indeed open to question whether there has not been too much time devoted in the past to the exercise of memory, to "parrot" teaching, and too little to a knowledge of their countries and their capabilities, to a more general instruction in ways of industry, and to the gradual and appreciable development of the ways and means of their own industries.

In 1841, Dr. Madden, who had been sent out as Her Majesty's Commissioner of Inquiry on the state of the West African Settlements, advocated the establishment in England of a normal school for the exclusive training and instruction of schoolmasters—natives themselves of Africa—to be destined for schools in West Africa: he supported also the introduction of a Model Farm in each Colony in association with existing schools, to afford masters the facilities of having every child taught some trade or calling in addition to acquiring the rudiments of

elementary education. He was of the opinion that all the instruction that can be given without inculcating and teaching them habits of industry would be of little avail, and he deplored the fact that the outcome of the ordinary school education was that industrious habits were, if not altogether discontinued, but little practised. My own experience and the Census statistics support to a great length even now, sad as it may seem, Dr. Madden in his conclusions arrived at so many years ago.

In a former part of this work I have acknowledged the private endeavours that have been creditably put forth to promote the agricultural industry of West Africa. These endeavours have been shortlived, and have, as a rule, unfortunately, resulted in relapses almost to conditions that existed prior to their undertaking.

We may remind ourselves, for instance—and there are many like examples—when Mr. Wm. Smith visited, in 1726, West Africa to survey the Settlements of the Royal African Company, he found—

"The gardens of Cape Coast are very pleasant and large, being near eight miles in circumference. They are nowhere circumscribed by any bounds or hedges except on the south side near the town, but all in general is called the garden as far as any regular walks are planted. They are very fertile, and produce everything that grows within the Torrid Zone: such as oranges, lemons, limes, citrons, guavas,

papaws, plantains, bananas, cocoa-nuts, cinnamon, tamarinds, pine-apples, Indian cabbage, also European; and many sorts of European salads, such as cucumbers, pumpkins, water-melons, and parsley."

Again, Dr. Madden, from his experience in the above-mentioned directions and of the sad fate of the agricultural work alluded to by Mr. Smith, says :—

"It is unfortunately the lot of all agricultural improvements in these countries to die with the individual who commenced and carried them on; and, unfortunately, the tendency of the climate to abridge European life is so great, that ere any improvements can be said to be fairly carried into effect the individual dies; and his executors generally find he died embarrassed, and his relatives rarely get sufficient means to keep his plantation in cultivation, and after a further effort to keep it, it is ultimately abandoned."

My own experience of the West Coast leads me to express the opinion that for general marked and progressive work nothing will answer save permanent botanical stations or allied establishments, worked and kept up by the Government. The main features to be secured at any site are good soil, fresh water supply, protection by hill or belt of forest against tornadoes or other strong winds, and accessibility either by water or good road. Such institutions could be established on the Sierra Leone hills, on the hills of Aquapim of the Gold Coast, on the mainland of Lagos Colony; and in British Combo, ceded mile,

or on one of the islands of the Gambia above the influence of the tide. Thus would the botany of West Africa become known, its economy developed and added to by the introduction of alien elements of commercial importance. That mother or nurse for the development of economic botany in our Colonies —Royal Gardens, Kew—would help, as she has always done, by the supply of good practical and educated gardeners, who would become, perhaps, in time, local curators; and by the promotion of a system of training up, as gardeners, at Kew, or in some Tropical miniature thereof, some of the native youths of the country.

In support of such a training there will be found in the Preface, dated 1849, of Hooker's 'Niger Flora;' to use the Editor's own words:—

"It further showed that the only hope of enlightening the sons of Africa is by native agency: and it is with no small pride that the Editor of this work, in the capacity of Director of the Royal Gardens of Kew, is at this moment giving in charge a considerable collection of useful tropical plants for introduction into Africa, to two native missionaries (recently ordained by the Bishop of London), than whom he knows not any well-educated Europeans more competent to estimate the value of such importations, or likely to feel more interest in their successful cultivation and use."

Should such an Institution be at any time decided

on—and it is to be hoped that a decision will prove to be of early date—from the bitter experience of the past; from the sad lessons of our other Colonies, which have carried their eggs in one basket, and have as a consequence glutted the markets with their one commodity at great financial losses; and from the wants of the present, as regards the permanent establishment of a Botanic Garden or some allied institution—call it what you will—it may be deemed to be convenient to find embodied in this Book the following "Suggestions (with certain modifications capable of easy adaptation in West Africa) for the information of Colonial Governments about to appoint Superintendents of Botanic Gardens, and for the guidance of the Superintendents themselves," a copy of which has been placed at my disposal through the thoughtfulness and courtesy of W. Thistleton Dyer, Esq., C.M.G., the Director of Kew Gardens, to whom I am also indebted for the Kew standing instructions for collecting plants and seeds reproduced at Appendix I., which will be found of much interest and advantage to collectors in that part of the world with which this Work has to do:—

I. The Superintendent's time should be occupied by the duties of the gardens in the interests of the Colony and mother country. These duties include not merely the keep and cultivation of the plants, but correspondence with other gardens in the Colony and elsewhere, and activity in procuring by means of

travellers, visitors, ships' officers, &c., all plants that it may be desirable to introduce, whether for use or ornament, and botanical information generally.

II. The gardens should be both useful and attractive to the general public, and should contain—

(*a.*) A conspicuously ticketed collection of the plants, shrubs, and trees of the Colony.

(*b.*) A collection, also well ticketed, of all such useful plants as can be cultivated in the Colony.

(*c.*) A collection of useful and ornamental plants for distribution, exchange, &c.

III. The Superintendent should keep a catalogue of all the plants cultivated and that have been cultivated in the garden; a monthly journal of operations, which may be consulted by persons desirous of forming gardens, and a brief meteorological abstract of the mean maximum and mean minimum temperature of the month, with its humidity, clearness, or cloudiness, amount of rain, &c. He should annually prepare a report on the progress and condition of the garden, of its receipts and expenditure, donations, donors' names, and those of the more important plants distributed from it; this report should be printed by the Government.

It is also desirable that the Superintendent should keep an arranged and named *Herbarium* of the flowering plants and ferns of the Colony; and a public *museum* containing named specimens of the Colonial woods and other useful vegetable products should be attached to every garden.

IV. A *library* of botanical books of reference should be attached to the garden, and catalogued in duplicate, and no book should be lent out of the library on any pretext whatever. Of this catalogue, one copy should be kept in the library, and the other should be deposited in some Government office, and these should be annually compared. The fact and date of comparison should be stated in the Annual Report, and all losses and additions recorded.

V. No Superintendent or other officer of the garden should be permitted to sell any plants or garden produce without the written orders of the Government, nor should they be permitted for their own personal emolument to sell or trade in plants of any kind, indigenous or cultivated, nor to take apprentice or other fees.

VI. The Superintendent should not be permitted to cultivate vegetables for the table of any public officer or private individual but his own, or that of other persons employed in the gardens; and in all such cases the value of this perquisite should be calculated as part of the salary or wages of the individual who enjoys it. He should not cultivate for his own table rare or expensive fruits, such as take much care or time, or offer temptation for pilfering.

With regard to supplying occasionally or periodically the table of the Governor with vegetables, fruit, flowers, &c., this as a duty imposed on the Superintendent is in every respect objectionable; but, on the

other hand, a Superintendent must be ineligible or inefficient who has not a sufficient supply of flowers to send frequently to the Governor's house, if not far distant, or who does not use every effort to gratify those institutions or persons, public or private, who actively promote the interests of the gardens. Under no circumstances are fees for such objects to be accepted.

VII. A sufficient stock of all useful and ornamental plants should be kept for interchange with other gardens in the Colony and elsewhere ; and, further, the Superintendent may often be required to cultivate a large stock of certain plants for distribution in the Colony or elsewhere. In the case of interchange a sufficient return in kind or otherwise should be required, at the discretion of the Superintendent ; but no general distribution should ever take place, except under the orders of Government, which should further decide under which of the following conditions the stock should be distributed :—

(*a.*) By sale by auction or otherwise.

(*b.*) Gratis, under guarantee that the recipient of the plants will devote a certain amount of land, time, and labour to their cultivation.

(*c.*) Gratis to Government establishments, or to colonists or others who have benefited the gardens directly or indirectly.

Specific information regarding any of the above points may be had by application to the Director of

the Royal Gardens, Kew, who will be glad to recommend the books most suited to each Colonial garden, and the best and least expensive way of procuring them. He will also give assistance towards naming dried specimens of the plants of the Colony for the Superintendent, provided the latter keeps up a herbarium and a proper correspondence in plants, &c., with the Royal Gardens.

The following extracts on the disadvantages and advantages of vegetation, from Dr. Parke's 'Practical Hygiene,' may be here of comparative interest :—

"Vegetation produces a great effect on the movement of air. Its velocity is checked, and sometimes in thick clusters of trees or underwood the air is most stagnant. If moist and decaying vegetation be a coincident condition of such stagnation, the most fatal forms of malarious diseases are produced.

"Vegetation may thus do harm by obstructing the movement of the air; on the other hand, it may guard from currents of impure air. The protective influence of a belt of trees against malaria is most striking.

"Herbage is always healthy. In the Tropics, it cools the ground, both by obstructing the sun's rays and by aiding evaporation; and nothing is more desirable than to cover, if it be possible, the hot sandy plains of the Tropics with close-cut grass.

"Trees should be removed with judgment. In cold countries they shelter from cold winds, in hot they cool the ground; in both they may protect from

malarious currents; a decided and pernicious interference with the movement of air should be almost the only reason for removing them."

It will be seen from the foregoing remarks, that while it may be a beneficial thing to thin the forest, it is a bad thing to fell all the trees.

These Chapters have but the aim of husbanding and developing in our Colonies Nature's bountiful resources, and of thus perhaps bringing forth later benefit; and should their contents hit, or even fall any way near their mark, and thus serve as a guide for the next archer, the writer will feel fully compensated for his practice.

XIX.

IT occurred to me in the preparation of this Book that it would be useful and convenient, and serve advantageously its purpose, to have some information, in a condensed and practical form, of the economic plants, in their botanical order, of tropical West Africa; and, accordingly, with the kind and generous permission of the Kew Authorities, I employed, at my own expense, out of official hours, Mr. Hillier, of the Kew Economic Museum, to help toward such an end by extracting from the various applicable works. Where information was meagre or vague, reference to the specimens in the Museum and Herbarium and to their description offered ready means of supplying much supplementary information; as also to the useful little Catalogue, styled "Official Guide to the Museums of Economic Botany," Royal Gardens, Kew. In my labours generally, and while engaged at the Kew Economic Museum, I received, as do all, courteous attention and much assistance at the hands of its Curator, Mr. Jackson.

Accordingly, appended will be found a list—so far as it goes—of the "Economic Plants of West Africa," for which I am mainly—indeed I may say altogether

—indebted to Mr. Hillier, whose good creditable work, application and zeal I must fully acknowledge.

I trust that the spirit which actuated him and the result of his labours may, in connection with his future—in which I wish him well—receive at the proper time the consideration of the Kew Authorities.

It is my duty, and I hope I may not be viewed as taking a liberty, to record specially my indebtedness to Sir Joseph Hooker, the late Director of the Royal Gardens, Kew; to E. Thistleton Dyer, Esq., C.M.G., the present Director; and to Professor Oliver, for the continuous courtesy and attention, both privately and officially, I have received from each.

In my desire to do as much as my time admitted, I have troubled them from time to time as a collector of botanical specimens; and I must say that I have always experienced at Kew the greatest desire and encouragement to meet the wants of the Colonies and to promote their interests, scientifically and commercially.

As one proof, Mr. Dyer was good enough to place me in possession, when I left England in 1884 to assume the government of the Settlements on the Gambia, of three Wardian cases full of ornamental and economic plants, our object being to see what could be done to promote commercial progress in those parts. Indeed, such stimulants are most beneficial. The result, of course, remained in local hands. In view of nature and condition of garden and grounds

when I arrived, as also of the want of good water—for it is there pronounced brackish and bad—I regret to have to say that expectations hoped for may not be realised, but when I left, in December, 1885, many of the plants had up to that time been kept flourishing.

In connection with the preparation of this Work, I must also thank A. Hutton, Esq., of Liverpool ; Dr. Murie, Linnean Society ; E. M. Holmes, Esq., Pharmaceutical Society ; T. Christie, Esq., and many others, who will, I hope, be pleased to accept thus my grateful acknowledgments.

Want of sufficient time for it, absences from England, and consequent withdrawals from many available places of reference, must serve as my apology for any shortcomings, imperfections, omissions or commissions in this Book. Yet, as it stands, I trust it may prove of some advantage. It may have brought within readable compass some information that has already in a scattered form appeared, and may have for its issue additional interest towards the further scientific and commercial development of a country where above all other parts it behoves every one connected with it to do his duty, for thus only can be realised the expression of Sir George Campbell (vide *Fortnightly Review* of February, 1877) :—

"The civilisation and utilisation of Africa is the great enterprise of the future," or, in other words, the retribution of justice for the past.

During my stay at the Gambia, I made collections in birds, beetles, butterflies, moths, shells, reptiles, batrachians and fishes. For lists of the three first-named I am deeply indebted to my friend Captain G. F. Shelley, F.Z.S., &c.; and to Mr. Herbert Druce, F.Z.S., &c., for that of the moths; while for the shells, &c., I am grateful for the courtesy and co-operation of Dr. Günther and Mr. Edgar Smith of the British Museum, South Kensington.

As Appendices to this Work, I have decided that the publication of such lists, which have the advantage of "definite locality," would be valuable and useful.

XX.

List of Economic Plants of Western Africa.

Ranunculaceæ.

Clematis grandiflora, DC.—Slender climbing shrub. Leaves used as a vesicant in Sierra Leone.—Kew Museum.

Distribution: Upper and Lower Guinea.

Dilleniaceæ.

Water Tree (*Tetracera alnifolia*, Willd).—The climbing stems yield a good supply of clear water if cut across. Sierra Leone.—'Treasury of Botany.'

Distribution: Upper and Lower Guinea.

Anonaceæ.

Calabash Nutmeg (*Monodora Myristica*, Dun.).—Tree 50 to 60 feet high. Seeds used as a condiment.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 141.

Distribution: Upper and Lower Guinea.

Sour Sop or Custard Apple (*Anona muricata*, L.).—Small tree. The pulp of the fruit is edible, and has an agreeable acid flavour.—'Treasury of Botany.'

Distribution: Native of West Indies. Introduced.

Anona senegalensis, Pers.—Shrub or small tree, affording one of the best native fruits, resembling an apricot in flavour: the petals are used to flavour country dishes.—Kew Museum.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea, Mozambique District, Cape de Verd Islands.

Alligator Apple (*Anona palustris*, L.).—Small tree. The wood is used in Jamaica as a substitute for cork, being soft and compressible. The fruit is said to be narcotic and poisonous, and to be eaten by alligators. Introduced.—'Treasury of Botany,' Lindley and Moore.

Custard Apple or Bullock's Heart (*Anona reticulata*, L.).—The tree is cultivated for its fruit, and is almost naturalized in Golungo Alto, Angola. Introduced.—'Flora of Trop. Africa,' Oliver, vol. i., p. 16.

Cherimoyer (*Anona Cherimolia*, Mill.).—This tree is cultivated for its delicious fruit in Tropical Africa. Introduced. 'Flora of Trop. Africa,' Oliver, vol. i., p. 16.

Sweet Sop (*Anona squamosa*, L.).—A tree culti-

vated for its fruit in Tropical Africa and Cape Verd Islands. The natives use the powdered leaves mixed with flour as a hair-wash.—'Treasury of Botany,' Lindley and Moore, &c.

"Krookare" (*Uvaria* sp.).—Leaves used in fevers. The fruit is edible. Sierra Leone.—Kew Museum.

Finger root (*Uvaria Chamæ*, Beauv. ?).—Used in Sierra Leone as a mild purgative.—Kew Museum.

"Ogana" (Gabon), African, Guinea or Negro Pepper (*Xylopia Æthiopica*, A. Rich.).—Tree attaining 60 feet high. Fruits aromatic. Sold in the markets of West Africa for use by the natives as pepper, and also in medicine as a stimulant. The wood is elastic, and excellent for oars and masts of small boats.—Casamance, 'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' pp. 45, 46, &c.

Distribution: Upper Guinea.

"Dean" of Senegal (*Xylopia parviflora*, Benth.).—Shrub 20 feet high. Wood used for same purposes as the last, and also for cabinet work.—Casamance 'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 45.

Distribution: Upper Guinea.

"Gbeyido" or "Wasu" (*Xylopia? polycarpa*, Oliv.).

—A shrub. The bark yields a yellow dye, and is also used as a remedy for ulcers.—Kew Museum.

Distribution : Upper Guinea.

MENISPERMACEÆ.

Tinospora Bakis, Miers (*Cocculus Bakis*, Rich.).—Climbing plant. In Senegambia the Negroes employ the roots as a diuretic and febrifuge.—'Bulletin Mensuel de la Société Nationale d'Acclimatation de France,' Jan., 1887, p. 33.

Distribution :—Upper Guinea, Nile Land.

Cocculus villosus, DC.—A climber. The juice of the ripe berries makes a durable bluish-purple ink ; roots and leaves used in native medicine in India.—'Forest Flora of N. W. and Cent. India,' Brandis, p. 10.

Distribution : Extratropical W. Africa, Mozamb. District.

Cocculus Leæba, DC.—A climber, known in India under the name of "Ullar-billar," where it is prescribed as a febrifuge.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 25.

Distribution : Upper Guinea, N. Central, Nile Land, Cape de Verd Islands.

Velvet-leaf or Spurious *Pareira Brava* (*Cissampelos Pareira*, L.).—A variable plant with a climbing stem. In high repute medicinally in urinary diseases ;

bitter and tonic.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, North Central, Nile Land, South Central, Mozambique District.

Nymphæaceæ.

"Nénuphar" (*Nymphæa* sp.).—An aquatic plant. Roots used as food in times of scarcity. Senegal.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 133.

Papaveraceæ.

Red or Corn poppy, Corn rose (*Papaver Rhœas*, L.).—An erect annual, one to three feet high. The red petals when fresh are supposed to possess slight narcotic properties, but they are now only used for their beautiful colour, which is readily communicated to water, and used for colouring medicines. The milky juice of the plant has a sedative action.—'Medicinal Plants,' Bentley and Trimen, vol. i., No. 19.

Distribution: Cape de Verd Islands.

Spring poppy (*Argemone mexicana*, L.).—A herb of shrubby habit. Seeds acrid, narcotic and purgative, employed as a substitute for Ipecacuanha. They yield an oil recommended as a remedy for cholera and as a lubricant.—'Treasury of Botany,' Spon's

'Encyclopædia of the Industrial Arts, Manufactures, and Commercial Products,' p. 1409, &c.

Distribution: Upper Guinea, Mozambique District, Cape de Verd Islands.

CRUCIFERÆ.

Nasturtium humifusum, Guill. et Perr.—Small shrub having a taste like that of the watercress. Sheep are very fond of it.—'Flora Senegambia,' Guill. et Perr., vol. i., p. 20.

Distribution: Upper Guinea.

Watercress (*Nasturtium officinale*, R. Br.).—The well-known salad. The plant is considered to be a good antiscorbutic.

Distribution: Cape de Verd Islands.

Cardamine hirsuta, L.—Annual herb. The leaves and flowers form an agreeable salad.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Nile Land.

Brassica juncea, H. F. and T.—Herb cultivated abundantly in India for the seeds, which yield mustard-seed oil; used as a lubricant. It is also used as a salad.—'Oil-seeds and Oils, India Museum,' Dr. M. C. Cooke, p. 29; 'Flora of British India,' Sir J. D. Hooker, vol. i., p. 157.

Distribution: Nile Land, Lower Guinea, Mozambique District.

Capparideæ.

Gynandropsis pentaphylla, DC.—A herb. Bruised leaves rubefacient and vesicant ; expressed juice used in otalgia in India. Used also as a pot-herb.—'Pharm. of India,' E. J. Waring, p. 25 ; 'Flora of Tropical Africa,' Oliver, vol. i., p. 82.

Distribution : Upper Guinea, North Central, Nile Land, Lower Guinea, Mozamb. District.

Mærua angolensis, DC.—Shrub or small tree. Wood fine and hard, good for joinery. Fruit said to be poisonous.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 45.

Distribution : Upper Guinea, Nile Land, Lower Guinea, and South Extratropical Africa.

Boscia salicifolia, Oliv.—Shrub. Knotty root, boiled and eaten on the Shiré.—'Flora of Tropical Africa,' Oliver, vol. i., p. 93.

Distribution : Nile Land, Lower Guinea, Mozamb. District.

Cratæva religiosa, Forst.—Tree attaining 20 feet. Wood used in India for drums, models, turnery, &c. Bark boiled in oil used for outward application in rheumatism ; bark also tonic and stomachic.—'Manual of Indian Timbers,' J. S. Gamble, p. 16 ;

Pharm. of India,' E. J. Waring, p. 25. Museum, Kew.

Distribution: Upper Guinea, North Central, Nile Land.

VIOLARIEÆ.

Herb of St. Martin (*Sauvagesia erecta*, L.).—Herb used in Brazil in ophthalmia, in Peru in disorders of the bowels, and in the West Indies as a diuretic.—'Treasury of Botany.'

Distribution: Upper Guinea.

BIXINEÆ.

"Fayar" or yellow dye plant of the Soudan (*Cochlospermum tinctorium*, Rich.).—Small tree or shrub. Roots large, succulent, yield a yellow dye, and are also used in medicine in cases of amenorrhœa.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Nile Land.

"Borotuto" (*Cochlospermum angolense*, Welw. Mss.).—Small tree. Bark used by natives in making a coarse cordage.—'Flora of Trop. Africa,' Oliver, vol. i., p. 113.

Distribution: Lower Guinea.

Arnatto (*Bixa Orellana*, L.).—Small tree. The well-known orange or yellow-coloured dye known as

"Arnatto" or "Rocon" is prepared from the red pulp covering the seeds of this plant. Used for dyeing silks, staining cheese, &c.

Distribution: Upper Guinea, Lower Guinea.

Oncoba spinosa, Forsk.—Shrub. The fruit, which is edible, has a hard shell, used for ornamental purposes by the natives of Upper Guinea. Some snuff-boxes made of these fruits are exhibited in the Kew Museum from Natal.—Kew Museum.

Distribution: Upper Guinea, Nile Land, Mozamb. District.

POLYGALEÆ.

"Buaze" fibre plant of the Zambesi (*Securidaca longipedunculata*, Fres., *var. parvifolia*).—Shrub. Fibre from twigs used for making fishing-nets, cord, &c., by the natives.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Lower Guinea.

PORTULACEÆ.

Purslane (*Portulaca oleracea*, L.).—Annual herb. Antiscorbutic. Used in salads as a pot-herb, and for pickling.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Nile Land, Lower Guinea.

Tamariscineæ.

Tamarisk (*Tamarix Gallica*, L.).—Bush, or small tree. Galls formed on twigs of this plant are used in dyeing and in medicine. The plant affords also a manna considered to be detergent, aperient, and expectorant.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 61.

Distribution: Upper Guinea, Nile Land.

Tamarix articulata, Vahl.—Bush, or small tree. Wood used for ploughs, Persian wheels, small ornaments, and charcoal. Bark and galls used in tanning, and as a mordant in dyeing.—'Manual of Indian Timbers,' J. S. Gamble, p. 20.

Distribution: Nile Land, Lower Guinea, South Central.

Hypericineæ.

Guttier du Gabon, Ogina-gina (*Haronga maaagascariensis*, Chois.).—Shrub, or small tree. The bark secretes a sticky liquid or gum, which is used with the leaves in fumigation as a cure for urinary fistula.—Gabon, 'Catalogue des Produits des Colonies Françaises, Exposition de 1867,' p. 47.

Distribution: Upper Guinea, Lower Guinea, Mozambique District.

GUTTIFERÆ.

Hog or Doctor's gum, Gamboge tree (*Symphonia globulifera*, L.).—Tree 20 to 80 feet high. The yellow resin found at the roots of old trees is used as a vulnerary and diuretic, in topical applications to wounds, in gout plasters, and as a substitute for copaiba. In British Guiana, under the name of "Karamani," the natives use it for fixing arrow heads to spears, coating ropes, &c.—Kew Museum.

Distribution: Upper Guinea, Lower Guinea.

Butter or Tallow tree of West Africa (*Pentadesma butyracea*, Don).—Fruits yield a yellow greasy juice when cut, which is mixed by the Negroes with their food; they are also said to be eaten.—Sierra Leone. Kew Museum.

Distribution: Upper Guinea.

Bitter Kola (*Garcinia Kola*, Heckel).—A tree of variable aspect, 10 to 12 feet in height. The fruit is about the size of an apple, containing three or four seeds, which are covered with an abundant sourish pulp; these seeds have a strongly bitter, astringent, and aromatic taste, and differ in this respect from the true kola. They are chewed by the Negroes, and esteemed by them for their aromatic flavour, which approaches that of green coffee. They also believe these seeds to have an aphrodisiac action, and as a

masticatory are said to be a valuable remedy for colds.—'Pharmaceutical Journal,' 3rd series, vol. xiv., p. 586.

Distribution: Eastern Coast of Africa and of Senegal.

African Mammee apple (*Ochrocarpus africanus*, Oliv.).—A tree 40 to 50 feet high. Pulp of the fruit eaten by the Negroes. Princes Island, Africa.—Kew Museum.

Distribution: Upper Guinea.

DIPTEROCARPEÆ.

Laintlaintain of Sierra Leone (*Lophira alata*, Banks).—From the fruits an oil called "Meni" is obtained in Senegambia and in Sierra Leone, where it is used for cooking and for the hair. The wood is hard and heavy, and might be turned to account. The leaf is used as a charm in the Nile Land, and the calyx of the fruit is worn as an ornament by the native women. Western Africa.—Kew Museum. 'Flora of Tropical Africa,' Oliver, vol. i., p. 174, &c.

Distribution: Upper Guinea, Nile Land.

MALVACEÆ.

Sida carpinifolia, L.—Perennial fibrous plant of India. Roots used in medicine.—Kew Museum.

'Vegetable Materia Medica of Western India,' W. Dymock, p. 81.

Distribution: Upper Guinea.

Sida rhombifolia, L.—A perennial herbaceous plant. The bark yields abundant delicate flaxy fibres. Roots used in medicine in India.—'Useful Plants of India,' H. Drury; 'Vegetable Materia Medica of Western India,' W. Dymock, p. 80.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Cape de Verd Islands.

Wissandula rostrata, Planch.—A small shrub. Native of the Malay Islands. It yields a beautiful hemp.—'Flora of British India,' Sir J. D. Hooker, vol. i., p. 325.

Distribution: Upper Guinea, Nile Land, Lower Guinea.

Indian Mallow (*Abutilon indicum*, Don).—Shrub. The stem yields a strong fibre. The roots, leaves and seeds are used in medicine.—'Useful Plants of India,' H. Drury.

Distribution: Upper Guinea, Nile Land, Mozamb. District.

Malachra capitata, L.—Perennial herbaceous plant, from which a fibre is obtained in India.—'Memorandum on Materials in India suitable for the Manufacture of Paper,' L. Liotard, p. 78.

Distribution: Upper Guinea, Lower Guinea.

Urena lobata, L.—A common Tropical weed, used medicinally as a mucilage. The inner bark affords an abundance of fibre resembling jute. Paper has been made from this fibre in India.—'Treasury of Botany,' Lindley and Moore. Kew Museum.

Distribution: Upper Guinea, Nile Land, Mozambique District.

Pavonia zeylanica, Cav.—Perennial plant, from the roots of which an infusion is made and prescribed in fevers.—'Useful Plants of India,' H. Drury.

Distribution: Upper Guinea, Nile Land.

Hibiscus tiliaceus, L.—A small tree with purplish branches. It gives a fibre which is extensively used in Bengal for rough ropes. The bark is used for caulking purposes in Formosa.—'Manual of Indian Timbers,' J. S. Gamble, p. 43. Kew Museum.

Distribution: Upper Guinea, Mozambique District.

Indian Hemp, Bastard Jute (*Hibiscus cannabinus*, L.). —Annual. Cultivated for its fibre in most parts of Africa. The plant is largely grown in Western India, both as a pot-herb and for its fibre, known as "Ambari," which much resembles jute. Paper made from this fibre, and an oil from the seeds, are exhibited in the Kew Museum.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 204; 'Treasury of Botany,' Lindley and Moore. Kew Museum.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea, Mozambique District.

Hibiscus furcatus, Roxb.—Annual or perennial. The bark yields an abundance of strong white fibre. —'Useful Plants of India,' H. Drury.

Distribution: Upper Guinea, Mozambique District.

"Ochro" (*Hibiscus esculentus*, L.).—A tall herb which affords a strong fibre suited for the manufacture of ropes, gunny-bags, paper, &c. The fruits known as "Ochro" or "Bendi-kai" are very mucilaginous, and used in thickening soups, &c.; the young fruits are pickled like capers. Seeds emollient and demulcent. Leaves used for poultices.—'Useful Plants of India,' H. Drury.

Distribution: Upper Guinea, Nile Land.

Hibiscus Abelmoschus, L.—A shrubby plant, from which a strong fibre is produced. Seeds highly scented, cordial and stomachic, and sometimes used as a substitute for animal musk in perfumery. When bruised or reduced to powder and steeped in rum they are considered very efficacious in snake bites. The plant abounds in mucilage.—'Useful Plants of India,' H. Drury.

Distribution: Upper Guinea, Lower Guinea Mozambique District.

"Tabaco" (*Hibiscus quinquelobus*, Don; *Paritium sterculiæfolium*, Guill. et Perr.).—Small tree. Wood used for cabinet-work. Casamance, 'Catalogue des

Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 45.

Distribution : Upper Guinea.

Hibiscus surattensis, L.—Herbaceous. Affords a fibre. A specimen of plaited fibre from this plant is exhibited in the Kew Museum from Ceylon.

Distribution : Upper Guinea, Lower Guinea, Mozambique District.

Portia or Tulip Tree of India (*Thespesia populnea.* Corr.).—Small tree, the timber of which is durable; used in India for gun-stocks, boats, cart and carriage building, and for furniture. The fibre is used for various purposes, and in Demerara for making coffee-bags; it is also used in medicine and in dyeing. The flower-buds and unripe fruits give a yellow dye. From the seeds an oil is extracted which might be useful in cutaneous affections.—'Manual of Indian Timbers,' J. S. Gamble, p. 43 ; 'Treasury of Botany,' Lindley and Moore ; 'Oil-seeds and Oils in the India Museum,' Dr. M. C. Cooke ; Kew Museum.

Distribution : Upper Guinea, Mozambique District.

Cotton, American or Sea Island (*Gossypium barbadense*, L.).—Small shrub cultivated in many districts of Tropical Africa, affording the best cotton of commerce.

Distribution : Upper Guinea, North Central, Nile Land, Lower Guinea, Mozambique District.

Gossypium herbaceum, L.—Branching annual or perennial cultivated in almost every district of Tropical Africa. The bulk of the cotton supply from India is furnished by this species.

Distribution: Upper Guinea, Nile Land, Mozamb. District, Cape de Verd Islands.

Gossypium arboreum, L.—Shrub cultivated in most tropical countries, and yields part of the cotton of commerce.

Cotton seeds give a fixed oil, said to be an excellent substitute for olive oil. The residue or cake after the expression of the oil is employed for feeding cattle. The root bark is regarded as an excellent emmenogogue.—'Medicinal Plants,' Bentley and Trimen, vol. i., No. 37.

Baobab, Monkey-Bread Tree, or Ethiopian Sour Gourd (*Adansonia digitata*, L.).—Tree of moderate height, with a trunk of vast thickness. The bark is used for paper-making, and by the natives of the Umyali River, S. Africa, as quinine in fevers. The pulp of the fruit is slightly acid, often eaten, and the juice from it is used as a specific in putrid and pestilential fevers. The powdered leaves are used in soups, sauces, &c., by the Africans, under the name of "Lalo," to diminish perspiration and to keep the blood in a healthy state.—'Treasury of Botany,' Lindley and Moore. Kew Museum, &c.

Distribution: Upper Guinea, Nile Land, South

Central, Mozambique District, Cape de Verd Islands.

Benten in Yoloff, Bintaforo in Mandingue, Silk Cotton or Kapok (*Eriodendron anfractuosum*, DC.).—Large tree. The cotton obtained from the fruits is used for stuffing pillows, &c. An oil is extracted from the seeds, of a dark brown colour. A solution of the gum of this tree is used in medicine. The leaves are sometimes used as a substitute for Ochro (*Hibiscus esculentus*, L.).—'Useful Plants of India,' H. Drury, &c.

Distribution: Upper Guinea, Lower Guinea.

STERCULIACEÆ.

African Tragacanth (*Sterculia Tragacantha*, Lindl.).—Tree 40 to 50 feet high. The gum afforded by this tree in great quantity is commonly found in parcels of Senegal (Arabic) gum.—Spon's 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 1686.

Distribution: Upper Guinea, Lower Guinea.

"Ndimb" of Casamance (*Sterculia ? cordifolia*, Cav.).—Tree 60 to 80 feet high. The Negroes eat as a delicacy the aril which encloses the bottom of the seed. The wood is hard, and is employed in the construction of embankments, domestic utensils, &c.—'Flora Senegambia,' Guillemin et Perrottet, vol. i., p. 80.

Distribution Upper Guinea.

Kookomboya (*Sterculia cinerea*, Rich.).—Tree of moderate height. The wood makes good poles for tents, and the bark stripped from the young branches is used as cordage. S. W. Trop. Africa.—Kew Museum.

Distribution : Upper Guinea, Nile Land.

Sterculia Barteri, Mast.—The wood of this tree is used on the Niger for floats by fishermen. The bark is described as resinous, with a disagreeable odour.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 218.

Distribution : Upper Guinea.

Cola or Kola (*Cola acuminata*, R. Br.) —Tree 20 to 30 feet high, well known as furnishing the "Kola nuts," so much esteemed by the natives for their bitter flavour. These nuts are said to possess the power of rendering putrid water agreeable, but are chiefly used for satisfying the craving of hunger and to enable the user to endure prolonged labour without fatigue. The roots, called "chew-stick," are used in Sierra Leone for cleaning the teeth and sweetening the breath. Various other virtues are ascribed to this plant.—'Flora of Trop. Africa,' D. Oliver, p. 220 ; 'Kew Museum Guide,' p. 21.

Distribution : Upper Guinea, Lower Guinea.

Waltheria indica, L.—Perennial plant or undershrub employed as a febrifuge in Surinam.—'Treasury of Botany,' Lindley and Moore.

Distribution : Throughout Tropical Africa, Cape de Verd Islands.

Cacao (*Theobroma Cacao*, L.).—This tree is cultivated for its seeds on some parts of the West Coast of Africa, and according to Spon's 'Encyclopædia' some very fine cacao has been sent from Monrovia, which fetched the highest price of any in the market, and that in 1878, 185,197 lbs. were imported from the West Coast. Cacao is said to be the chief product of Principé, and also to be cultivated in St. Thomé, the Cape Verd Islands, and Senegambia.—Spon's 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' pp. 687, 690; 'Society of Arts Journal,' vol. xxxii., p. 231.

TILIACEÆ.

Grewia asiatica, L.—Shrub or small tree cultivated throughout India for its fruits, which are commonly used for flavouring sherbets. The bark is used in rope-making.—'Manual of Indian Timbers,' J. S. Gamble, p. 55; 'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, South Central.

Grewia mollis, Juss.—Shrub or small tree, the bark of which is said by Barter to be used in soups for its mucilage.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 248.

Distribution: Upper Guinea, Nile Land.

Grewia populifolia, Vahl.—Shrub of slow growth

Wood used for walking-sticks. Fruit eaten under the name of "Gingo."—'Manual of Indian Timbers,' J. S. Gamble, p. 54; 'Flora of British India,' Sir J. D. Hooker, vol. i., p. 385.

Distribution: Throughout the whole of Tropical Africa.

Grewia villosa, Willd.—A small shrub, bearing edible fruits about the size of a cherry.—'Forest Flora of North-West and Central India,' Dr. Brandis, p. 39.

Distribution: Throughout Tropical Africa, Cape de Verd Islands.

Grewia salvifolia, Heyne.—Shrub or small tree, having edible fruits.—'Manual of Indian Timbers,' J. S. Gamble, p. 55.

Distribution: Throughout all districts of Tropical Africa.

"Ovumbapoo" Berries (*Grewia* sp.).—A shrub, three to five feet high. The fruits are pounded to a pulp with water and eaten, or fermented into a beer or spirit. South-West Tropical Africa. (Kew Museum.)

Triumfetta semitriloba, L.—Shrubby plant, the inner bark of which affords a very good fibre.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Lower Guinea.

"Jews' Mallow" or "Jute" (*Corchorus olitorius*, L.)—Annual. This is one of the species that affords the

well-known fibre of commerce called "Jute," which is found wild, or cultivated as a pot-herb in every part of Tropical Africa.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 262.

Found also in Cape de Verd Islands.

Corchorus tridens, L.—Annual. The young tops, according to Dr. Welwitsch, are cooked with palm-oil, and used as spinach by the natives of Angola.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 264.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District, Cape de Verd Islands.

Corchorus trilocularis, L.—Annual, said to contain a large quantity of mucilage, and to possess emollient properties. The seeds are used in Bombay in fever and obstructions of the abdominal viscera. —'Vegetable Materia Medica of West India,' W. Dymock, p. 92; 'Flora Senegambia,' Guillemin et Perrottet, vol. i., p. 88.

Distribution: Nile Land, Lower Guinea, South Central, Mozambique District, Cape de Verd Islands.

Corchorus fascicularis, Lam.—Annual, or sometimes perennial. Under the name of "Bhauphallee" the whole plant is sold in Bombay; it is very mucilaginous, somewhat astringent, and is valued as a restorative.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 92.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Humiriaceæ.

"D'jouga" (*Aubrya gabonensis*, Baill.).—A large tree, affording an excellent timber. From the fruits a fermented drink is made by the natives and called "Stoutou," Gabon.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 47.

Distribution: Upper Guinea.

Zygophylleæ.

Tribulus terrestris, L.—Annual. The fruit, and sometimes the whole plant, is used by the Hindoos under the name of "Chota Gokhroo," and is regarded by them as having cooling, diuretic, tonic and aphrodisiac properties.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 95.

Distribution: Widely spread thoughout Tropical Africa, Cape de Verd Islands.

"Nitre Bush" (*Nitraria Schoberi*, L.).—The fruits of this genus are eaten in the Caspian Desert. Camels browse on the young shoots.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea.

Zygophyllum simplex, L.—Annual. The leaves are used by the Arabs in ophthalmia. The seeds are

swept up by the nomad tribes of the Multan Desert, and eaten; they are known to them as "Alathi."—'Treasury of Botany,' Lindley and Moore; 'Flora of British India,' Sir J. D. Hooker, vol. i., p. 425.

Distribution: Nile Land, Lower Guinea, Cape de Verd Islands.

Fagonia arabica, L. (*F. cretica*, L.).—Annual. Under the name of "Dhamasa" this plant has a great reputation in India as a suppurative in the cases of abscess, and for cooling the mouth, the steam of the decoction being inhaled. This plant is also used by the hill people as a remedy for fever.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 96.

Distribution: North Central, Nile Land, Cape de Verd Islands.

GERANIACEÆ.

"Amrulsák" (*Oxalis corniculata*, L.).—A herb considered by the Hindoos to have cooling, refrigerant and stomachic properties. The fresh juice is used to relieve intoxication from *Datura*, and is said to be useful in dysentery. All parts of the plant have an acid taste.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 97.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District, Cape de Verd Islands.

RUTACEÆ.

Zanthoxylum senegalense, DC.—Shrub or small tree. The bark is aromatic and stimulant; when reduced to a powder it is soaked in water, and applied externally in rheumatic affections by the natives.—'Flora Senegambia,' Guillemin et Perrottet, vol. i., p. 141.

Distribution: Upper Guinea.

Clausena inæqualis, Benth.—Shrub or small tree; wood heavy and close-grained, but little used. Cape of Good Hope. (Kew Museum.)

Distribution: Upper Guinea.

The Orange, Lemon, and Lime are cultivated in the Cape Verd Islands, St. Thomé, and probably in various other parts of West Africa.—'Society of Arts Journal,' vol. xxxii., p. 231, &c.

SIMARUBEÆ.

"Woodginoos" of Abyssinia (*Brucea antidysenterica*, Mill.).—Small tree. Root a specific in dysentery. A plain bitter without any aromatic or resinous taste. Bark sold under the name of "Angostura Bark." (True Angostura bark is afforded by *Galipea Cusparia*, St. Hil. of Venezuela.)—'History of Dichlamydeous Plants,' G. Don, vol. i., p. 800.

Distribution: Upper Guinea, Nile Land.

"Dika," "Udika," "Oba" or "Iba" (*Irvingia Barteri*, Hook. f.).—Tree, thirty to fifty feet high. The fruit is eaten by the blacks, and the seeds, which contain a quantity of oil, are pounded in a trough, when a white tallow rises to the surface, and after removal the residue is allowed to cool; this constitutes the Dika or Gabon Chocolat. Mr. Barter calls this tree the "Wild Mango" of the Sierra Leone people.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 47. (Kew Museum.)

Distribution: Upper Guinea.

Irvingia Smithii, Hook. f.—A tree, forty feet high. The fruits are said to be much sought after by monkeys.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 314.

Distribution: Upper Guinea, Lower Guinea.

"Soump" (*Balanites ægyptiaca*, Delile).—Shrub or small tree. Wood hard and durable, used in building; bark used as a cattle medicine in India. The young fruits are purgative; but when ripe, edible, and formed into an intoxicating drink by the negroes on the West Coast of Africa. The seeds are usually mixed with Gum Senegal, and afford an oil known as "Zachun." The leaves are slightly acrid and anthelmintic.—'Treasury of Botany,' &c.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea.

BURSERACEÆ.

African Bdellium (*Balsamodendron africanum*, Arn.).—Shrub or small tree. The bulk of the gum resin, known under the above name, comes from Senegal, where its collection is carried on simultaneously with that of Gum Arabic, the produce being mixed with the latter to increase its bulk. Classification takes place when the masses reach Bordeaux. Triturated with water it forms an emulsion. The resin is hard, with a bitter flavour and a slight aromatic odour of black pepper.—'Spon's Encyclopædia of the Industrial Arts, Manufactures, and Commercial Products,' p. 1637.

Distribution: Upper Guinea, Nile Land, Mozambique District.

"Mpafu" or "Mubafo" Tree of Tropical Africa (*Canarium edule*, Hook. f.).—The fruits of this tree afford an oil which is obtained by soaking them in large pits of water for several days, when the oil rises to the surface and is skimmed off. Under the bark are large masses of scented gum, used by the natives in fumigating themselves. A specimen of the resin exhibited in the Kew Museum is called "African Elemi," and is stated to be used for roofing. The names "Mpafu" and "Mubafo" are believed to be borne by the same tree. West Africa. (Kew Museum.)—'Report on the Royal Gardens, Kew, 1880,' p. 50.

Canarium macrophyllum, Oliv.—Tree of thirty feet.

The fruit is said to be eaten by the natives.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 328.

Distribution : Upper Guinea.

MELIACEÆ.

Persian Lilac, Bastard Cedar or Bead Tree (*Melia Azedarach*, L.).—The wood of this tree is handsomely marked and takes a good polish ; it is used in India for furniture. The bark is extremely bitter, and employed as an anthelmintic. Leaves and pulp of the fruit used in native medicine, and from the fruit an oil is obtained ; the nuts are frequently strung as beads. —'Manual of Indian Timbers,' J. S. Gamble, p. 70.

Distribution : Upper Guinea, Cape de Verd Islands.

"Motsakiri" (*Trichilia emetica*, Vahl).—Tree. The wood is used in South Tropical Africa for small canoes, &c.; and on the Shiré a large quantity of valuable oil and tallow is expressed from the seeds. The oil is used in cookery. (Kew Museum.)

Distribution : Upper Guinea, Nile Land, South Central, Mozambique District.

Crab Tree (*Carapa guyanensis*, Aubl.).—The wood of this tree is used in Demerara for furniture, shingles, masts and spars of vessels ; it takes a good polish. The bark is bitter and employed as a tonic. By pressure the seeds yield an oil, known under the various names of "Crab," "Carap," "Andiroba,"

"Talliconah," or "Coondi" oil, used for burning in lamps, anointing the hair, in medicine as a purgative and anthelmintic and for the healing of wounds. This oil contains a large proportion of stearine, associated with oleine and margarine. It makes an excellent soap, and as a lubricant is said to protect iron and steel from rust in a remarkable degree.—'Treasury of Botany,' Lindley and Moore ; 'Spon's Encyclopædia of the Industrial Arts, Manufactures, and Commercial Products,' p. 1386.

Distribution : Upper Guinea.

Cail-cédra or Mahogany Tree of the Gambia (*Khaya senegalensis*, Juss.).—A lofty tree, the wood of which is adapted for building, carpentry and joinery, and for turning. The bark is used as a bitter tonic, and as quinine by the blacks.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 116, &c.

Distribution : Upper Guinea, Nile Land, Mozambique District.

CHAILLETIACEÆ.

Ratsbane, Break or Broke-back (*Chailletia toxicaria*, Don).—Shrub. The seeds are used as a rat poison in Sierra Leone, and are said to produce the same effects as strychnia.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution : Upper Guinea.

Olacineæ.

Ximenia americana, L.—Shrub or small tree, known in Gabon as Elozy Zégué and Citron of the Sea. The wood is odoriferous, and used in Western India as a substitute for Sandal-wood. The fruit is slightly laxative and the seeds purgative. The seeds yield an oil said to be good for soap-making.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 115; 'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District, Cape de Verd Islands.

Apodytes dimidiata, E. Mey.—Moderate-sized tree. Wood light, yellowish, polishes well. Used for common furniture and agricultural implements.—'Silva Capensis,' Dr. L. Pappe, p. 3.

Distribution: Lower Guinea, Nile Land.

Icacina macrocarpa, Oliv.—An extensive climber. Fruits eaten by the Boobes. West Tropical Africa. (Kew Museum.)

Distribution: Upper Guinea.

Celastraceæ.

Guenoudeck des Sénégalais (*Celastrus senegalensis*, Lam.).—Shrub, attaining fifteen feet in height. The wood is white, close-grained, hard, and durable. The leaves are thrashed out and used as a fodder, and the

branches as dunnage for the roofs of houses in India. The root-bark is used by the natives of Senegal and Senegambia in the treatment of chronic dysentery.—'Forest Flora of North-West and Central India,' Dr. Brandis, p. 81; 'Flora Senegambia,' Guillemin et Perrottet, vol. i., p. 144.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Rhamneæ.

Jujube or Ber Tree (*Zizyphus jujuba*, Lam.).—A loosely-branched tree or shrub, ten to forty feet high. Used for hedges in West Africa, being periodically topped. Wood used in India for saddletrees, agricultural implements, oil-mills, &c. The bark is astringent, and is employed in the Moluccas in diarrhœa and to strengthen the stomach. The roots and seeds are used in fevers, and the powdered root-bark is mixed with oil and applied to ulcers. Leaves used to polish gems. This tree is largely cultivated by the Chinese, who preserve the fruits in syrup, and also use them in a dried state; these fruits occasionally find their way into the London market. A lac is produced on this tree in India.—'Manual of Indian Timbers,' J. S. Gamble, p. 89; 'Useful Plants of India,' H. Drury, &c.

Distribution: Upper Guinea, Lower Guinea, Mozambique District, Cape de Verd Islands.

Zizyphus Spina-Christi, Willd.—Small tree or shrub. The fruit, about the size of a sloe, has an agreeable flavour, affording a very pleasant food to the inhabitants of Egypt and Arabia.—'History of Dichlamydeous Plants,' G. Don, vol. ii., p. 24.

Distribution: Upper Guinea, North Central, Nile Land.

"Buffalo-Horn" (*Zizyphus mucronata*, Willd.).—Tree, twenty to thirty feet high. Wood tough, chiefly used for waggon-work.—'Silva Capensis,' Dr. L. Pappe, p. 12.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

AMPELIDEÆ.

Vitis cornifolia, Baker.—Sub-erect shrub, bearing black, two-celled, edible fruits.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 390.

Distribution: Upper Guinea, Nile Land.

Vitis palmatifida, Baker.—Sub-erect shrub, with edible fruits like black currants.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 397.

Distribution: Upper Guinea.

Forest Grapes (*Vitis Schimperiana*, Hochst.).—This plant bears oblong edible fruits, similar in appearance to the Frontignac grape.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 395; Kew Museum.

Vitis Welwitschii, Baker.—A wide-climbing shrub. Fruits green when unripe, then reddish, edible.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 393.

Distribution: Lower Guinea.

Vitis Leonensis, Hook. f.—A large climber. Fruits red, about $\frac{3}{8}$ inch long, edible.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 398.

Distribution: Upper Guinea.

Vitis bombycina, Baker.—A wide-climbing plant, with edible fruits.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 399.

Distribution: Upper Guinea.

Vitis aralioides, Welw. Mss.—A climber. Fruits one-seeded, of a bluish-purple colour, edible.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 411.

Distribution: Lower Guinea.

Country Grapes (*Vitis cæsia*, Afzel.).—The fruits of this climber are black when ripe, and have an acid taste, not very agreeable to the European; but are eaten by the negroes, who are rather fond of them. The plant is called "country grapes" by the settlers at Sierra Leone.—'History of Dichlamydeous Plants,' G. Don, vol. i., p. 710.

Distribution: Upper Guinea.

Leea tinctoria, Lindl.—A shrub, five to ten feet high. Used in dyeing.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 416.

Distribution: Upper Guinea.

SAPINDACEÆ.

Heart-seed, Heart-pea, or Winter Cherry (*Cardiospermum Halicacabum*, L.).—Stems annual. The root is white and fibrous, with a disagreeable odour and somewhat bitter taste; it is described as emetic, laxative, stomachic, rubefacient, &c. In the Moluccas the leaves are cooked and used as a vegetable, and on the Malabar Coast are used with castor-oil as an internal remedy for lumbago, &c. They are also said to be used externally to reduce swelling and tumours of various kinds.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 152; 'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, Nile Land, Mozambique District, Cape de Verd Islands.

Schmidelia africana, DC.—Tree, thirty to forty feet high. Fruits used in Abyssinia as a remedy against tape-worm. The dried fruits are pounded, mixed with flour, and then made into cakes.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, Nile Land.

Akee Apple (*Blighia sapida*, Koenig).—Small tree, thirty feet high. The flowers are fragrant, and the distilled water from them is used as a cosmetic. The fruit is fleshy, and contains three shining black seeds with a white spongy aril, which is the edible part of the fruit; it is said to possess an agreeable sub-

acid taste.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 426; 'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea.

Chytranthus Mannii, Hook. f.—Small tree, attaining eighteen feet in height. The fruits are eaten by the natives. Princes Island. (Kew Museum.)

Distribution: Upper Guinea.

"Kewer of Senegal" (*Sapindus senegalensis*, Poir.).—Small tree, twenty to thirty feet high. Wood suitable for carpentry work, but is little used. Outer covering of fruits edible, but the seeds are poisonous.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 43.

Switch Sorrel of Jamaica (*Dodonæa viscosa*, L.).—Shrub or small tree. The wood is used for engraving and in turnery, also for tool-handles and walking-sticks. According to Dr. Bennet, this plant is called "Apiri" in Tahiti; and fillets of it were once used for binding round the heads and waists of victors, after a battle and during the pursuit of the vanquished. The leaves have a sour and bitter taste, and the plant from this circumstance is called in Jamaica Switch Sorrel.—'Manual of Indian Timbers,' J. S. Gamble, p. 101; 'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, Nile Land, Mozambique District.

ANACARDIACEÆ.

Sorindeia juglandifolia, Planch., var. *divaricata.*—A shrub, the fruit of which is said to be eatable.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 440.

Distribution: Upper Guinea, Lower Guinea.

"Cashew Nut" (*Anacardium occidentale,* L.).—Large tree, somewhat like the walnut in appearance. Wood used for packing-cases in Burmah, for boat-building and charcoal. A milky juice from the stem, which dries black and hard, is used as a varnish. The plant yields a sub-astringent gum, which forms a strong mucilage of a yellowish colour with water; this is largely used in South America by bookbinders, and is occasionally imported into this country from that continent under the name of "Cajii" gum; its commercial value being the same as that of the inferior sorts of Arabic and Senegal gums. The pericarp of the fruit gives a black acrid oil known as "Cardol," from which Anacardic acid is obtained. This oil is very caustic, raises blisters, and is used in India for warts, corns, ulcers; and is sometimes applied to floors of houses in that country to protect the wood-work from white ants, and also to the binding of books, as this oil is highly disliked by insects. The Andamanese apply it to their fishing-lines, to colour and preserve them. The nuts or seeds are roasted and eaten as dessert, and by expression yield an oil similar to

almond oil. An excellent wine is said to be prepared from them in Brazil. The enlarged pedicel of the fruit is eaten. This tree is said to grow very abundantly from the Congo to Ambrizette.—'Manual of Indian Timbers,' J. S. Gamble, p. 108; Spon's 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' pp. 1352, 1638; 'Treasury of Botany,' Lindley and Moore, &c.

"Blood Plum" of Sierra Leone, "Dzingeregza" of Nupé (*Hæmatostaphis Barteri*, Hook. f.).—Small tree, bearing deep crimson fruits in clusters like grapes, which are said by Mr. Barter to have a sub-acid and pleasant taste when ripe, and to be eaten by the natives.—Kew Museum; 'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea.

Odina acida, Rich. (*? O. Oghigee*, Hook. f.).—Vogel states that the bark of this small deciduous tree is converted into a powder by the natives, and mixed with other substances to form a paint for the face.—'Niger Flora,' Sir W. Hooker, p. 286.

Distribution: Upper Guinea.

Hog Plum or Yellow Spanish Plum of Jamaica (*Spondias lutea*, L.).—Large tree. The bark is said to be used for tanning in British Guiana, and the fruits, which are of an oval shape, with flesh resembling the common plum, are used for feeding swine, for which

purpose it is commonly cultivated in Jamacia.—'Dictionary of Economic Plants,' J. Smith; Kew Museum, &c.

Distribution: Upper Guinea.

"M'Birr" of Senegal (*Sclerocarya Birrea*, Hochst. [*Spondias Birrea*, Rich.]).—The fruits of this tree are the size of a walnut. The seed is edible, and from the pulp a fermented liquor is prepared.—'Flora of Tropical Africa,' D. Oliver, vol. i., p. 449.

Mango (*Mangifera indica*, L.).—This tree is cultivated in the Tropics chiefly for its excellent fruit. In India the wood is used for planking, doors, window-frames, packing-cases, &c.; canoes and Masula boats are made of it. The bark yields a gum, and the seed gallic acid.—'Manual of Indian Timbers,' J. S. Gamble, p. 107, &c.

Distribution: Cultivated in Tropical Africa.

CONNARACEÆ.

Rourea santaloides, W. &. A.—Climbing shrub. Bark made into coarse cattle ropes in Ceylon. Root used as a bitter tonic in India in rheumatism, diabetes, scurvy, and pulmonary complaints.—Kew Museum; 'Vegetable Materia Medica of Western India,' W. Dymock, p. 170.

Distribution: Upper Guinea.

LEGUMINOSÆ.

Crotalaria glauca, Willd.—Erect annual, one to three feet high; said by Messrs. Speke and Grant to be eaten by the people of the Madi as spinach.—'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 12.

Crotalaria verrucosa, L.—Herbaceous plant. The juice of the leaves is said to diminish salivation, and combined with salt is anthelmintic. It is slightly purgative.—'Useful Plants of India,' H. Drury.

Distribution: Upper Guinea, Mozambique District.

Crotalaria retusa, L.—A small plant, cultivated in the Madras Presidency for the fibre used in the manufacture of cordage, canvas, &c. The root rubbed up and mixed with wine is said to be an excellent specific in colic and flatulency. The juice from the leaves is used in a drink in fevers, and is said to purify the blood. The plant is used in a decoction in chronic fevers.—'Useful Plants of India,' H. Drury, &c.

Distribution: Upper Guinea, Mozambique District.

Lupinus Termis, Forsk.—Annual, 12 to 18 inches high. The peduncles are peeled and eaten raw, and the seed boiled as other pulse by the Arabians. This plant is said by Messrs. Speke and Grant to be cultivated on the banks of the White Nile. The pods

are three inches long.—'History of Dichlamydeous Plants,' G. Don, vol. ii., p. 365, &c.

Distribution: Upper Guinea, Nile Land.

Trifolium subrotundum, Steud.—Perennial, cultivated in the Nile Land under the name of "Mayad" as a forage.—'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 59.

Distribution: Upper Guinea, Nile Land, Lower Guinea.

Indigo (*Indigofera tinctoria*, L.).—A copiously-branched shrub, four to six feet high, largely used as a dye by the natives of the Upper Gambia. Indigo of commerce is chiefly obtained from two species of *Indigofera*, viz., *I. tinctoria*, L., and *I. Anil*, L. In the preparation of indigo the plants are cut down just before the flowering stage. They are then closely pressed into a trough or vat, and covered with water. Fermentation then takes place, and is allowed to continue from twelve to fifteen hours. The plants are then removed, and the water is stirred and beaten with paddles, when its colour passes to a blue, and the sedimentary matter sinks to the bottom; the supernatant liquid is drawn off, and the residue, after being heated, is washed and filtered. After this process it is pressed into cakes—usually cubical—dried and stamped, and is then ready for the market. The use of indigo as a dye is of great antiquity, and is chiefly imported into this country for that

purpose. It has also been introduced into the British and Indian Pharmacopœias; has been used as a remedial agent in epilepsy, infantile convulsions, &c., but has now nearly or entirely gone out of use, as it is said to cause distressing nausea if used in sufficient doses to cause a desirable effect. Indigo is chiefly imported into this country from the East Indies, also from Guatemala and Northern South America. The imports of this dye in 1882 amounted to 95,488 cwts.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 72; 'Treasury of Botany,' Lindley and Moore; 'Floræ Senegambiæ Tentamen,' Guillemin et Perrottet, p. 178, &c.

Distribution: Universally cultivated. Wild in Senegambia, and perhaps elsewhere. Cape de Verd Islands.

Indigofera Anil, L.—The West Indian Indigo. A copiously-branched shrub, three to five feet high. This species of *Indigofera* is next in importance to *I. tinctoria* as an indigo-producing plant, for which purpose it is largely cultivated. It has been collected in Senegambia, Sierra Leone, Guinea, Mozambique, Angola and Zambesi-land, and is said to be subspontaneous in various parts of Tropical Africa, but especially along the Coast about Sierra Leone.—'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 98.

This plant was introduced into Senegambia in 1825, where its cultivation resulted in giving less

indigo than in its native country, Bengal: cultivation was abandoned in consequence. On the banks of the Gambia, this species has been cultivated by the Natives, introduced doubtless to Albreda from Senegal by the French: it flowers from August to March.—'Floræ Senegambiæ Tentamen,' Messrs. Guillemin, Perrottet and Richard, p. 180.

Indigofera trita, Linn. f. (*I. cinerea*, Willd.).—This species is said to yield indigo in West Africa.—Spon's 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 858.

Distribution: Lower Guinea, Nile Land.

Indigofera hirsuta, L.—An annual or biennial, said to yield indigo in West Africa.—Spon's 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 858.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea, Mozambique District, Cape de Verd Islands.

Indigofera endecaphylla, Jacq.—Annual or biennial, believed to be the source of the dye used by the negroes to dye the cotton with which they make their pagnes (cotton drawers).—'Flore d'Oware et de Benin en Afrique,' A. Palisot, tome ii., p. 44.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Indigofera enneaphylla, L.—Annual or biennial, the

juice of which is said to be given as an antiscorbutic, alterative and diuretic in India.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 176.

Distribution: Lower Guinea.

Indigofera diphylla, Vent.—Undershrub. Used as a dye by the natives in Senegambia.—'Flora Senegambia,' Guillemin et Perrotet.

Distribution: Upper Guinea, Nile Land, Mozambique District.

Tephrosia purpurea, Pers.—Perennial plant used in native medicine in India. It is described as deobstruent and diuretic, and to be useful for coughs; also as a blood purifier, &c. The plant is tied up in bundles for sale.—'Materia Medica of Western India,' W. Dymock, p. 178.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea, Mozambique District.

Tephrosia Vogelii, Hook. f.—Shrub, eight to ten feet high, cultivated by the natives, and called on the Gaboon "Igongo." It is thrown into the water to stupefy fish.—'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 110.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

"Sabral" (*Sesbania punctata*, DC.).—Shrub, five to ten feet high. Wood recommended for carpentry.

—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 44.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea, Cape de Verd Islands.

Sesbania ægyptiaca, Pers.—Shrub attaining ten feet in height. The wood is used in India for poles, and is said to make the best gunpowder charcoal. The bark is made into rope, and the leaves and branches used as a cattle fodder. Messrs. Speke and Grant state that the herd boys on the banks of the White Nile used the pod as a rattle.—'Manual of Indian Timbers,' J. S. Gamble, p. 119, &c.

Distribution: Upper Guinea, Nile Land.

"Dhunchee" or "Danchi" of India (*Sesbania aculeata*, Pers.).—Annual. Cultivated about Calcutta during the rains. It grows to a height of from six to ten feet, and yields fibre six to seven feet long, coarser than hemp (*Cannabis*), unless cut at a very early period. In Bengal the fishermen make the drag-ropes to their nets of this fibre on account of its strength and durability in water, as it is said to be more durable and stronger than jute (*Corchorus*). In Spon's 'Encyclopædia' it is stated that, if properly prepared and scutched, it would doubtless command a sale on this market for rope-making. The plant is said to require little attention, and to be of rapid growth.—'The Fibrous Plants of India,' Dr.

F. Royle, p. 294; Spon's 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 996.

Distribution: Upper Guinea, Mozambique District.

"Solah" or "Shola" of India (*Æschynomene aspera*, L.).—Annual or biennial. Said to grow to a great size in marshy places. From the pith-like stems, hats, swimming-jackets, floats for fishing nets, and various fancy articles are made, as it is found to be very useful where elasticity and lightness are required.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, Lower Guinea, Mozambique District.

Ambash or Pith-tree of the Nile, M'Bilor of Senegal (*Herminiera Elaphroxylon*, Guill. et Perr.).—Erect shrub, eight to twenty feet high. The wood is very light, and in the form of small logs is used by the natives to assist them in crossing rivers, and as floats to their nets. The wood cut into thin plates is said to be good for insect boxes. It grows very rapidly, and is found in or near water.—'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 145; 'Flora Senegambia,' Guillemin et Perrottet, vol. i., p. 202.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Zornia diphylla, Pers.—A small plant, with stems a

foot or more long. It is stacked by the Foulahs for horse provender.—'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 158.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District, Cape de Verd Islands.

Ground-nut, Arachides, Earth-pea, Mothu o siaht, &c. (*Arachis hypogæa*, L.).—Herbaceous. Cultivated to an immense degree in Western Tropical Africa and elsewhere for its seeds, which are largely exported to this country, France, Germany, &c. They yield an oil largely used by perfumers for pomades, &c., and is now extensively used in soap-making; it makes a good substitute for olive oil in pharmacy, and as a lubricant for delicate machinery and for burning in lamps is stated to be well adapted. The refuse cake after the oil has been expressed is used in this country and elsewhere for feeding cattle. It is said to have an agreeable sweet taste, and to be very digestible. The seeds are used in Tropical Africa and in various other parts of the world as food, either roasted or boiled, and are also prepared in various ways as a sweetmeat, &c.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 75; 'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 158.

Distribution: Cultivated throughout Tropical Africa; Cape de Verd Islands.

Desmodium gangeticum, DC.—Erect undershrub three to five feet high, considered to be febrifuge and

anticatarrhal.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 182.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Desmodium triflorum, DC.—Herbaceous plant. It is valued as a medicine for the cure of dysentery.—'Enumeratio Plantarum Zeylaniæ,' Dr. Thwaites, p. 86.

Distribution: Upper Guinea.

Uraria picta, Desv.—This shrubby plant is supposed in Western India to be an antidote to the poison of the Phoorsa snake (*Echis carinata*). The Hindoo name is "Dábrá."—'Vegetable Materia Medica of Western India,' W. Dymock, p. 181.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Common Tare or Vetch (*Vicia sativa*, L.).—Slender annual. Largely cultivated in England and elsewhere as a fodder plant. The Abyssinians grow it under the name of "Ententeratt."—'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 173.

Distribution: Nile Land.

Lathyrus sativus, L.—Slender annual extensively cultivated in Southern Europe under the name of Jarosse or Gesse, and in Lower Guinea under those of "Sobbeure," "Ater," and "Schimbera," for its seed, which is used as food, and also the pods when green.

The whole plant is used as forage, and the seed largely used as food for poultry.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution : Nile Land, Lower Guinea.

Crabs' Eyes, Jequerity, Prayer Beads, Jumble Beads, &c. (*Abrus precatorius*, L.).—Small shrub. The root has a sweetish taste, is mucilaginous, and is said to form an excellent substitute for Liquorice (*Glycyrrhiza glabra*), as it has similar properties. The small egg-shaped and scarlet-coloured seeds, with a black patch or scar at one end, are well known, and have long been used in various parts of the world as beads and for many other ornamental purposes. In India they are employed as a standard weight by jewellers and druggists under the name of Rati, and in Egypt have been used as food, but are hard and very indigestible. Recently these seeds have been brought into notice, under the name of "Jequerity," as a valuable addition to the list of plants used in ophthalmia, and the results after careful investigation were so surprising that they will form an important agent in ophthalmic therapeutics, inasmuch as granulations which had long resisted other treatment were cured by Jequerity in from twenty to thirty days. According to Dr. Moura these seeds have long been used in the provinces of Ceará and Piauhy in Brazil with good results in chronic granulations, but require very careful application. Hindoo medical authors

recommend a paste formed of the powdered seeds for outward application in nervous diseases.—'Pharmaceutical Journal,' 1883, 3rd series, vol. 14, p. 3 ; 'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 77, &c.

Distribution : Upper Guinea, Lower Guinea, Mozambique District, Cape de Verd Islands.

"Cajlee" (*Clitoria Ternatea*, L.).—A climbing plant. The root is said to be a powerful purgative, and to be used in India in ascites and enlargements of the abdominal viscera, and also to promote sickness and vomiting. The seeds are said to possess purgative properties, and the flowers to afford a blue dye, said by Rumphius to be used for colouring boiled rice in Amboyna.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 190, &c.

Distribution : Upper Guinea, North Central, Nile Land, Lower Guinea, Mozambique District.

Erythrina senegalensis, DC.—Small tree, cited by Vogel as being medicinal.—'Niger Flora,' Sir W. Hooker, p. 308.

Distribution : Upper Guinea.

Cowhage or Cow-itch (*Mucuna pruriens*, DC.).—Herbaceous climbing plant. The hairs of the pods are used as a mechanical anthelmintic in the expulsion of intestinal worms ; the pods are dipped in treacle or honey, then scraped, and the mixture administered in the form of an electuary. The hairs

are said to pierce the bodies of the worms, causing them to writhe, and so they become detached from the intestines. The administration is usually followed by a brisk purgative. An infusion of the roots is said to be used in some parts of India as a remedy in cholera, and in that country the young pods are cooked and eaten.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 78; 'Pharmacopœia of India,' Dr. Waring, p. 73, &c.

Distribution: Upper Guinea, Mozambique District.

Canavalia ensiformis, DC. (*C. gladiata*, DC.).—Perennial. Cultivated in India for its esculent pods, extensively used by Europeans, as by the natives. The white-seeded variety is considered to be the most wholesome. In Jamaica this plant is called "Overlook" by the negroes, who it is said have a superstitious idea that it fulfils the duties of a watchman, and from some dreaded power ascribed to it protects property from plunder, and for this reason it is planted along their provision grounds.—'Useful Plants of India,' H. Drury; 'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Nile Land, Lower Guinea.

Canavalia obtusifolia, DC.—Biennial. Said to be useful for binding sands on the sea-shore.—'Useful Plants of India,' H. Drury, p. 105, &c.

Distribution: Upper Guinea, Lower Guinea, Mozambique District.

Ordeal Bean of Old Calabar (*Physostigma venenosum*, Balf.).—Large perennial climber. Under the name of "Eséré" the seeds are employed as an ordeal by the natives of Old Calabar. Its principal medicinal use is as a local application to the eye, to contract the pupil in certain diseases and injuries of that organ. It has however been used in nervous affections, and in the treatment of strychnine poisoning, &c. The active principle is a peculiar alkaloid called Physostigmia, or Eseria.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 80, &c.

Distribution: Upper Guinea.

Physostigma cylindrosperma, Holmes (*Mucuna cylindrospermum*, Welw.).—A wide-climbing shrub. The seeds of this plant have for some time past been mixed with the Calabar beans of commerce (*Physostigma venenosum*, Balf.). The attention of Mr. Holmes having been attracted by this fact, he compared the available herbarium material of the two plants, and found them to be closely allied, and has substituted the name of *P. cylindrosperma* for that of *Mucuna cylindrospermum*, Welw. The actual yield of Eserine in the two sorts of Calabar bean is now under investigation. The seeds of *P. cylindrosperma* are longer than those of *P. venenosum*, Balf.—'Pharmaceutical Journal,' 3rd series, vol. ix., p. 913.

Distribution: Lower Guinea.

Sugar Bean of Jamaica (*Phaseolus lunatus*, L.).—

Biennial. The seeds, which are dark purple with white streaks or wholly white, are said to be eaten in Cochin China, as also in the East Indies, but the plant is said to be grown more for the beauty of the seeds than for their use as food.—'History of the Dichlamydeous Plants,' G. Don, vol. ii., p. 354, &c.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Phaseolus adenanthus, E. Mey. (*P. rostratus*, Wall.). —Herbaceous. The tuberous roots are eaten by the Hindoos. The whole plant is used in gonorrhœa, also in decoction of rice-water in diabetes, &c. The root is scraped, and together with sandal-wood, fresh butter and sugar is used as a liniment for sore eyes.—'Useful Plants of India,' H. Drury.

Distribution: Upper Guinea, Nile Land, Lower Guinea.

Kidney, French or Haricot Bean (*Phaseolus vulgaris*, L.).—Annual, cultivated in various parts of the world for its pods and seeds, which are extensively used as food.

Distribution: Commonly cultivated in Tropical Africa.

"Chowlee" of India (*Vigna catiang*, Endl.; *V. sinensis*, Endl.).—An annual climbing plant, universally cultivated throughout the Tropics for its seeds, which are used as food. The Chinese cal this plant "Tow-

Cok," and cook the green pods, which are frequently very long. The pulverised seeds are applied to sore eyes in India. In Tropical Africa the fibres of the long peduncles are used for making ropes, nets, and cloth.—'Treasury of Botany,' Lindley and Moore; 'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 205.

Distribution: Upper Guinea, Nile Land, Mozambique District.

Bambarra Ground-nut, "Litlo" of the Shiré Valley (*Voandzeia subterranea*, Thouars).—A creeping plant, native of and cultivated in many parts of Africa for its pods and seeds, which are largely used as food. The pods are known in Brazil by the name of Mandubi d'Angola. This plant also occurs in the Cape de Verd Islands.—'Treasury of Botany,' Lindley and Moore; 'Flora Senegambia,' Guill. et Perr., vol. i., p. 254.

Yam Bean (*Pachyrhizus angulatus*, Rich.).—Perennial. Cultivated throughout the Tropics for its tubers, which are like turnips. They are used as food, either raw or cooked. Starch obtained from these tubers in Jamaica, and flour from them from Formosa, are exhibited in the Kew Museum. The seeds are used as food, and in Fiji the natives call the plant Yaka or Wayaka, and prepare a tough fibre from the stems, which they use for making fishing-nets.—'Treasury of Botany,' Lindley and Moore; 'History of the Dichlamydeous Plants,' G. Don, vol. ii., p. 361.

"Wall" of India (*Dolichos Lablab*, L.).—A climbing perennial largely cultivated in the Tropics for its unpalatable seeds, which are considered to form wholesome and substantial food largely used by the poorer classes. In India cattle feed on the seeds, and readily eat the straw. The young pods are cooked and eaten.—'Useful Plants of India,' H. Drury, &c.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District, Cape de Verd Islands.

Horse Gram of India (*Dolichos biflorus*, L.; *D. uniflorus*, Lam.).—A wide-climbing plant cultivated in India for the seeds, which are used for food in curries, &c., by the natives, and also to feed cattle. This plant yields abundantly in a good soil.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District, Cape de Verd Islands.

Pigeon Pea, Congo Pea, "Dhal" of India (*Cajanus indicus*, Spreng.).—Erect shrub, eight to ten feet high, cultivated throughout the Tropics for the seeds, which are used as food by the poorer inhabitants and negroes, and is esteemed as a wholesome pulse. The seeds are commonly used in Jamaica for feeding pigeons, hence the name Pigeon Pea. Horses and other cattle are said to thrive on the seeds and young branches. The Wahiyou strike a light by using its wood and a reed.—'History of the Dichlamydeous

Plants,' G. Don, vol. ii., p. 365; 'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District, Cape de Verd Islands.

"Dialambam," Ebène du Senegal (*Dalbergia melanoxylon*, Guill. et Perr.).—Bush or small tree fifteen to twenty feet high. Wood valuable, said to be impervious to insects. It is extremely hard and heavy, the dull purple heart resembling rosewood when polished. This wood is in general use for furniture in Senegal, and was said to be worth 150 francs the metre cube at Goree in 1865. According to Colonel Grant, the wood is used for arrow-tips, wooden hammers for beating bark cloths, and for rafters. A native comb of this wood from East Tropical Africa is exhibited in the Kew Museum. The root is said to be a remedy for toothache.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 44; 'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 233, &c.

Distribution: Upper Guinea, Nile Land, Mozambique District.

Ecastaphyllum monetaria, Pers.—A wide-climbing shrub, the wood of which is red, and affords a resin resembling dragon's blood.—'A History of the Dichlamydeous Plants,' G. Don, vol. ii., p. 378.

Distribution: Upper Guinea.

Pterocarpus esculentus, Schum. et Thon.—Erect tree

twenty to thirty feet high. Seeds eatable, but if eaten uncooked are said to produce an intoxicating effect. —'Nupé.' Kew Museum.

Distribution: Upper Guinea.

African Rosewood, Santal Rouge d'Afrique, Kino Véne et Wenn of Senegal. Bois de Sang-Vene in Yoloff, African or Gambia Kino (*Pterocarpus erinaceus*, Poir.).—Tree often 40 to 70 feet high, with a very hard, fine-grained red wood suitable for naval construction, planking, &c. It is used on the East Coast of Africa at Shupanga for paddles, oars, &c., under the name of "Malompe," and is imported into England for use in turning, &c. This wood was said to be worth 150 francs the metre cube at Goree in 1865. The Kino known to the Portuguese as *sangue del drago* (dragon's blood), and imported into this country, is obtained from this tree from incisions made in the trunk. This juice soon coagulates to a blood-red and brittle mass, and is said to be practically indistinguishable from the officinal Kino (*P. marsupium*). Kino is used as an astringent medicine, and in its action is closely allied to Catechu, and may be used in medicine internally in diarrhœa, &c., as a substitute for tannin, and as an injection in leucorrhœa, and used as a topical application to indolent and flabby ulcers. It is also used in the manufacture of wines, and would be valuable as a tanning and dyeing material if obtained in large quantities.—'Catalogue des Produits

des Colonies Françaises, Exposition Universelle de 1867,' p. 44; 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 1668; 'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 81, &c.

Distribution: Upper Guinea, Lower Guinea.

"Ossani," *Lonchocarpus sericeus*, H.B.K.—Erect tree 30 to 40 feet high, very common on the sea-shore. Wood close-grained and durable. The bark is employed in abdominal complaints, and for children as a laxative.—Gabon, 'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 47.

Distribution: Upper Guinea, Lower Guinea.

West African Indigo; Yoruba name "Elu" Wild Indigo (*Lonchocarpus cyanescens*, Benth.).—Woody climber, 20 to 30 feet long. From specimens collected by Captain Moloney, C.M.G., on the Gold Coast, it is clear that this plant, or a closely allied species, is the source of an abundant supply of indigo, which, according to Mr. Barter and Captain Moloney, is contained in the leaves, and is prepared by the natives by powdering them in a mortar and forming them into pasty balls and dried ready for the market. It is used in dyeing cloth, and affords a fine deep and permanent blue, which is mixed with potash. In England it is worth from 4*s.* to 4*s.* 6*d.* per lb.—'New Economic Products at the Royal Gardens, Kew,' W. T. T.

Dyer, C.M.G., 'Linnæan Society's Journal,' vol. xx., p. 405.

Distribution: Upper Guinea.

Cabbage Tree of the West Indies, Angelin of Trinidad (*Andira inermis*, H.B.K.).—Tree 20 to 30 feet high. The bark is anthelmintic and a powerful narcotic, and requires much care and judgment in using it. The tree is said to afford a valuable timber, and by some is credited with being the source of Partridge wood of commerce.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea.

Barwood or Camwood (*Baphia nitida*, Afzel.).—Erect shrub, 8 to 10 feet high. The wood is of a deep red colour and hard, with a fine close grain. Its chief use is as a dye, for which purpose it is imported into this country to the extent of about 300 or 400 tons annually from Sierra Leone. It usually comes in the form of trimmed logs about four feet long and one foot in diameter. It yields a brilliant deep red colour, with which the English Bandana handkerchiefs are dyed. The powdered wood is used by the native women on the West Coast of Africa to paint their bodies; amulets are also made of it, and they use it in their Fetish ceremonies.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea.

M'Pano (*Baphia pubescens*, Hook. f.; *B. laurifolia*,

H. Baill.).—Tree about 20 feet high. Wood valuable, chiefly used in dyeing.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 47.

Distribution: Upper Guinea.

Baphiopsis parviflora, Benth.—Tree 40 to 50 feet high. The wood is heavy and close-grained.—Kew Museum.

Distribution: Upper Guinea.

Swartzia madagascariensis, Desv.—Tree 20 to 30 feet high. According to Messrs. Speke and Grant, the wood is very hard, and of a deep red colour.—'Flora of Tropical Africa,' D. Oliver, vol. ii., p. 257.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea, South Central, Mozambique District.

Motunda (*Cordyla africana*, Lour.).—Tree sometimes 12 feet in circumference, from which a gum is obtained, and used for making size for whitewash by the natives. The fruit when ripe is about the size of a large lemon, yellow and pulpy, and is eaten by the natives.—'Tette. E. Africa, Coll. Sir J. Kirk.' Kew Museum.

Distribution: Upper Guinea, Nile Land, Mozambique District.

Barbadoes Pride, Macata Wood (*Cæsalpinia pulcherrima*, Sw.; *Poinciana pulcherrima*, L.).—Small tree 10 to 15 feet high. Cultivated throughout the

Tropics for its brilliant flowers, which are called by the French in the West Indies "Fleurs de paradis." All parts of this plant are said to be emmenogogue and purgative, and to be frequently used for those purposes by the natives of the West Indies. The wood is said to make the best of all charcoal, and the bark, which is acid and tonic, is said to be poisonous. The leaves and flowers are used in decoctions in fevers in the West Indies, and the leaves alone as a substitute for senna in the East Indies. The powdered seeds are used as a remedy in colic pains.—'Useful Plants of India,' H. Drury; 'Vegetable Materia Medica of Western India,' W. Dymock, p. 208. Kew Museum.

Distribution: Sierra Leone, Loanda, and Zanzibar.

Bonduc Seeds, Grey Nicker Seeds or Nuts, Guilandina Seeds (*Cæsalpinia Bonducella*, Roxb.).—Scrambling shrub. The root bark is used as a tonic. The seeds are regarded in India as a tonic and antiperiodic, and are there especially employed in intermittent fevers, and also as a tonic in debility and other cases. A fatty oil is obtained from these seeds in India, and is reputed to be useful in convulsions, paralysis, &c.; it is also used as a cosmetic. Various other medicinal uses are ascribed to these seeds by the Indian doctors, but their principal use seems to be for making into necklaces, bracelets, rosaries, &c.; and strung upon red silk are worn as a charm by the native women in India,

and are also hung upon trees to prevent their fruit falling off. Under the name of "Warree Warree" the natives of the Gambia use these seeds for playing a game called Warree Warree.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 85. Kew Museum, &c.

Distribution: Upper Guinea, Mozambique District.

"Jerusalem Thorn" of Jamaica, "Genet epineux" of the French West Indian Islands (*Parkinsonia aculeata*, L.).—An ornamental spring shrub from 12 to 15 feet high; it is not indigenous in Africa, but is cultivated or naturalized in various localities. In Senegal the Colonists make impenetrable hedges of it round their gardens, cattle enclosures, &c., on account of the numerous spines with which the plant is armed. The young shoots afford a beautiful white fibre, but wanting in strength. It has been recommended with other substances as a half-stuff for paper-making.—'Flora Senegambia,' Guillemin et Perrottet, vol. i., p. 257; 'The Fibrous Plants of India,' Dr. Royle, p. 298.

Cassia Absus, L.—A much-branched herb or under-shrub, from one to four feet high. Under the name of "Chichm" the seeds are used by the Arabs and Egyptians in ophthalmia. They are reduced to a powder, mixed with sugar, and applied between the ball and lid of the eye. This remedy is also used by the negroes on the West Coast of Africa, and can only be employed in chronic cases when the malady is not in a high state of inflammation. The remedy should

be applied with great care.—'Flora Senegambia,' Guillemin et Perrottet, vol. i., p. 257, &c.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Negro Coffee, L'herbe puante. Fedigose seeds of Tette. Café Marron, Wild Coffee of Dominica (*Cassia occidentalis*, L.).—Annual, or of two or three years' duration. The seeds of this plant, which is found in abundance in the environs of negro villages, acquires by torrefaction an agreeable odour analogous with that of coffee. The natives, and especially the European colonists, are said to frequently employ these seeds in infusion as a substitute for coffee, for which purpose it is also used in Dominica; they are also used in France and the West Indies as a febrifuge, and an infusion of the root is considered by the American Indians as an antidote against various poisons. The whole plant is purgative.—'Flora Senegambia,' Guillemin et Perrottet, vol. i., p. 261; 'Kew Report for 1881,' p. 34, &c.

Distribution: Widely diffused in Tropical Africa, growing in damp and watery places; Cape de Verd Islands.

Italian, Tripoli or Senegal Senna (*Cassia obovata*, Collad.).—Perennial. It is one of the species that afford senna of commerce. It is known under the above names, and also in Jamaica as Port Royal or

Jamaica Senna.—'Medicinal Plants,' Bentley and Trimen, vol ii., No. 89.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea, Cape de Verd Islands.

Cassia alata, L.—Erect shrub three to eight feet high. The leaves are said to cure ringworm and also to have purgative properties, and have been used in the same manner as senna. The plant is said by Hindoo doctors to cure all poisonous bites.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 217, &c.

Distribution: Upper Guinea.

"Doré" of the Gambia (*Cassia Tora*, L.).—Annual, two to three feet high. The leaves are said to be aperient and to be used as a remedy for ulcers and ringworm. The seeds are used to ease irritation of itchy eruptions in India. On the Gambia the leaves and stalks are eaten as food, and the leaves used in medicine.—'Vegetable Materia Medica of Western India,' W. Dymock, p. 216; Kew Museum.

Distribution: Widely diffused in Tropical Africa; Cape de Verd Islands.

Cassia Sophera, L.—An annual, three to five feet high. In India the leaves are eaten in curries by the natives. The bark and powdered seeds are used in diabetes. A plaster of the root with sandal-wood is said to cure ringworm.—'Useful Plants of India,' H. Drury, &c.

Distribution: Upper Guinea.

Sengeng (*Cassia* sp.).—This plant is used freely in venereal diseases and in leprosy; it is very bitter.—Gambia. Kew Museum.

Velvet Tamarind of Sierra Leone, Black Tamarind, Solum in Yoloff, Kocyto in Mandingue (*Dialium guineense*, Willd; *D. nitidum*, Guill. et Perr.).—Tree of moderate size. The pulp surrounding the seeds is pleasantly acid and commonly eaten. The wood is said to be strong and excellent for carpentry, and to be suitable for small boats, &c. It is used by the natives of Senegal and Casamance.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' pp. 44 and 45.

Distribution: Upper Guinea.

St. Thomas' Tree (*Bauhinia tomentosa*, L.).—Shrub or small tree. Dried leaves and flower-buds used by native Indian doctors in dysenteric affections, also a decoction of the bark and root in liver and phlegmatic complaints, and as a vermifuge. The bruised bark is occasionally aplied to tumours and wounds. Fibre and cord made of the fibre of this plant are exhibited in Kew Museum.—'Useful Plants of India,' H. Drury.

Distribution: Lower Guinea, Mozambique District.

Bei (*Bauhinia rufescens*, Lam.).—Shrub or small tree. Wood used in carpentry.—'Catalogue des Pro-

duits des Colonies Françaises, Exposition Universelle de 1867,' p. 44.

Distribution: Upper Guinea, North Central, Nile Land.

Nguiguis or Guiguis (*Bauhinia reticulata*, DC.).—Small spreading tree. Wood durable and easily worked. Bark yields a tough fibre, used for making cords in Senegal, and is also used in medicine as an astringent. The seeds when burnt produce a black (? blue) dye.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 44; Kew Museum.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Frankincense Tree of Sierra Leone, Thiévi of Senegambia, Bumbo, Bungo or Bungbö (*Daniellia thurifera*, Bennett).—Tree 50 to 150 feet high. This tree is said to yield two kinds of frankincense: the one is recognised by the dark brown or black shining and irregular fragments, while the other is of a lighter brown or yellow tint, less compact and more friable; the lighter of the two is least valued, but both are usually intermixed in samples offered for sale. The bark of the tree is perforated deeply in all directions by an insect termed Tumbo by the natives, the bore being circular and about an inch in diameter, in which the gummy matter accumulates, blended with the woody fibre, and then issues from the orifice and

falls to the ground ; it is then collected by the negro women and children, who resort to the woods for that purpose. The gum is also obtained by stripping the dead or unsound bark from the wood, the more decayed portions of which are commonly saturated with the gummy substance. This woody resinous secretion is used for a variety of purposes, but chiefly as a perfume by the native females of Sierra Leone, who triturate the gum with lime manufactured from sea-shells between two purposely adapted stones, and when reduced to a fine powder they rub their bodies with it. It is also used occasionally for fumigating houses in sickness.—'Pharmaceutical Journal,' vol. xiv., 1855, pp. 402–3. Kew Museum.

Distribution : Upper Guinea.

Ogea Gum (Yoruba name), (*Daniellia* sp.). Tree nearly allied to *D. thurifera*, Bennett.—From material collected by Captain Moloney on the Gold Coast, the tree affording this substance is believed to be a new species of *Daniellia*, but until further specimens have been received the specific name cannot be determined. The gum exudes from orifices in the trunk caused by the boring of a grub. Ogea is used by the natives for fires and for light, and when powdered, as a body perfume by the women. Some excellent specimens of the gum, and a transverse section of the stem of the tree, shewing the borings of the grub, from Lagos, are exhibited in the Kew

Museum (Coll. Capt. Moloney). The habitat of the Ogea tree seems to be in swamp-lands.—'New Economic Products at the Royal Gardens, Kew,' W. T. T. Dyer; 'Linnæan Society's Journal,' vol. xx., p. 408, &c.

Tamarind (*Tamarindus indica*, L.).—Tree 60 to 80 feet high. The wood, which is very hard, and sinks in water, is highly prized in India, though so difficult to work. The natives employ it for wheels, planes, furniture, oil and sugar mills, &c. It is also an excellent wood for turning purposes, as also for gunpowder charcoal. The fruits have an agreeable acid flavour, and are highly valued in very hot countries for the preparation of cooling beverages; they are also used in medicine in various ways, but chiefly as a laxative. The leaves are said to furnish a yellow dye, and to be used in curries in India. The powdered seeds mixed with gum form a strong cement, and when deprived of the hard outer covering by long boiling, the kernels are used as food by the natives of India in times of scarcity.—'Manual of Indian Timbers,' Gamble, p. 142; 'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, Nile Land, Lower Guinea, South Central, Mozambique District.

Brachystegia spicæformis, Benth.—Tree 20 to 40 feet high. Bark said by Messrs. Speke and Grant to be employed by the natives of the Mozambique

District for various fabrics, and that a red juice exudes on cutting it.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 306.

Distribution: Lower Guinea, Mozambique District.

Dattock of the Gambia, Detarr in Yoloff, Manbode in Mandingue (*Detarium senegalense*, Gmelin).—Much-branching tree. Wood adapted for naval construction, carpentry work, and fancy turning. Fruits edible, and when cooked have a slight flavour of gingerbread. There are said to be two varieties of this fruit, one bitter and the other sweet; the latter is much prized by the negroes, and is eagerly sought after by monkeys and other animals. The bitter variety is regarded as a violent poison. The seeds of *D. senegalense* are said by Dr. Baikie to be beaten into an oil-cake for feeding cattle in some parts of the Nupe District.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 44; 'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, North Central, Nile Land.

Sierra Leone Copal, Kobo Tree (*Copaifera Guibourtiana*, Benth.).—Tree large, much branched; wood white, close-grained, hard and odoriferous; used by the natives for various purposes, and is said to take a fine polish. This tree furnishes the Sierra Leone copal of commerce. It is an almost white gum, exceedingly elastic, and is said to form the foundation

of all fine varnishes; besides the ordinary copal, this tree is said to afford inferior sorts, gathered from the trunks or branches of young or immature productions and are used to adulterate the finer samples. According to Spon's 'Encyclopædia,' Sierra Leone copal fetches from 7½*d.* to 10*d.* per pound on the London market. The young leaves are said to be employed by the Timneh and Sherbro peoples as a cure for sores and ulcerations.—'Pharmaceutical Journal,' 1856, vol. xvi., p. 371; Spon's 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 1644, &c.

Distribution: Upper Guinea.

Mopane, or Iron-wood (*Copaifera* (*Colophospermum*) *Mopane*, Kirk).—A fine forest tree. According to Dr. Kirk it forms in the Zambesi District large, monotonous, shadeless forests; the heart-wood is dark, heavy, and very durable, but difficult to work. Specimens of the wood and gum from this tree are in the Kew Museum.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 315, &c.

Distribution: Lower Guinea, Mozambique District.

Cynometra Mannii, Oliv. (?).—Tree, thirty to eighty feet high. Wood close-grained and heavy.—Kew Museum.

Distribution: Upper Guinea.

Sassy Bark of Sierra Leone, Cassa of the Congo,

Mancone of the Portuguese, Bourane, Red-water Tree, Ordeal Bark, &c. (*Erythrophlæum guineense*, Don).—Large tree, forty to one hundred feet high. Wood highly valued for its hard and almost incorruptible nature. It is said to be used at Bissao and Cacheo for gun-carriages on account of its durability, as also in the construction of houses and in ship-building, as it is supposed to be almost fireproof. The natives value the wood for domestic utensils, as it is stated not to be attacked by termites. The bark of this tree is powerfully poisonous, and is administered by native tribes in widely remote regions as an ordeal; when used for this purpose, it is either chewed by the accused or administered in the form of a decoction which is of a red colour, and generally proves fatal. A decoction of the bark is also used by the natives for poisoning their arrows.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' pp. 44 and 45; 'Pharmaceutical Journal,' vol. xvi., 1856, p. 236, &c.

Distribution: Upper Guinea, Mozambique District.

Owala of Gabon, Opochala of the Eboe Country (*Pentaclethra macrophylla*, Benth.).—Tree, fifteen to sixty feet or higher. Seeds used as food on the Niger, and yield a limpid oil adapted to soap-making and lubricating.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 323. Spon's 'Encyclopædia of the Industrial

Arts, Manufactures, and Commercial Products,' p. 1406.

Distribution : Upper Guinea.

West Indian Filberts, &c. (*Entada scandens*, Benth.). —A large climber of the forest. In Manila, the bark is used under the name of "gogo," for washing the hair by ladies ; and in Ceylon, the fibre which is called "Poospatte" is employed for making ropes. The seeds are used as an antifebrile medicine by the Ghaut people, and in various parts of the Tropics are roasted and eaten after having been steeped in water ; they are also made into snuff-boxes, spoons, &c. The Nepalese use the kernels for washing their hair, and the Bengalese washermen for crimping their linen.—'Manual of Indian Timbers,' Gamble, p. 145, &c.

Distribution : Upper Guinea, Lower Guinea.

Neté des Yoloffs, Houlle des Sérères, Nitta or Nutta, Arbre Sacré, Doura of the Soudan, African Locust Tree, &c. (*Parkia biglobosa*, Benth.).—Tree, forty to fifty feet high. Wood useful for carpentry work. The fruit-pulp is eaten and also prepared into a pleasant beverage. The natives of the Soudan roast the seeds, and then bruise and allow them to ferment in water until they become putrid, when they are carefully washed, pounded into powder, and made into cakes which are excellent sauce for all kinds of food but have an unpleasant smell. The torrefied seeds are used as coffee or chocolate.—'Catalogue des

Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 45 ; 'Treasury of Botany,' Lindley and Moore, &c.

Distribution : Upper Guinea, Nile Land.

Parkia filicoidea, Welw. mss.—Tree, forty to fifty feet high. The mealy contents of the fruits are eaten and the crushed seeds used in native cookery.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 324.

Distribution : Upper Guinea, Lower Guinea, Mozambique District.

Adenanthera pavonina, L.—Large tree. Wood used in South India in house-building and for cabinet work, and also as a red dye. The seeds are used as weights by jewellers, and are also made into necklaces ; they also yield an oil.—'Manual of Indian Timbers,' Gamble, p. 146.

With regard to the distribution of this plant Professor Oliver, in his 'Flora of Tropical Africa,' vol. ii., p. 239, says :—"*A. pavonina* has been introduced into the New World, and is doubtless met with here and there on the African coast, although I have not seen specimens from thence. M. Baillon says, it is found on the Gaboon River (Adans. vi., 207). In the Kew herbarium there is an imperfect specimen, collected by Dr. Meller on the Rovuma River in young fruit, which may belong to this genus."

Ogagouma (*Tetrapleura Thonningii*, Benth.).—Large

tree. According to the Gabonaise, a decoction of the bark will produce vomiting and a fumigation of the fruits is useful as a febrifuge. In the markets of Sierra Leone the fruits are sold for washing purposes, and are likewise used on the Zambesi.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 121 ; 'Treasury of Botany,' Lindley and Moore, &c.

Distribution : Upper Guinea, Lower Guinea.

Desmanthus virgatus, Willd.—Shrub, two to three feet high. In Jamaica the small brown seeds are strung like beads and made into bracelets, work-bags, &c.—'Treasury of Botany,' Lindley and Moore.

Distribution : Oliver, in his 'Flora of Tropical Africa,' vol. ii., p. 335, says :—" The only Tropical African specimens I have seen are in Dr. Welwitsch's herbarium, collected in Ambriz (Congo), where the plant occurs sporadically amongst cultivated *Amaranthaceæ*."

Soune of Senegal (*Mimosa asperata*, L.).—Much-branched, prickly shrub, often attaining several feet in height. Wood suitable for carpentry.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 44.

Distribution : Very abundant and widely spread through Tropical Africa.

Bois Sophie of Dominica (*Leucæna glauca*, Benth.). —Small tree. Wood durable and suitable for fancy

cabinet work. The small brown seeds are used in the West Indies as beads for necklaces, work-bags, and other fancy articles.

Distribution: Widely distributed in all tropical countries, but not known as being indigenous to Tropical Africa.

Acacia mellifera, Benth.—Shrub or small tree, said to yield a gum like gum-arabic. From the flowers bees collect a great deal of honey.—'History of the Dichlamydeous Plants,' Don, vol. ii., p. 392.

Distribution: Upper Guinea, Nile Land.

Acacia erubescens, Welw. mss. Small much-branched tree, said by Dr. Welwitsch to afford abundantly the best gum collected in the Angola region.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 343.

Distribution: Lower Guinea.

Acacia pennata, Willd.—Small tree. The bark is converted into a sort of tow, which is used in Cochin-china to fill up cracks in houses and also for caulking boats.—'History of the Dichlamydeous Plants,' Don, vol. ii., p. 416.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Acacia Sieberiana, DC.—Tree, twenty to thirty feet high, and sometimes more than twice that height. Bark used for making a coarse cordage. Pods used in

tanning.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 83, &c.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea.

Gonakie (*Acacia Adansonii*, Guill. et Perr.).—Tree, thirty to forty feet high. Wood very fine, hard, and durable; suitable for naval construction: for knees, planking for decks, futtocks, &c. The astringent fruits are used in tanning. The gum from this tree is used by the Moors in dysentery, and the pods, bark and leaves are employed by the Negroes in scorbutic affections and ophthalmia.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' pp. 44, 102; 'Flora Senegambia,' Guillemin et Perrottet.

Distribution: Upper Guinea.

Acacia albida, Delile.—Large tree. It affords a gum similar to gum arabic.—Kew Museum.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Gum Arabic, Babool of India, Neb Neb (Yoloff) (*Acacia arabica*, Willd.).—Moderate-sized or large tree. In India the wood is used for wheels, agricultural implements, railway-sleepers, fuel, &c., and on the Nile for boat-building. The bark is a most powerful astringent, and is employed by the Negroes of Senegambia in dysentery; it is also used in dyeing

and tanning. The pods are used for making ink, and on the Nile are largely used in tanning; when young, they are given as fodder to cattle, sheep, and goats; the natives of Tette use them for dyeing black. This tree affords the Morocco, Mogadore, Brown Barbary, or East Indian gum-arabic of commerce.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 94; 'Manual of Indian Timbers,' Gamble, p. 151, &c.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Gum Arabic (*Acacia senegal*, Willd. [*A. Verek*, Guill. et Perr.]).—Small tree, about twenty feet high; wood said to be hard and heavy, to take a beautiful polish, and to be used for weavers' shuttles and also to be good for carpentry and cabinet work. The chief supply and best quality gum-arabic is afforded by this species, and is known in commerce under the names of Kordofan, Picked Turkey, White Sennaar, or Senegal Gum. As a general rule the gum exudes spontaneously, but in some districts incisions are made in the bark to facilitate the outflow. In Senegal the collecting is carried on from November to July, at which time the dry winds from the desert prevail, which causes the bark to crack and the gum to flow and harden in large masses. This gum is mostly shipped to Bordeaux, where over 100,000 cwts. are imported in some years. The best gum comes from Kordofan, where 30,000 cwts. are collected

annually. Gum-arabic is largely used in medicine, in the arts for giving lustre to crape and silks, for thickening colours and mordants in calico-printing, in the manufacture of blacking, &c.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 94, &c.

Distribution: Senegal, Upper Nile, South Nubia, Atbara, Kordofan.

Acacia etbaica, Schweinf.—Slender tree, attaining twenty to thirty feet. This species is said by Dr. Schweinfurth to afford an excellent gum-arabic.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 349.

Distribution: Nile Land, Lower Guinea.

Acacia Farnesiana, Willd.—Shrub or low tree, largely cultivated on the perfume farms of the South of France, and frequently throughout the Tropics, for the perfume obtained from the flowers and known as Cassie.—'Guide to Museums,' Kew, 1883, p. 54, &c.

Distribution: Not indigenous in Tropical Africa, unless in Angola, Cape de Verd Islands.

Acacia Seyal, Delile.—Small or medium-sized tree. The Nile variety of this plant, named *Fistula*, together with *A. stenocarpa*, Hochst., yield an inferior kind of gum-arabic known in commerce as Suakim, Talca or Talka gum.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 94.

Distribution: Upper Guinea, North Central, Nile Land, Mozambique District.

Koh-Fay (*Acacia* sp.).—The seeds yield an oil with which the natives anoint their bodies. Sierra Leone.—Kew Museum.

Besenna or Mesenna (*Albizzia anthelmintica*, A. Brongn.).—Shrub or small tree. Bark used under the above native names by the Abyssinians as an anthelmintic. Wood hard, and used on the Zambesi in canoe-building.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 357, &c.

Distribution: Nile Land, Lower Guinea, Mozambique District.

Siris Tree of India, Laebach of the Arabs (*Albizzia Lebbek*, Benth.).—Large tree. Wood fairly durable, works well, and takes a good polish. Used in India for furniture, oil-mills, boats, &c., and in the Andaman Islands for building purposes. The tree affords a gum, and the leaves and twigs are used as fodder for camels.—'Manual of Indian Timbers,' Gamble, p. 157.

Distribution: Upper Guinea, Nile Land, Mozambique District.

Apaon on the Bagroo, Flatcrown of Natal (*Albizzia fastigiata*, E. Mey.).—Tree. Wood used in Natal for naves of wheels. On the West Coast of Africa the natives prepare a sauce from the seeds by maceration.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 362; Kew Museum.

Distribution: Upper Guinea, Lower Guinea.

Albizzia Brownei, Walp.—Tree, thirty feet high ; said to afford a fine gum, like copal.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 362.

Distribution : Upper Guinea, Lower Guinea.

Pithecolobium sp.—Pods used in tanning hides, as a dye, and also in the manufacture of ink. River Niger.—Kew Museum.

ROSACEÆ.

Icaco or Cocoa Plum of the West Indies, Ouaraye of Senegal (*Chrysobalanus Icaco*, L.).—Shrub, one to three feet high. The fruits, which are about the size of a plum, are sold in the markets of the West Indies, where they are eaten by the natives ; in a preserved state they are largely exported from Cuba. The seeds yield a fixed oil, and are said to be used in dysentery. An astringent bath prepared from the leaves and roots has been recommended in leucorrhœa and blenorrhœa.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution : Upper Guinea, Lower Guinea.

Grey or Rough-skinned Plum of Sierra Leone, Mampatas of Senegal (*Parinarium excelsum*, Sabine).—Large tree. Wood close-grained, used for building and cabinet work. The fruits are farinaceous and have an insipid taste, but are said to be much

esteemed by the negroes.—'History of the Dichlamydeous Plants,' Don, vol. ii., p. 479; 'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 43, &c.

Distribution: Upper Guinea.

Parinarium curatellæfolium, Planch.—Small or medium-sized tree. The fruit, which is about the size of an ordinary plum, is of a mealy and not unpleasant taste; and, according to Mr. Barter, is one of the best native fruits of the Niger.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 368.

Distribution: Upper Guinea, Mozambique District.

Ginger-bread Plum, Neou of Senegal (*Parinarium macrophyllum*, Sabine).—Shrub or small tree. Wood hard. Fruits eaten by the natives.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 369, &c.

Distribution: Upper Guinea.

Parinarium polyandrum, Benth.—Shrub or small tree. According to Mr. Barter, the fruit is hardly edible; but the wood is well suited for the charcoal used by native smiths. Nupe.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 370.

Mola or Mobola Plum (*Parinarium Mobola*, Oliv.).—Tree of considerable size. The fruit-pulp is of a strawberry-like flavour, and is eaten by the natives. The oily kernels, known as Mabo seeds, are occasion-

ally imported into this country from the West Coast of Africa as an oil-seed.—Kew Museum.

Distribution: Lower Guinea, South Central, Mozambique District.

M'Poga Nuts, Iku of the Yorubas (*Parinarium* sp.).—Tree. Fruits edible and sold in the markets of Ekpé. The seeds are used medicinally by the Yorubas, and are occasionally imported into this country as an oil-seed; they are said to yield 80 per cent. of oil.—'Kew Report, 1877,' p. 35; Kew Museum.

Distribution: Abundant in the Gaboon.

Niko Seeds or Nuts (*Parinarium* sp.).—The seeds of this plant are occasionally imported into this country as an oil-seed. The oil obtained from them is of a yellow colour and dries readily into a thick varnish-like mass.—'Kew Report, 1877,' p. 35; and 1881, p. 51.

Distribution: Liberia.

Bramble or Blackberry Bush of the Cape (*Rubus pinnatus*, Willd.).—Shrub, loosely scrambling or scandent, sometimes reaching ten to fifteen feet. Roots astringent and used as a decoction in diarrhœa, &c.—'An Enumeration of South African Medicinal Plants,' Pappe, p. 12.

Distribution: Upper Guinea, Lower Guinea.

CRASSULACEÆ.

Bryophyllum calycinum, Salisb.—Shrubby plant, two to four feet high. It is used in Mauritius as a fomentation or poultice in intestinal complaints. Messrs. Speke and Grant say regarding this plant: 'Planted by huts in Madi; said to have medicinal properties; also grows wild in dells."—'Treasury of Botany,' Lindley and Moore; 'Flora of Tropical Africa,' vol. ii., p. 390.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Kalanchoe brasiliensis, Camb.—Plant, two to six feet high; said to be used by the Brazilians in domestic medicine.—'History of the Dichlamydeous Plants,' Don, vol. iii., p. 108.

Distribution: Upper Guinea, Nile Land, Lower Guinea.

Varkensooren (Pig's Ears) of the Cape (*Cotyledon orbiculata*, L.).—Shrubby plant, one to two feet high. The fresh juice of this plant has been used in epilepsy, and the leaves form an excellent application to hard corns.—'An Enumeration of South African Medicinal Plants,' Pappe, p. 16.

Distribution: Lower Guinea.

Rhizophoreæ.

Mangrove, Paletuvier of Senegal (*Rhizophora mucronata*, Lam.).—Small ever-green tree. Wood tough and durable, but rarely used. Bark used in tanning, and also as an astringent in medicine. Fruit said to be edible.—'Manual of Indian Timbers,' Gamble, p. 176, &c.

Distribution: Upper Guinea, Mozambique District.

Combretaceæ.

Terminalia macroptera, Guill. et Perr.—Tree, sixty feet high. Wood beautiful and close-grained.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 45.

Distribution: Upper Guinea, Nile Land.

Terminalia avicennioides, Guill. et Perr.—Small tree, twelve to twenty feet high. Wood good for cabinet work.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 45.

Distribution: Upper Guinea, North Central, Nile Land.

Indian Almond (*Terminalia Catappa*, L.).—Large tree. Wood light, lasting, and useful for many purposes. The bark and leaves yield a black pigment, used by the Indians to dye their teeth. The kernels of the fruits are said to taste like almonds, and are

extensively eaten as dessert. This tree is one upon which the Tasar silkworm is fed.—'Manual of Indian Timbers,' Gamble, p. 182, &c.

Distribution: Upper Guinea (cultivated at St. Louis and Gambia).

Button Mangrove (*Conocarpus erecta*, Jacq.).—Small tree. Wood very hard and valuable for posts, being durable in the ground.—'Catalogue of the Trinidad Collection, International Exhibition, 1862,' p. 17, &c.

Distribution: Upper Guinea.

Combretum glutinosum, Perr.—Small tree, branching from the base. Wood useful for carpentry work, but of small dimensions. The ash of the leaves of this species is said to be used in Senegal as a mordant in dyeing cotton stuffs with indigo.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 43; Kew Museum.

Distribution: Upper Guinea, North Central, Nile Land.

Combretum Kirkii, Laws.—Climbing shrub. According to Dr. Welwitsch, the leaves and fruit of a variety of this plant, called by him *C. tinctorum*, are used by the natives as a yellow dye.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 430.

Distribution: Lower Guinea, Mozambique District.

Mozambiti, "Lignum Vitæ" (*Combretum truncatum*, Welw. mss.).—Large tree. Wood dense, close-grained,

and very heavy, with a deep reddish-brown heartwood and light sapwood. The ash left on burning the wood is used by the Portuguese as whitewash for houses, and by the natives to reduce the acidity of the native Tamarind pulp, Mozambique District.—Kew Museum.

Distribution: Lower Guinea, Mozambique District.

Rangoon Creeper (*Quisqualis indica*, L.).—Shrub, eight to fifteen feet high. The seeds are reputed to be used as a vermifuge.—'Pharmacopœia of India,' Waring, p. 90.

Distribution: Upper Guinea, Lower Guinea.

Gyrocarpus Jacquini, Roxb.—Large tree. Wood used in Southern India for making boxes and toys. Seeds used for rosaries and necklaces.—'Manual of Indian Timbers,' Gamble, p. 187.

Distribution: Lower Guinea.

Myrtaceæ.

Napoleona imperialis, Beauv.—Tree. Fruits eaten by the natives of Onitsha.—Kew Museum.

Distribution: Upper Guinea.

Lythrarieæ.

Ammannia baccifera, L.—Annual. The leaves are highly acrid and are largely employed by the

natives of India as a vesicant.—'Pharmacopœia of India,' Waring, p. 87.

Distribution: Nile Land, Lower Guinea.

Henna, Foudenn of Senegal (*Lawsonia alba*, Lam.).—Shrub, six feet high. Largely cultivated in India and Arabia for the leaves, which are used by the natives to dye their finger-nails and hair, and also the manes and hoofs of horses; it is also said to prevent whitlow. The flowers are very fragrant, and are used in perfumery and embalming. An essential oil, known as "mehudee," is distilled from the leaves by the natives of some parts of India, notably in Lucknow, which is delightfully fragrant.—Spon's 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' pp. 858, 1424, &c.

Distribution: Upper Guinea, Nile Land.

Hardpeer of the Cape (*Olinia cymosa*, Thunb.).—Shrub 4 to 10 feet high. Wood hard, close-grained and tough; well adapted for turner's work. Used in the manufacture of musical instruments, picture frames, and fancy work, also for axles and poles for waggons.—'Treasury of Botany,' Lindley and Moore.

Distribution: Nile Land, Lower Guinea.

Pomegranate (*Punica Granatum*, L.).—Shrub or small tree. The bark and the rind of the fruit are used for tanning, and for dyeing morocco leather. The root-bark is an effectual anthelmintic. The

flowers give a light-red dye. Wood not used, but might be tried as a substitute for boxwood.—'Manual of Indian Timbers,' Gamble, p. 205.

Distribution: Occurs occasionally as an escape from cultivation in Angola.

ONAGRARIEÆ.

Jussiæa villosa, Lam.—Erect branching herb. The plant reduced to a pulp and steeped in buttermilk is considered to be useful in dysentery; a decoction is used as a vermifuge and purgative.—'Vegetable Materia Medica of Western India,' Dymock, p. 265.

Distribution: Upper Guinea, Nile Land, Mozambique District.

Jussiæa pilosa, H.B.K.—Branching herb, attaining three feet. Said to afford a yellow dye.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Nile Land, Mozambique District.

CUCURBITACEÆ.

Telfairia occidentalis, Hook. f.—Climbing plant cultivated for the seeds, which are boiled and eaten by the Negroes of the Fernando Po district.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 524.

Distribution: Upper Guinea.

Trochomeria vitifolia, Hook. f.—Small plant. Roots very large and eaten by Negroes, and also used in medicine.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 525.

Distribution: Lower Guinea.

Bottle or Club Gourd, White Pumpkin, Charrah of the Arabs, &c. (*Lagenaria vulgaris*, Ser.).—Climbing plant. The fruit is said to be eaten by the poorer classes in India, where it is also used in poultices. It has bitter and slightly purgative properties. The shells of the fruit or gourds are largely employed in the Tropics for domestic utensils, musical instruments, snuff-boxes, buoys used in swimming across rivers, and for a variety of other purposes. A decoction of the leaves mixed with sugar is used in jaundice. The seeds are said to be used in medicine in India, and to yield an oil of a light yellow colour.—'Useful Plants of India,' Drury, &c.

Distribution: Cultivated throughout Tropical and Sub-Tropical Africa.

Loofah, Konyikon, or Native Sponge of Western Africa, Bonnet or Dish-cloth Gourd of North America, &c. (*Luffa ægyptiaca*, Mill.).—Herb. Cultivated throughout the Tropics for its fruits, which, when young, are eaten. The close vascular network of the inside of this gourd serves as a scrubbing-brush, sponge, and to strain palm-wine. It is also made into light ornamental articles, baskets, &c. The

seeds afford an oil, and are said to be emetic and cathartic.—'Oil-seeds and Oils in the India Museum,' Cooke, p. 56; 'Guide to the Museums of Economic Botany, Kew,' 1883, p. 71.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Papengaye of the Negroes (*Luffa acutangula*, Rxb.).—Climbing plant. The young fruit is said to be one of the best native vegetables of India, and is much esteemed by the natives in curries, &c. The root in decoction is purgative, and is said to check cholera. An oil expressed from the seeds is useful in impœtigo. This species is said to present both bitter and poisonous, and edible sweet varieties.—'Useful Plants of India,' Drury, &c.

Distribution: Tropical Africa.

Narras (*Acanthosicyos horrida*, Welw.).—Furze-like spinous shrub, attaining five feet or more in height. The fruit is eaten by the natives of Mossamedes. The seeds are also said to be eaten.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Lower Guinea.

White Gourd of India (*Benincasa cerifera*, Savi.).—Herbaceous plant. The fruit, the flesh of which is white, is a common vegetable in some parts of India, and is extensively used by the natives in curries, &c. Under the name of Petha it is sold as a preserve

in the Bazaars. It is also considered tonic and diuretic, and a specific for hæmorrhage; the fresh juice from it is given either with sugar or as an adjunct to other medicines in the treatment of nervous diseases.—'Vegetable Materia Medica of Western India,' Dymock, p. 287. Kew Museum.

Distribution: Cultivated throughout Asia and the Islands, also in Africa.

Cladosicycos edulis, Hook. f.—Large herb. The fruits are one foot long and three inches diameter. Edible.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 534.

Distribution: Upper Guinea, Lower Guinea.

Hairy Cerasee of Jamaica, Condeamor of Venezuela (*Momordica Charantia*, L.).—Climbing herb. The fruit after having been steeped in salt water is eaten in curries by the natives in India, and in an unripe state is used as a vegetable in various parts of the Tropics. The tubers are used medicinally, and the juice of the leaves mixed with warm water is considered anthelmintic. The pulverised plant is a good specific applied externally in leprosy and malignant ulcers.—'Useful Plants of India,' Drury; 'Hortus Jamaicensis,' Lunan, p. 174, &c.

Distribution: Upper Guinea, North Central, Lower Guinea, Mozambique District.

Smooth-leaved Cerasee (*Momordica Balsamina*, L.).

—Climbing herb. This plant is famous in Syria for curing wounds. The unripe fruit is cut open, infused in sweet oil, and exposed to the sun until it becomes red; it is then applied to fresh wounds on cotton. The Syrians esteem this next to Balsam of Mecca.—'History of the Dichlamydeous Plants,' Don, vol. iii., p. 35, &c.

Distribution: Upper Guinea, Nile Land.

Cucumber (*Cucumis sativus*, L.).—The well-known fruits of this plant are largely used as a salad, and in a young state, when they are known as gherkins, are preserved in vinegar. In India a pale bland oil is obtained from the seeds by expression, and is used in cookery, and for burning in lamps; the seeds are also used in confectionery.—'Treasury of Botany,' Lindley and Moore; 'Oil-seeds and Oils in the India Museum,' Cooke, p. 40.

Distribution: Cultivated in Tropical Africa.

Chate of Egypt (*Cucumis dipsaceus*, Ehrenb.).—Annual. Fruit eaten in Egypt by grandees and Europeans.—'History of the Dichlamydeous Plants,' Don, vol. iii., p. 27.

Distribution: Upper Guinea, Nile Land.

Cucumis Prophetarum, L.—Annual. Fruits extremely bitter, equalling that of the Colocynth. Under the name of Kirbut they are sold in a dried state in the markets of Sind for use as an emetic, and in small

doses with honey as a stomachic for children.—'Vegetable Materia Medica of Western India,' Dymock, p. 281, &c.

Distribution: Nile Land, Lower Guinea.

Melon (*Cucumis Melo*, L.).—Annual. Cultivated in many parts of the world for its fruits, of which there are many varieties. According to Mr. Barter this fruit is called Boange by the Nupé people, and is eaten, being of the flavour of a green flesh melon.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 546.

Distribution: Upper Guinea, Nile Land.

Cucumis hirsutus, Sond.—Perennial. According to Sonder the fruit is acidulous and edible.—'Flora of Tropical Africa,' Oliver, vol. ii., p. 547.

Distribution: Lower Guinea, Mozambique District.

Water Melon, Béraf of Senegal (*Citrullus vulgaris*, Schrad.).—Annual. Commonly cultivated in all warm countries of the world for its fleshy edible fruit. The seeds, called Turbooj, together with those of *Cucumis utilissimus*, *C. Melo*, and *Benincasa cerifera*, are used by the natives in India as a cooling diuretic and strengthening medicine. The seeds are also said to yield an oil. This plant is exceedingly variable.—'Vegetable Materia Medica of Western India,' Dymock, p. 289, &c.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Colocynth (*Citrullus Colocynthis*, Schrad.).—Perennial herb. The Colocynth is well known on account of its purgative properties, and comes into the market under the names of Turkey or Peeled Colocynth, and Mogador or Unpeeled Colocynth. The Turkey form is chiefly imported from Spain and Syria in a peeled state, but is sometimes imported simply dried, without having been peeled. The Mogador variety is larger than the Turkey, to which it is inferior in quality, and usually comes into the market in an unpeeled state. The seeds are used as food in some parts of Africa, more especially in the Sahara, where the Tibboos free them from the bitter pulp by treading upon them inclosed in strong bags; the testa is afterwards separated from the kernel by rubbing the seeds and by winnowing; after which the kernels are heated to boiling, then washed with cold water, dried and powdered, and eaten with dried dates, or used in other ways as food. The seeds are also said to yield a clear limpid oil.—'Medicinal Plants,' Bentley and Trimen, No. 114, &c.

Distribution: Cape Verd Islands, Nile Land.

Pompion or Pumpkin (*Cucurbita Pepo*, Duch.).—Annual. Cultivated in all warm and temperate parts of the globe. The young unripe fruits are universally eaten by the natives in India in stews, curries, &c. They are also used in some parts of England by the poorer classes as a vegetable. A sample of Pumpkin

Meal from Jamaica, and a sweetmeat made of the fruit from Formosa, are shown in the Kew Museum. The seeds yield a clear, limpid, and almost colourless sweet-oil, which is edible, and also used for burning in lamps. —'Treasury of Botany,' Lindley and Moore; 'Oil-seeds and Oils in the India Museum,' Cooke, p. 41.

Distribution: Nile Land, Lower Guinea.

Common Gourd, Melon, Pumpkin, &c. (*Cucurbita maxima*, Duch.).—Annual, cultivated in all warm and temperate parts of the globe. The fruits of this species are largely used in India, France, and North America as an article of food, and as it keeps well it is used in the latter country through a great part of the winter. Some specimens of these fruits or gourds grown in Western Africa and carved by the Negroes at Bahia are to be seen in the Kew Museum.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, Nile Land, Lower Guinea.

Bryonia laciniosa, L.—Perennial. The whole plant is collected when in fruit for medicinal purposes. It is bitter and aperient, and is considered to have tonic properties.—'Vegetable Materia Medica of Western India,' Dymock, p. 293.

Distribution: Upper Guinea, Nile Land, Mozambique District.

Haffafalu (Tigre name), Aregressa (Amhara name)

(*Zehneria scrobiculata*, Hochst.).—Herb. The powdered leaves are soothing and sedative, and are used by the Abyssinians as a remedy for tapeworm.—'Pharmaceutical Journal,' 1851, vol. xi., p. 163.

Distribution: Upper Guinea, Nile Land.

Sicyos angulatus, L.—Climbing plant. Root and seeds bitter and diuretic.—'Treasury of Botany,' Lindley and Moore.

Distribution: Nile Land, Lower Guinea.

Eguse, Argosee, or Laikee Seeds.—The seeds known under these names are produced by some *Cucurbitaceous* plant. In Sierra Leone and other parts of Western Africa they are used as food by the inhabitants in various country dishes. An oil is extracted from them, which when pure is said to be an excellent substitute for salad oil and for burning in lamps; it is also employed for various medicinal purposes.—'Pharmaceutical Journal,' 1856, vol. xvi., p. 307, &c.

CACTEÆ.

The cochineal insect fed upon species of *Opuntia* is largely cultivated in the Canary Islands. The imports into this country from there in 1879 amounted to 24,720 cwt.—Spon's 'Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 857.

FICOIDEÆ.

Ice Plant (*Mesembryanthemum crystallinum*, L.).—This plant is burned for its ashes, which contain an alkali used in the manufacture of glass.—'Dictionary of Economic Plants,' Smith, p. 218.

Distribution: Canary Islands.

Sesuvium Portulacastrum, L.—A prostrate herb often wholly blood-red or purple. Used as a pot-herb, but has a rather saltish taste.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Lower Guinea, Mozambique District.

Khâprá of India (*Trianthema monogyna*, L.).—A perennial plant common in rice-fields. The leaves are used as a pot-herb, and the root when reduced to a powder as a cathartic.—'Vegetable Materia Medica of Western India,' Dymock, p. 59.

Distribution: Upper Guinea.

Mollugo Cerviana, Ser.—Annual herb. The young shoots and flowers are given in infusion in fevers as a mild diaphoretic, and the plant mixed with oil is used as an ointment for scabies and other cutaneous affections.—'Useful Plants of India,' Drury.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Mollugo Spergula, L.—Small plant. The leaves

are bitter, and are used by the natives in India as a stomachic, aperient, and antiseptic, and in infusion are considered efficacious in suppressed lochia. Moistened with castor-oil they are said to be a good remedy for earache.—'Useful Plants of India,' Drury.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Mollugo nudicaulis, Lam.—Annual. Used in Madagascar as a cough medicine, and known there as "Antananarivo."—Kew Museum.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Gisekia pharnaceoides, L.—Annual. The plant is pounded in a mortar with water, and then used as a powerful anthelmintic.—'Useful Plants of India,' Drury.

Distribution: Upper Guinea, Nile Land, Lower Guinea.

UMBELLIFERÆ.

Hydrocotyle asiatica, L.—Perennial. Leaves bitter, and given in infusion in bowel complaints to children. The plant is one of the remedies for leprosy on the Malabar Coast, &c.—'Useful Plants of India,' Drury.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Eryngium fœtidum, L.—Biennial herb cultivated in South America as a condiment. According to

Don all parts of the plant are reckoned very powerful antihysterics, and much used by negroes and the poorer whites on all occasions of that nature, whence they call it filweed. It is chiefly administered in decoctions or infusions.—'History of the Dichlamydeous Plants,' Don, vol. iii., p. 272.

Distribution : Upper Guinea.

RUBIACEÆ.

"Doy" (Bassa), "Amelliky" or Peach (Sierra Leone), (*Sarcocephalus esculentus*, Afzel.).—A large shrub or tree. The root is used in medicine in Sierra Leone under the names of "Egbessye" or "Doundake." Fruit edible, and is the country fig or peach of Sierra Leone. The plant yields a gum.—Kew Museum.

Distribution : Upper Guinea.

Koos of Senegal (*Mitragyne africana*, Korth.).—Bush 6 feet high, or tree 20 to 40 feet. Wood durable and largely used by the people of Nupé. It is also used for carving, being easy to work.—Kew Museum, and 'Flora of Tropical Africa,' Oliver, vol. iii., p. 41.

Distribution : Upper Guinea, Nile Land.

Corynanthe paniculata, Welw.—Tree 25 to 40 feet, or a shrub 12 to 15 feet high. Timber useful for building purposes.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 43.

Distribution : Lower Guinea.

Bellenda or Bembee of Sierra Leone, African Bark (*Crossopteryx Kotschyana*, Fenzl.).—Bushy tree or shrub. The bark is employed as a febrifuge.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 44.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Urophyllum rubens, Benth.—Shrub six feet high. Used as a red dye by the natives of Fernando Po.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 73.

Distribution: Upper Guinea.

Randia malleifera, Benth.—Shrub or small tree. The "Blippo," with the inky sap of which the Niam-Niam and the Monbuttoo delight to dye themselves.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 98.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea.

Wilde Katjepiering, Buffelsbal (*Gardenia Thunbergia*, L.).—Shrub or tree. Wood hard, heavy, and strong, and used for making tools, clubs, kieries, yokes, axles, fellies, ploughs, &c., at the Cape of Good Hope. The fruit is eaten by elephants in the Mozambique District. This tree is said to be used medicinally in the Madi country.—'Silva Capensis,' Pappe, p. 18; 'Flora of Tropical Africa,' Oliver, vol. iii., p. 101.

Distribution: Upper Guinea, North Central, Nile Land, Lower Guinea, South Central, Mozambique District.

Gardenia Vogelii, Hook. f.—Shrub 8 to 15 feet high. Used in Djer Land as a paint for the body.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 103.

Distribution: Upper Guinea, Nile Land, Lower Guinea.

Oxyanthus tubiflorus, DC.—Evergreen shrub. The fruit is beaten in a mortar and used as food.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 108.

Distribution: Upper Guinea.

Morelia senegalensis, A. Rich.—Evergreen shrub 12 to 30 feet high. Used to intoxicate fish.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 113.

Distribution: Upper Guinea, Nile Land.

Canthium Afzelianum, Hiern.—Shrub of moderate size. The bruised bark is employed by the natives of Sierra Leone in the case of swollen legs and knees.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 143.

Distribution: Upper Guinea.

Vangueria edulis, Vahl.—A good-sized shrub. Fruit eaten by the natives of Madagascar and Mauritius under the names of Voa-vanga and Voa-vanguer.—'History of the Dichlamydeous Plants,' Don, vol. iii., p. 549.

Distribution: Upper Guinea, Nile Land, South Central.

Craterispermum laurinum, Benth.—Shrub. According to Mann it gives a yellow dye when beaten

up with grass.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 161.

Distribution: Upper Guinea.

Kattah Bark (*Ixora* sp.).—A celebrated vermifuge of Sierra Leone.—Kew Museum.

Coffee (*Coffea arabica*, L.).—Tree 10 to 15 feet high, or large shrub. Native of Tropical parts of Africa, and cultivated for its fruits, which afford the well-known coffee of commerce. Coffee-leaf tea from Jamaica and the East Indies are exhibited in the Kew Museum, as are also walking-sticks made of the wood.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 144.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Liberian or Monrovian Coffee (*Coffea liberica*, Bull and Hiern).—Native of Liberia. A larger and more robust plant than *C. arabica*, and producing considerably larger berries and of a finer flavour. This species probably affords the Cape Coast Coffee.—'Medicinal Plants,' Bentley and Trimen, vol. ii., No. 144; 'Flora of Tropical Africa,' Oliver, vol. iii., p. 181.

Distribution: Upper Guinea, Lower Guinea.

Coffea stenophylla, G. Don.—Small tree 20 feet high, or shrub four to six feet. The fruits of this species are the source of the Highland Coffee of Sierra Leone.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 182.

Tolmgah or Brimstone Tree of Sierra Leone (*Morinda citrifolia*, L.).—Tree sometimes of immense size. Bitter and astringent, used at Nupé in dysentery and fevers. The wood is used in Upper Guinea for flooring, as it is said to be excellent, and also to resist the attacks of insects ; in India it is used for native slippers. From the root-bark a scarlet dye is procured, used for dyeing handkerchiefs, turbans, &c. The fruit and leaves are used in medicine.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 192 ; 'Useful Plants of India,' Drury.

Distribution: Upper Guinea, Lower Guinea, North Central.

Galium Aparine, L.—Annual. Known in England under the name of Cleavers, and in Scotland as Grip-grass. The plant has astringent properties, and is a rural remedy for colds, in infusion. It is also said to be useful in scorbutic affections. In France the crushed herb is used as a poultice to sores and blisters.—'Useful Plants of Great Britain,' Sowerby, p. 137.

Distribution : Upper Guinea, Nile Land.

DIPSACEÆ.

Scabiosa succisa, L.—Herbaceous perennial plant. Used on the Continent as a yellow and green dye. The root is very astringent, and has been suggested as a tanning material. It is called Devil's bit in

England.—'Useful Plants of Great Britain,' Sowerby, p. 140.

Distribution: Upper Guinea, and widely distributed over the temperate regions of the Old World.

COMPOSITÆ.

Vernonia cinerea, Less.—An erect herb, said to be used in medicine by the Hindus in decoction to promote perspiration in febrile affections.—'Vegetable Materia Medica of Western India,' Dymock, p. 351.

Distribution: Widely spread in Tropical Africa, north and south of the Equator.

Vernonia senegalensis, Less.—Shrub 10 to 15 feet high. Used in medicine in West Tropical Africa.—Kew Museum.

Distribution: Upper Guinea, Lower Guinea, Mozambique District.

Chew-stick of Ewuro (*Vernonia amygdalina*, Del.).—Shrub 6 to 10 feet high, used in Sierra Leone as a bitter. This plant is called Grabra in Abyssinia.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 284.

Distribution: Upper Guinea, Lower Guinea, Nile Land.

Vernonia Perrottetii, Sch.—Annual, one to two feet or more in height, mixed with *Hygrophila spinosa*, T.

And.; burnt salt is extracted from their ashes.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 272.

Distribution: Upper Guinea, Nile Land.

Elephantopus scaber, L.—Erect herb two to eight feet high. In Travancore the bruised leaves are boiled with rice and given internally in swellings of the body or pains of the stomach. A decoction of the root is given in dysuria.—'Useful Plants of India,' Drury.

Distribution: Upper Guinea, Nile Land.

Grangea maderaspatana, Poir.—Herb varying from a few inches to a foot or more in height. The leaves are used in India as a stomachic, deobstruent, and antispasmodic. In Brazil the plant is known under the name of Marcella, and is used as a substitute for chamomile.—'Vegetable Materia Medica of Western India,' Dymock, p. 360; 'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Blumea aurita, DC.—Herb one and a-half to three feet high. The plant has a strong turpentine smell, and is used by the natives of India in dyspepsia.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Nile Land, Cape Verd.

Blumea lacera, DC.—Herb growing to four feet

high. Has similar properties to the last, and is likewise used by the natives of India.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

Ra-sana or kowra-sana of India (*Pluchea lanceolata*, O. and H. (*Berthelotia lanceolata*, DC.).—Small shrub three feet or more high. Leaves aperient; used in India as a substitute for senna.—'Vegetable Materia Medica of Western India,' Dymock, p. 372.

Distribution: Upper Guinea.

Sphærauthus indicus, L. (*S. hirtus*, Willd.).—Herb two to three feet high. Seeds considered anthelmintic, and are prescribed in powders. The powdered root is stomachic, and the powdered root-bark mixed with whey is a valuable remedy for piles. In Java the plant is considered to be a useful diuretic. Flowers used in cutaneous affections and as a blood purifier. Roots anthelmintic.—'Useful Plants of India,' Drury.

Distribution: Upper Guinea, Mozambique District.

Helichrysum auriculatum, Less.—Small plant. An infusion of this plant is used as tea by the natives of the Cape of Good Hope.—'Flora Capensis Medicæ,' Pappe, p. 24.

Distribution: Lower Guinea, Mozambique District.

Eclipta alba, Haask. (*E. prostrata*, L.).—Small herb. Used in Brazil as a remedy for diarrhœa, and as a

black stain for the hair. The root has purgative and emetic properties assigned to it, and has been used in affections of the liver and spleen, and in dropsy. The expressed juice appears to be the best form of administration.—'Pharmacopœia of India,' Waring, p. 128; Kew Museum.

Distribution: Widely spread in Tropical Africa.

Hæmorrhage Plant (*Aspilia latifolia*, O. & H.).—Herb, one and a half to four feet high. In Liberia this plant is used in hæmorrhage by the natives, and is preferred by them to any European treatment. The pounded leaves and flowers applied to a wound are said to stop hæmorrhage in a few minutes and to heal the wound rapidly.—'Pharmaceutical Journal,' vol. viii., 1878, p. 563.

Distribution: Upper Guinea, Nile Land.

Spilanthes Acmella, L.—Annual. This plant has similar properties to the Para cress of Brazil (S. *oleracea*, L.), the flower-heads of which have a hot burning taste, and cause profuse salivation: they are sometimes chewed to relieve toothache.—'Vegetable Materia Medica of Western India,' Dymock, p. 360.

Distribution: Upper Guinea, Nile Land, Lower Guinea, Mozambique District.

African Marigold (*Tagetes erecta*, L.).—Small plant used in India in diseases of the eye and to purify the

blood. The flowers are sometimes used as a yellow dye.—'Punjab Products,' Powell, p. 358.

Distribution : Abyssinia and other parts of Tropical Africa.

Emilia sonchifolia, D.C.—Annual, six inches to two feet high. On the Malabar Coast a decoction of this plant is used as a febrifuge, and the juice mixed with sugar in bowel complaints. In China the leaves are eaten raw in salads, and in Travancore the juice from them is applied in cases of night-blindness ; it is also considered as cooling, and is used as a remedy for inflammation of the eyes.—'Useful Plants of India,' Drury.

Distribution : Upper Guinea, Mozambique District.

Senecio Tedliei, O. & H.—Herbaceous plant, known in Ashantee under the name of "Yangkompno." The pounded leaves are said to be applied to cuts and contusions.—'Flora of Tropical Africa,' Oliver, vol. iii., p. 420.

Distribution : Upper Guinea.

Star Thistle (*Centaurea Calcitrapa*, L.).—Annual or biennial, one to two feet high. The roots are bitter, and used as a substitute for *Cnicus Benedictus*, L., which has tonic, diaphoretic and emetic properties.—'Medical and Economical Botany,' Lindley, p. 232.

Distribution : Upper Guinea, North Central, Nile Land.

Blessed Thistle of the Parisians (*Carthamus lanatus*, L.).—Annual, said to possess sudorific, febrifuge and anthelmintic properties.—'Mérat et Lens' Dictionnaire Médicale,' tom. ii., p. 115.

Distribution: Nile Land, Canary Islands, Madeira, &c. (widely cultivated).

Dicoma tomentosa, Cass.—Annual, six inches to two feet high. Plant strongly bitter. Used in the neighbourhood of Belgaum as a febrifuge, especially in the febrile attacks to which women are subject after childbirth.—'Vegetable Materia Medica of Western India,' Dymock, p. 388.

Distribution: Upper Guinea, North Central, Nile Land, Mozambique District.

Chicory or Succory (*Cichorium Intybus*, L.).—Perennial. The leaves are blanched and used as a salad, under the name of "Barbe du Capucine." The root roasted and ground is largely used to mix with and to adulterate coffee; its medicinal properties are closely like those of the dandelion. The herbage forms good food for cattle.—'Treasury of Botany,' Lindley and Moore.

Distribution: St. Thomas.

GOODENOVIEÆ.

Taccada of India and Ceylon (*Scævola Lobelia*, L.).—Shrubby plant. The pith of the young stems

resembles that of the Rice Paper plant (*Fatsia papyrifera*, Bth.), and is much used by the Siamese and Malays for making artificial flowers, &c.—Kew Museum.

Distribution: Upper Guinea, Lower Guinea, Mozambique District.

ERICACEÆ.

Agauria salicifolia, Hook. f.—Tree fifteen to twenty-five feet high. Used in Madagascar as a lotion in scabies, under the name of "Angàvodiàna." —'Pharmaceutical Journal,' vol. xi., 1881, p. 853.

Distribution: Upper Guinea and the Mascarine Islands.

PLUMBAGINEÆ.

Chitra or Chita of Bengal (*Plumbago zeylanica*, L.).—Perennial shrubby plant. A tincture of the root-bark has been employed as an antiperiodic and also in the treatment of intermittents with good results. It acts as a powerful sudorific.—'Pharmacopœia of India,' Waring, p. 170, &c.

Distribution: Widely spread in Tropical Africa.

MYRSINEÆ.

Soaria (*Mæsa lanceolata*, Forsk).—Tree twenty to thirty feet high. In Abyssinia the fresh fruit, or more frequently the dried, is reduced to a powder,

and taken mixed with cheuro or with a bouillie of wheat as an anthelmintic. — 'Pharmaceutical Journal,' vol. iii., 1861, p. 23.

Distribution: Upper Guinea, Nile Land, Mozambique District, also Arabia.

Buekenhout of the Cape (*Myrsine melanophlæos*, R. Br.).—Tree forty to fifty feet high. Wood tough, used chiefly for wagon-work.—'Silva Capensis,' Pappe, p. 22.

Distribution: Upper Guinea.

Sapotaceæ.

Miraculous Berry, Assarbah of the Fante races, Tahme of the Akkrah and Adampe Districts (*Sideroxylon dulcificum*, A.DC.).—Shrub six feet high. The fruits are exceedingly sweet, and in size somewhat resemble the olive; they are credited with rendering the most sour and acidulous substances intensely sweet. The natives of the Gold Coast usually reserve them for rendering the stale and acidulated kankies more palatable, and in bestowing a sweetness on sour palm wine and pitto. During the rainy season these fruits may be purchased in the native markets at comparatively trifling prices. The peculiar principle is said to be soon dissipated. — 'Pharmaceutical Journal,' 1852, vol. xi., p. 445.

Distribution: Upper Guinea.

Shea, Galam or Bambouk Butter (*Butyrospermum Parkii*, Kotschy).—Tree reaching a height of thirty to forty feet, with a trunk five to six feet in diameter. The wood is red like cedar, very hard and close-grained. Shea butter is a solid fat obtained from the kernels, which are first dried in the sun, then bruised, and finally boiled, when the fat floats on the surface and is skimmed off for use; it constitutes a main article of inland commerce, and is employed by the natives for anointing their bodies, for lighting, and for food. This fat is imported from Sierra Leone to the extent of from 300 to 500 tons annually for use in the manufacture of hard soaps, chiefly in combination with other oils. A substance somewhat resembling gutta-percha is found in Shea Butter, and is called Gutta-Shea; no application, however, has been found for it. The fleshy portion of the fruit is very sweet, and is eaten by the natives.—'Spon's Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' pp. 1410 and 1654; 'Pharmaceutical Journal,' 1879, vol. ix., p. 818.

Distribution: Upper Guinea, Nile Land.

Ebenaceæ.

Bush Guarri, Omgwali of the Kafirs, Emboto of Mossamedes (*Euclea lanceolata*, E. Mey.).—Shrub or small tree. Wood dark, heavy, and durable. Fruits

edible.—'Silva Capensis,' Pappe, p. 26; 'Monograph of Ebenaceæ,' Hiern, p. 97.

Distribution: Lower Guinea.

Cape and Orange River Ebony, Black Ebony, Zwartebbenhout, Sneezewood, Emboto or Embolo of South Africa (*Euclea pseudebenus*, E. Mey.).—Shrub six to eight feet high. The heart-wood is extremely hard, black, and durable. Fruit the size of a pea, and edible.—'Monograph of Ebenaceæ,' Hiern, p. 96, &c.

Distribution: Lower Guinea, South Central.

Mualâla (*Maba Mualala*, Welw. MSS.).—Tree fifteen to thirty-five feet high. Wood very hard and valuable, black in the centre, but not always so.—'Monograph of Ebenaceæ,' Hiern, p. 111.

Distribution: Lower Guinea.

Maba buxifolia, Pers.—Shrub or tree. Wood dark-coloured, remarkably hard and durable. Used for making anchors for large boats in the Province of Tavoy, Burma. The berries when ripe are universally eaten. A decoction of the leaves is employed in gastritis in Madagascar.—'Monograph of Ebenaceæ,' Hiern, pp. 30 and 118.

Distribution: Upper Guinea, Lower Guinea.

Ajé or Ajejeh of Abyssinia, Makudima of Sechuana, Kasinjamtolmera of Tette, Musolveira of Golungo Alto and Monkey Guava (*Diospyros mespiliformis*, Hochst).—Shrub or tree, six to forty

feet high. The wood is white, compact, and much valued by the natives, and is useful for many purposes; the heart-wood is black, like ebony. Fruits edible.—'Monograph of Ebenaceæ,' Hiern, p. 165.

Distribution: Upper Guinea, Nile Land, Lower Guinea, South Central, Mozambique District.

Musolveira (*Diospyros platyphylla*, Welw.).—A moderate-sized tree. According to Dr. Welwitsch the fruits are edible.—'Monograph of Ebenaceæ,' Hiern, p. 267.

Distribution: Lower Guinea.

Dendo or N'Dendo (*Diospyros Dendo*, Welw. MSS.).—Tree twenty-five to thirty-five feet high, and one to two feet in diameter. Valuable as a timber tree. The wood is very black, and hard in the centre.—'Monograph of Ebenaceæ,' Hiern, p. 196.

Distribution: Lower Guinea.

Diospyros Loureiriana, G. Don.—Shrub or small tree. Under the name of Nhamodéma the natives of the Mozambique District use the roots to clean and to dye their teeth red. The fruit is said to be edible.—'Monograph of Ebenaceæ,' Hiern, p. 195.

Distribution: Lower Guinea, Mozambique District.

Apocynaceæ.

White Rubber Vine, "Abo" of the Niger (*Landolphia owariensis*, Beauv.).—The genus Landolphia was founded upon specimens of this species collected in Oware by Palisot de Beauvois, and it extends from Sierra Leone, where it was collected by Don, to Angola, from which Kew possesses specimens from Welwitsch and Monteiro. It was collected on the Niger by Barter, and near the mouth of the Congo by R. C. Phillips (who states that it bears the native name of "Mvoochi"). A form not specifically distinguishable was found by Schweinfurth in North Central Africa. He remarks ('Heart of Africa,' i., p. 192) that "it is well known in the Guinea trade for its production of caoutchouc." From the fruit, "the sourness of which exceeds that of the citron, the natives of Djurland manufacture a beverage refreshing as lemonade."—'Report of the Royal Gardens at Kew,' 1880, p. 38.

Landolphia Mannii, sp. n.—A very distinct species collected by Gustav Mann at Corisco Bay (Lat. 1° N.), and not at present known from any other locality. Mann describes it as a climber twenty feet high, and yielding caoutchouc.—'Report of the Royal Gardens at Kew,' 1880, p. 39.

Mbungu Rubber Plant (*Landolphia florida*, Bth.)

—Woody climber. This beautiful species, originally described in the Niger Flora by Bentham, appears to be distributed over the whole of Central Tropical Africa. On the Niger, according to Barter, the fruit, which is very sour, is eaten by the natives under the name of Aboli. According to Monteiro, who collected specimens in Angola, the india-rubber of South-West Africa is derived from this species. *L. florida* is said to yield the best rubber of any of the species of *Landolphia*. The natives make playing balls of it, and consider it to be the most adhesive known. The milk if rubbed upon the skin adheres like birdlime, and can scarcely be rubbed off.

The form in which West African Rubber comes into commerce is somewhat peculiar. It is accounted for by the method of collection, which has been described as follows:—Every part exudes a milky juice when cut or wounded; but this will not run into a vessel placed to catch it, as it dries so quickly as to form a ridge on the wound, which stops its further flow. The blacks collect it by making long cuts in the bark with a knife, and as the milky juice gushes out it is wiped off continually with the fingers and smeared on their arms, shoulders and breast, till a thick covering is formed. This is peeled off their bodies and cut into small squares, which are then said to be boiled in water. In the English market it appears as more or less agglutinated masses

of small cubes, of which there are specimens in the Kew Museum under the name of Thimble Rubber.—'Report of the Royal Gardens at Kew,' 1880, p. 39; 'New Commercial Plants,' Christy, No. 1, p. 8.

Carissa edulis, Schum. et Thon.—Spiny shrub. The fruits are black and edible, and have an agreeable flavour, much like sweet cherries; and make an excellent soup for the sick.—'Niger Flora,' Hooker, p. 446.

Distribution: Accra; rather common in Guinea.

Hpokpoka Tree of Sierra Leone (*Tabernæmontana crassa*, Bth.).—The Kew Museum contains a fibre and cloth, called Dodo cloth, made from fibre obtained from this tree from Sierra Leone. The husk of the fruit is full of rubber, and is said to yield a considerable proportion of the West African kind.—'New Commercial Plants,' Christy, No. 4, p. 13, etc.

Distribution: Upper Guinea.

Iboga of the Gabon (*Tabernæmontana* sp.).—The roots are tonic, and in large doses have an exciting effect on the nervous system.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 108.

Distribution: Gabon.

Vegetable Silk (*Strophanthus* sp.).—The seed hairs are used for stuffing purposes.—'Spon's Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 998.

Distribution: Native of Senegal.

"Umtsuti," or poison plant of S. Africa (*Strophanthus hispidus*, D.C.).—Shrub. Professor Fraser, speaking of this species at a meeting of the Edinburgh Botanical Society, May 14th, 1885, said that he had "discovered how the active principle of this plant, used by the natives on the Shiré, East Africa, as well as many other districts of that Continent for poisoning their arrows, is of incalculable benefit in cardiac diseases. Though acting in the same manner, it far surpasses the principle of digitalis in intensity." The Wanika arrow-poison of the East Coast of Africa is stated to be either prepared from the roots of *S. hispidus*, DC., or *S. Kombe*, Oliv. A full account of this by Mr. Gerrard appeared in the 'Pharmaceutical Journal,' 1881, pp. 833–834, and 849–850.

Distribution: Upper Guinea.

Inée or Onaye of the Gabon (*Strophanthus* sp.).—The seeds are used to poison the arrows of the Pahouins; the poison exercises a powerful action on the heart.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 108.

Distribution: Gabon.

Asclepiadeæ.

Xysmalobium Heudelotianum, Dcne. — Perennial herb. This plant produces a watery, turnip-shaped root called "Yahhop" by the negroes. Senegambia,

by whom it is eaten.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea.

Mudar of India, Ashoor or Oshoor of the Arabs (*Calotropis procera*, R. Br.).—Shrub six to ten feet high. The economic uses of this species, together with the *Calotropis gigantea* of India, are probably similar in every respect. The silky hairs from the apex of the seeds of the latter species are used in India for stuffing pillows, and may be used as a paper material. The fibre produced from the stems is called Bowstring Hemp, and is very strong and valuable. The root-bark of *C. procera* is used in European pharmacy as a substitute for ipecacuanha, both as an emetic and in the treatment of leprosy. The fresh juice is used in rheumatism and chest diseases as a rubefacient, and the leaves are given as a cure for guinea worm. In the Peshawur Valley the juice from the plant is employed in the preparation of catgut, &c.—'Economic Products of India,' Watt, part iii., No. 60; 'Useful Plants of India,' Drury, &c.

Distribution: Upper Guinea, Cape de Verd Islands.

Pergularia sanguinolenta, Lindl.—Twining shrub. This plant yields a kind of dragon's-blood, with which the Dragon's Blood of commerce is adulterated. —'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea.

LOGANIACEÆ.

Nuxia congesta, Br.—Shrub. The wood is close-grained, heavy, and looks worthy of attention.—Kew Museum.

Distribution: Upper Guinea.

Anthocleista Vogelii, Planch.—Tree. The hollow stems are used as quivers for small poisoned arrows by the natives on the River Niger.—Kew Museum.

Distribution: Upper Guinea.

M'boundou, Casa or Icaja of Gabon (*Strychnos* sp.).—In Gabon the leaves and roots are employed as an ordeal.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 109.

Distribution: Gabon.

Voiva Vountaca or Voavotaka of Madagascar (*Strychnos spinosa*, Lam. [*Brehmia spinosa*, Harv.]).—Shrub growing to ten feet high. The hard-shelled ripe fruit resembles an orange in size and appearance, and contains many seeds immersed in a copious pulp. The latter is of a somewhat acid taste, and is said to be delicious and commonly eaten by the natives wherever it grows.—'Treasury of Botany,' Lindley and Moore.

Distribution: West and Central Africa.

GENTIANEÆ.

Faroa sp.—Annual herb. The plant possesses bitter tonic properties, and is favourably spoken of by Dr. Welwitsch.—'Treasury of Botany,' Lindley and Moore.

Distribution : Lower Guinea.

BORAGINEÆ.

Heliotropium undulatum, Vahl.—Shrubby plant. In India this plant is given after snake-bite, while tobacco oil is locally applied to the bite itself.—'Economic Products of India,' Watt, part v., No. 615.

Distribution : Upper Guinea, Cape Verd Islands.

Indian Turnsole (*Heliotropium indicum*, L.).—Small annual. In India the juice from the leaves is applied to gum-boils, pimples on the face, and in certain cases of ophthalmia. In Jamaica it is used to cleanse and consolidate wounds and ulcers, and boiled with castor-oil it is of use in the stings or bites of poisonous animals. It is said by Martius to allay inflammation with undoubted advantage.—'The Useful Plants of India,' Drury, p. 426.

Distribution : Common in W. Tropical Africa.

Trichodesma africana, Br.—Herb. The leaves are

used in India as a diuretic.—'Economic Products of India,' Watt, part v., No. 1174.

Distribution: Upper Guinea, Cape Verd Islands.

CONVOLVULACEÆ.

Ipomæa digitata, L.—Large scandent perennial. This plant is greatly cultivated in India on account of its large red flowers. The great tuberous roots are much used in native medicine, being regarded as tonic, alterative, aphrodisiac, demulcent, and lactagogue. The powdered root-stock is given with wine, for the purpose of increasing the secretion of milk.—'Economic Products of India," Watt, part v., No. 658.

Distribution: Cultivated at Cape Palmas.

Ipomæa hederacea, Jacq.—(*Pharbitis Nil*, Chois.).—Annual. The seeds of this plant are sold in the Indian bazaars under the name of "Kala-dana" as an effectual and safe cathartic, for which purpose it is equal to jalap, and is superior to it in portability and flavour. A resin called pharbitism is obtained from these seeds, and is said to be a safe and effective purgative.—'Useful Plants of India,' Drury, p. 337.

Distribution: Upper Guinea.

Moon Flower (*Ipomæa bona-nox*, L.).—Scandent herb. In India the seeds are eaten when young. The dried capsules and seeds, as also the flowers, leaves and roots, are used as remedies for snake-bite.

The juice from the plant is used to hasten the inspissation of Central American Rubber (*Castilloa elastica*, Cerv.).—'Economic Products of India,' Watt, part v., No. 657. 'Dictionary of Economic Plants,' Smith, p. 88.

Distribution: Upper Guinea.

Ipomæa biloba, Forsk. (Convolvulus Pes-Capræ, L.).—Creeping and twining plant, found on the sea-shore; it is a good sand-binder and is eaten by goats, horses, and rabbits. In India the natives boil the leaves and apply them externally as an anodyne in colic, and in decoction use them in rheumatism.—'Useful Plants of India,' Drury, p. 259.

Distribution: Upper Guinea, Cape Verd Islands.

Ipomæa aquatica, Forsk. (I. reptans, Poir.).—Annual. Commonly eaten by the poorer classes of India as a vegetable. The roots are also said to be eaten.—'Economic Products of India,' Watt, part vi., No. 414.

Distribution: Upper Guinea.

Sweet Potato (*Ipomæa Batatas*, Lam.).—Perennial. This plant has long been universally cultivated in tropical and sub-tropical regions for its tuberous roots. It forms one of the chief articles of food of the natives of New Zealand and the Pacific Islands. It is cultivated in the South of France and Spain, and makes an excellent preserve, which is highly prized by

the Spaniards. From the latter country tubers are occasionally exported to England.—'Dictionary of Economic Products,' Smith, p. 399.

Distribution: Cultivated in Tropical Africa.

Evolvulus alsinoides, L.—Perennial. According to Mr. Barter the plant is fragrant, and is burnt to perfume houses. Confluence.—Kew Museum.

Distribution: Upper Guinea.

SOLANACEÆ.

Tomato or Love Apple (*Lycopersicum esculentum*, Mill.).—Annual. The fruits, known as tomatoes, are largely eaten, either raw, or cooked in various ways. In a green state they form an excellent pickle. Used as an article of diet they are considered beneficial in affections of the liver, indigestion, diarrhœa, and other complaints.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Cape Verd Islands.

Solanum nigrum, L.—Herbaceous or shrubby plant. This species possesses slight narcotic properties, on which account the Bohemians place the leaves in the cradles of infants to promote sleep; they are also used for poultices, as a soothing agent. In Bourbon and Mauritius these leaves are eaten as a substitute for spinach. In India the berries are considered tonic, diuretic, and useful in anasarca and heart-

disease. The plant is also used in fevers, dropsical affections, &c.—'Treasury of Botany,' Lindley and Moore; 'Economic Products of India,' Watt, part v., No. 1098.

Distribution: Upper Guinea, Cape Verd Islands.

Brinjal or Aubergine, Egg plant (*Solanum Melongena*, L.).—Herbaceous plant two to eight feet high. It is largely cultivated in hot countries for the fruits, which are more or less egg-shaped, and which vary considerably in size and colour. They are very highly esteemed in France, and are sometimes to be found in the English markets.—'Guide to Museums of Economic Botany,' Kew.

Distribution: Upper Guinea; common in cultivated grounds.

Physalis minima, L.—Herbaceous annual. In India the fruit is officinal, being considered tonic, diuretic, and purgative.—'Economic Products of India,' Watt, part. v., No. 883.

Distribution: Upper Guinea.

Winter Cherry (*Physalis Alkekengi*, L.).—Herbaceous plant. The fruits have an acidulous and not unpleasant flavour, followed by a slight bitterness. Though esteemed detergent and aperient, they are chiefly recommended as a diuretic. In some parts of Germany the country people eat them, and in Spain and Switzerland they frequently supply the place of other eatable fruits. By some they are esteemed equal to gooseberries for

tarts. Instances are related of their good effects in dropsical and calculous disorders, but at present they are wholly disregarded.—'History of the Dichlamydeous Plants,' Don, vol. iv., p. 448.

Distribution: Cape Verd Islands.

Capsicums, Chillies, Red Pepper, &c. (*Capsicum annuum*, L.).—Herbaceous plant. This species is cultivated in various parts of the world for the fruits which are the source of Cayenne pepper, which is prepared as follows:—The ripe fruits are first dried in the sun or oven, and then ground into powder; this is mixed with a large quantity of wheat-flour. The mixed powder is formed into cakes with leaven, and baked till they are thoroughly hard, after which they are ground and sifted. The pulverised rind or skin makes the best Cayenne pepper, and chiefly from the small kinds known as "bird peppers." Capsicum fruits are used medicinally in powder or as a tincture, as an external application, or as a gargle in certain cases of sore throat, particularly those of a malignant character; and internally as a stimulant in cases of impaired digestion, &c. In India these fruits are used for plasters in cholera, and to counteract bad climate.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea.

Shrubby Capsicum or Spur Pepper (*Capsicum*

frutescens, L.).—Dwarf bushy shrub. The fruits are used for pickling, both in their green and ripe states, as well as for making chilli vinegar; but they are chiefly used, however, for making Cayenne pepper. In India they are used as medicine in typhus and intermittent fevers and dropsy; they are stomachic and rubefacient, and in native practice are prescribed in gout, dyspepsia, cholera, and ague.—'Treasury of Botany,' Lindley and Moore; 'Economic Products of India,' Watt, part v., No. 263.

Distribution: Cape Verd Islands.

Withania somnifera, Dunal. (*Physalis somnifera*, L.).—A shrubby perennial. The root is said to have deobstruent and diuretic properties. The leaves moistened with warm castor-oil are useful externally applied in cases of carbuncle. They are very bitter, and are given in infusion in fevers. The seeds are employed in the coagulation of milk in making butter. The fruit is diuretic. The root and leaves are powerfully narcotic: the latter are applied to inflamed tumours, and the former in obstinate ulcers and rheumatic swellings of the joint, being mixed with dried ginger and so applied. The Telinga physicians reckon the roots alexipharmic.—'The Useful Plants of India,' Drury, p. 446.

Distribution: Upper Guinea, Cape Verd Islands.

Thorn Apple, Stramonium (*Datura Stramonium*, L.).—A coarse weedy annual, over three feet in height.

The properties of stramonium are regarded as anodyne and antispasmodic, and in overdoses is a powerful poison; it has been found useful in neuralgic and rheumatic affections, in gastrodia and other painful diseases. Some have regarded it as a very valuable remedy in mania and epilepsy, but in these diseases it not unfrequently produces injurious effects. In spasmodic asthma, dyspnœa, catarrhs, &c., the leaves are generally smoked like tobacco, or an inhalation from an infusion of them in warm water is resorted to. In Cochin China a strong decoction of the leaves is regarded as a very efficacious remedy in hydrophobia.—'Medicinal Plants,' Bentley and Trimen, vol. iii., No. 192.

Distribution: Cape Verd Islands.

Metel or Hairy Thorn Apple (*Datura Metel*, L.).—Herbaceous plant. This species is said to possess similar properties to *D. Stramonium*, L.—'Dictionary of Economic Plants,' Smith, p. 152.

Distribution: Cape Verd Islands.

Tobacco (*Nicotiana Tabacum*, L.).—Handsome plant, attaining a height of three to six feet. Tobacco forms a very important article of commerce; but though it is cultivated in the Cape Verd Archipelago and other parts of Western Africa, it appears only to be grown for local consumption. Besides its use for smoking and for making snuff, tobacco affords an alkaloid known as nicotine, which is a very energetic

poison. As a medicine, tobacco-leaf owes its value to its powerfully sedative and antispasmodic properties. In overdoses it acts as an acro-narcotic poison. The imports of tobacco into Great Britain for the year 1886 amounted to 87,022,051 lbs., the home consumption amounting to 52,817,991 lbs.—'Medicinal Plants,' Bentley and Trimen, No. 191, &c.

SCROPHULARINEÆ.

Herpestris Monniera, H. B. and K.—Annual creeping plant. The Hindus regard this as a powerful diuretic and aperient, but there is no trustworthy evidence of its value in these respects. According to Roxburgh the juice of the leaves conjoined with petroleum is used in India in rheumatism. Whatsoever benefit is derived from this formula is doubtless due to the petroleum.—'Pharmacopœia of India,' Waring, p. 161.

Distribution: Upper Guinea.

Paraguay Herb (*Vandellia diffusa*, L.).—Small herb. In South America this plant is used as an emetic. For this purpose a good handful of it is boiled in half a litre of water, and a small cupful taken every ten minutes until vomiting ensues. Employed in this manner the vandellia is as certain in its action as ipecacuanha, without occasioning violent purgations or uncontrollable vomiting; the only drawback to its

use being its very bitter taste.—'Pharmaceutical Journal,' vol. ii., 1872, p. 849.

Distribution: Upper Guinea.

Pipybras (*Scoparia dulcis*, L.).—Herbaceous plant, one to three feet high. Used in Sierra Leone as a diuretic. In Liberia a decoction of the plant is used for gravel and kidney complaints.—'Pharmaceutical Journal,' vol. viii., 1878, p. 564.

Distribution: Upper Guinea.

BIGNONIACEÆ.

Kindee seu Brochee (*Newbouldia* sp.).—The boiled roots of this plant, together with the leaves, are used in native medicine in Sierra Leone in fevers.—Kew Museum.

Distribution: Sierra Leone.

Tchiogo or Tulipier of Gabon (*Spathodea campanulata*, Beauv.).—Tree. The flowers are employed in Gabon as an application to ulcers.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 46.

Distribution: Upper Guinea.

Etua Tree of the Fantees (*Kigelia pinnata*, DC.; [*K. africana*, Benth.]).—Tree of large size, having a whitish bark and spreading branches. The fruit, which is often more than two feet long, and from five to eight inches broad, has an astringent taste, and

after having been cut in half and roasted, is employed in Nubia as an outward application in rheumatic and other complaints. On the Gold Coast this fruit is employed as a charm by the fetish men and women, in which case it is painted in alternate stripes of red, white, and black, or entirely black, and dotted all over with red and white spots. The ceremony in which it is used is an invocation to the fetish to discover the remedy to cure the disease of the person seeking advice from the fetish man or woman. The natives also esteem the bark as a sovereign cure for dysentery, and have done so for many ages. The Nubians hold this tree sacred, and celebrate their religious festivals under it by moonlight.—'Treasury of Botany,' Lindley and Moore; 'Pharmaceutical Journal,' vol. iii., 1861, p. 182.

Distribution: Upper Guinea.

PEDALINEÆ.

Pedalium Murex, L.—Tall, succulent, branching annual plant. All parts of the plant give off a musky odour when rubbed, and the fresh branches possess the curious property of rendering water or milk mucilaginous by simply drawing them a few times round in the vessel containing it. In India the buttermilk sold in the markets is frequently adulterated with water thickened by this means. The seeds are also mucilaginous, and are used in India for

making poultices.—'Treasury of Botany,' Lindley and Moore.

Distribution: Tropical Africa.

Gingelly, Sesame, Til or Benné Oil plant (*Sesamum indicum*, DC.).—Annual, two to four feet high, cultivated in warm countries for the sake of the seed, from which a valuable oil is obtained, known in commerce under the above names. It is commonly reckoned that an acre requires $\frac{1}{10}$ of a bushel of seed, and yields $1\frac{1}{2}$ to 2 bushels, occupying the land for about three to four months. When the crop is ripe it is cut down and stacked for seven days; it is then sun-dried for three days, being collected into a heap at night, and kept in a heap on alternate days between the sun-drying. This causes the bursting of the pods and the liberation of the seeds. The latter are then subjected to frequent washings in cold water and subsequent exposure to the sun, with the object of bleaching; the oil is then extracted by pressure. In India the common yield is two quarts of oil from nine pounds of seed. The oil is used for cooking, anointing the body and hair, in medicine, for absorbing the fugitive odours of plants, and for illumination. In Europe the superfine quality largely replaces olive-oil for domestic purposes, and the other grades are employed by soap-makers. In some parts of North America the leaves are used in infusion as a demulcent; they also serve for the preparation of

emollient poultices. Senegal exported 600 cwts. of Sesamum seed in 1870. Lagos (where it is called "Beni" seed) shipped 729 tons in the same year.—'Spon's Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 1388, &c.

Distribution: Upper Guinea.

ACANTHACEÆ.

Peristrophe bicalyculata, Nees.—Erect annual. The whole plant macerated in an infusion of rice is said to be a useful remedy for poisonous snake-bites. The plant is also said to have like properties to *Fumaria parviflora*, and is used in its stead, but has not the bitterness of that plant.—'Economic Products of India,' Watt, part v., No. 868.

Distribution: Upper Guinea, Cape Verd Islands.

VERBENACEÆ.

Lippia nodiflora, Rich.—Wide trailing perennial herb. In Bombay this plant is used under the name of Ratoliya as a demulcent in gonorrhœa. According to Ainslie, the tender stalks and leaves are in a slight degree bitter, and are used, when toasted, in infusion by native practitioners in cases of indigestion in children, to the extent of two ozs. twice daily; it is also ordered as a drink for women after childbirth.

'Materia Medica of Western India,' Dymock, p. 499.

Distribution: Upper Guinea.

Bormbor or Gambia Tea (*Lippia adoensis*, Hochst.).—Herbaceous plant commonly used in the Gambia in fevers to promote perspiration.—Kew Museum.

Distribution: Upper Guinea.

Vervain or Vervein (*Verbena officinalis*, L.).—Herbaceous plant. This plant was an object of much superstition amongst the ancients, by whom it was worn as a charm against evil, and for good luck. In medicine it was much used in affections of the bladder, and particularly in calculus. The flowers were employed as a remedy for defective vision. In India the fresh leaves are used as a febrifuge and tonic, and the plant is officinal at Lahore, being depurative and febrifuge.—'Treasury of Botany,' Lindley and Moore; 'Economic Products of India,' Watt, part v., No. 1209.

Distribution: Cape Verd Islands.

Evino of Gabon (*Vitex cuneata*, Schum. et Thon.).—Large tree. The wood is good for planking and for furniture. The natives employ it for the ribs of small boats, and for pirogues of small dimensions.—'Catalogue des Produits des Colonies Françaises Exposition Universelle de 1867,' p. 46.

Distribution: Upper Guinea.

Vitex sp.—Shrub. Fruits edible, from Lagos.—Kew Museum. Coll. Barter.

Cantong (*Vitex* sp.).—Wood of a dark-brown colour and useful-looking, from the River Bagroo.—Kew Museum. Coll. Mann.

White Mangrove, Garigari or Aguirigui of Gabon (*Avicennia africana*, Beauv.).—This tree is very abundant by the rivers, but scarce by the sea. The wood is compact, fibrous, and good for ship-building. The bark is employed by the natives in medicine against eruptions of the skin.—'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 46.

Distribution: Upper Guinea.

LABIATÆ.

Fever plant of Liberia (*Ocimum viride*, Willd.).—Erect shrubby plant, about three feet high, said to be used in Sierra Leone and Liberia in fevers; it has also been used as a substitute for quinine, and is said to be much cheaper and equally effectual. It is given in the form of an infusion, a wine-glassful being administered at intervals until perspiration is freely induced, the patient being kept warm in bed.—'Pharmaceutical Journal,' vol. viii., 1878, p. 563.

Distribution: Upper Guinea.

Ocimum canum, Sims.—Herbaceous erect plant.

Used in India to restrain mucous discharge in catarrh.—'Pharmaceutical Journal,' vol. viii., 1878, p. 563.

Distribution: Upper Guinea.

Common Sweet Basil (*Ocimum Basilicum*, L.).—Erect herbaceous annual. The seeds are mucilaginous and cooling, and are used in infusion in gonorrhœa, diarrhœa, and chronic dysentery. A cold infusion of the seeds can relieve after-pains of parturition. The juice of the leaves forms an excellent nostrum for the cure of ringworm, and the bruised leaves for scorpion stings. The leaves and leafy tops have a flavour somewhat resembling that of cloves, and are on this account much employed for seasoning soups, stews, sauces, and other dishes. The roots are used in India for making rosaries. Diaphoretic and expectorant properties are also ascribed to this plant.—'Economic Products of India,' Watt, part v., No. 821; 'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Upper Guinea, Cape Verd Islands.

Hyptis spicigera, Lamk.—Herbaceous plant. The seeds are occasionally imported as an oil-seed into this country from the east and west coasts of Africa, but nothing seems to be known as to its uses.—Kew Museum.

Distribution: Upper Guinea, Cape Verd Islands.

Salvia ægyptiaca, L.—Dwarf undershrub. In Scinde

the seeds are used as food and in medicine, and are known under the name of "Tookmeria." The plant is browsed by sheep and goats in the Punjab.—'Economic Products of India,' Watt, part vi., No. 712, &c.

Distribution: Cape Verd Islands.

Leonotis nepetæfolia, Br.—Tall annual, four to six feet high. In Bombay, where it is known as "Matisúl," the ashes of the flower-heads mixed with curds are applied to ringworm and other itchy diseases of the skin. In Brazil the plant is employed under the name of "Cordâo do Frade" in baths as a remedy for rheumatic complaints.—'Materia Medica of Western India,' Dymock, p. 508; Lindley's 'Flora Medica,' p. 488.

Distribution: Upper Guinea.

PLANTAGINEÆ.

Way Bread (*Plantago major*, L.).—Perennial herb. The broad leaves are a popular and probably beneficial application to wounds and bruises, and are much valued by the Highlanders for this purpose. The small seeds are relished by granivorous birds, and large quantities of the ripe spikes are gathered in the neighbourhood of London for the supply of the caged birds of the metropolis. Under the name of "Ohbako" the plant is used in medicine by the

Japanese.—'The Useful Plants of Great Britain,' Sowerby, p. 213, &c.

Distribution: Cape Verd Islands.

Plantago Psyllium, L.—Erect annual. The seeds when soaked in water yield a mucilage which is largely used in France and Germany as a stiffening material for muslin and other fabrics; it has also been recommended as a sizing material for photographic prints.—'Photographic News,' June 20th, 1884, &c.

Distribution: Cape Verd Islands.

NYCTAGINEÆ.

Boerhaavia repens, L. (*B. diffusa*, L.).—Herbaceous plant. The plant is a good expectorant and has been prescribed in asthma with marked success; it is given in the form of a powder, decoction, or infusion. Taken largely it acts as an emetic.—'Pharmacopœia of India,' Waring, p. 185.

Distribution: Cape Verd Islands.

AMARANTACEÆ.

Celosia argentea, L.—Annual, one to three feet high. Used in India under the name of "Sarwali" as a pot-herb in times of scarcity. The fruits are used in North Formosa in ophthalmia, and the seed in Japan in medicine under the name of "Nogeito."—

'Economic Products of India,' Watt, part vi., No. 188. Kew Museum.

Distribution: Upper Guinea.

Amarantus spinosus, L.—Erect annual, one to two feet high. A poultice of the leaves is officinal in the Bengal Pharmacopœia: but it is a simple emollient. In Mauritius a decoction of the leaves and roots is used internally as a diuretic, and in Central America the root is used in dysentery. The plant also possesses mucilaginous properties.—'Pharmacopœia of India,' Waring, p. 184.—Kew Museum.

Distribution: Upper Guinea, Cape Verd Islands.

Amarantus paniculatus, L.—Annual, with a stem four to five feet high. Largely cultivated in India for its seed, which when ground into flour is used as food by the natives.—Kew Museum.

Distribution: Upper Guinea.

Amarantus viridis, L.—Erect annual. According to Roxburgh the tender tops of this plant are eaten by the natives, though not so much esteemed as the cultivated sorts.—Roxburgh's 'Flora Indica,' vol. iii., p. 605.

Distribution: Cape Verd Islands.

Cyathula prostrata, Blume (*Achyranthes prostrata*, L.).—Slender annual, one to two feet high. Tonic, diaphoretic, and astringent. Used in Ceylon under the name of "Bin Sèbo" in fevers, diarrhœa, and

dysentery.—'Catalogue of Ceylon Exhibits, Paris Exhibition,' 1855, p. 17.

Distribution: Upper Guinea.

Ærua javanica, Juss. (*A. tomentosa*, Forsk.).—Shrubby plant. In Egypt the flowers are used under the name of "Toorf" for stuffing mattresses.—'Treasures of Botany,' Lindley and Moore.

Distribution: Upper Guinea, Cape Verd Islands.

Achyranthes aspera, L.—Herb, one to three feet high. Astringent and diuretic properties are assigned to this plant. In India it is said to be successfully employed in native practice in menorrhagia and diarrhœa, and is also favourably reported upon as a diuretic. The whole plant when incinerated affords a considerable quantity of potash, which is used for washing clothes; and also in medicine in conjunction with an infusion of ginger in dropsical affections. The stem is used as a tooth-brush in the Punjab. The flowering spike is believed to be a curing agent in the bites of scorpions and other venomous insects and reptiles. In Ceylon the plant is known under the name of "Karalsebo," and is used in dysentery, fevers, and diarrhœa.—'Pharmacopœia of India,' Waring, p. 184, &c.

Distribution: Upper Guinea, Cape Verd Islands.

CHENOPODIACEÆ.

White Goosefoot (*Chenopodium album*, L.).—Annual, attaining several feet in height. In some of the Hebrides it is commonly collected by the inhabitants, boiled and eaten as a green vegetable. Under the name of "Bathu" this plant is used in Lahore as food, in medicine, and to clean copper vessels preparatory for tinning them. It is considered a laxative in diseases of the spleen, bile, and worms.—'The Useful Plants of Great Britain,' Sowerby, p. 217; 'Punjab Products,' Powell, vol. i., p. 372, &c.

Distribution: Upper Guinea.

Herba Santa Maria of Brazil, Herva tormiguera of the Azores and Lisbon (*Chenopodium ambrosioides*, L.).—Small plant, with a powerful aromatic odour. It has been used in Europe by Plenk with good results in nervous affections, chiefly in chorea. It is administered in the form of an infusion, eight grams of the herb to 230 grams of boiling water, with some bruised peppermint; it has also been used with success in similar complaints in conjunction with cinchona. In Brazil the tops of the plants are used as a vermifuge, for which purpose it is said to be remarkably efficacious; and an infusion of the plant as a carminative, diaphoretic, and emmenogogue in amenorrhœa, and

in coughs and congestion of the lungs.—'Pharmaceutical Journal,' vol. ix., 1879, p. 713.

Distribution: Upper Guinea, Cape Verd Islands.

Arthrocnemum indicum, Moq.—Small plant. It has been recommended as a source for fossil alkali or barilla.—'Economic Products of India,' Watt, part v., No. 142.

Distribution: Upper Guinea.

Seablite (*Suæda fruticosa*, Forsk.).—Perennial, one to three feet high. This plant was formerly burnt for barilla in the South of Europe.—'Student's Flora of the British Islands,' Hooker, p. 321.

Distribution: Upper Guinea.

Suæda maritima, Dum.—Universally eaten, and an essential article of food during famines.—'Indian Flora,' Hooker, vol. v., p. 14.

Distribution: Cape Verd Islands.

PIPERACEÆ.

Black Pepper of Western Africa, African or Guinea Cubebs, Benin Pepper, Irrei, Ere or Eeré of Yoruba (*Piper Clusii*, Cas. DC.).—Climbing plant, usually found attached to the larger brushwood or moderate-sized trees of the forest thickets. In the mountainous districts of Sierra Leone it grows abundantly, and considerable quantities of the fruit are transmitted to

the markets of the town for sale during the dry season, where they can be purchased at a cheap rate. They have a camphoraceous taste, are moderately acrid, and in a fresh state diffuse a rich aromatic odour. In Sierra Leone this pepper is used as a condiment to flavour soups and other dishes. In the Kongo region an infusion of the green fruits, leaves, or entire plant constitutes one of the component parts of a fetish potion with which the Gangàs or native doctors attempt the cure of manifold series of diseases. —'Pharmaceutical Journal,' vol. xiv., 1854, p. 198.

Distribution: Upper Guinea.

Ashantee Pepper, or Dojvie (*Piper guineense*, Thon.).—This species is probably identical with the last. The fruits are brought by the native merchants from the interior and exhibited for sale in the markets of the Gold Coast. The natives of Akkrah sometimes employ them in lieu of the common black pepper.—'Pharmaceutical Journal,' vol. xiv., 1854, p. 199.

Distribution: Upper Guinea.

MYRISTICEÆ.

Combo of the Gabon, Mutago of Angola (*Myristica angolensis*, Welw.).—The seeds of this plant have been recently imported into Liverpool from St Thomas as an oil-seed. They are said to yield 72 per cent., or nearly three-quarters of their weight, of a

fatty oil. They have no smell and little taste.—'New Commercial Plants and Drugs,' Christy, No. 8, p. 26.

Distribution: Upper Guinea.

Niowe of Gabon (*Myristica longifolia*).—The seeds contain 54 to 58 per cent. of fat.—'New Commercial Plants and Drugs,' Christy, No. 8, p. 27.

Distribution: Upper Guinea.

Myristica sp.—According to Mann, the wood of a species of *Myristica* is split and used by the civilized natives of Fernando Po for covering the sides of their houses.—Kew Museum.

Distribution: Upper Guinea.

BALANOPHOREÆ.

Thonningia sanguinea, Vahl.—A fleshy, parasitical, leafless plant found growing on roots of trees. It is said by Barter to possess an astringent property, and to be sold in the markets on the Niger for use in native medicine.—Kew Museum.

Distribution: Upper Guinea.

EUPHORBIACEÆ.

Australian Asthma Herb (*Euphorbia pilulifera*, L.).—Prostrate or ascending branched annual, attaining one to two feet. A decoction made by immersing a handful of stalks and leaves in two quarts of water,

reduced by boiling to three pints, and a wineglassful taken three times a day, is said to be an excellent remedy for asthma, bronchitis, and other like complaints. The plant is said to possess tonic and suporific qualities.—*The Colonies and India*, May 7th, 1881.

Distribution : Upper Guinea.

Euphorbia hypericifolia, L.—Annual. An infusion of the dried leaves has been highly recommended as a remedy in dysentery after due depletion, diarrhœa, menorrhagia, and leucorrhœa. The plant is said to have a harsh and astringent taste, and its effects upon the system are those of an astringent and feeble narcotic.—'United States Dispensatory,' Wood and Bache, p. 335.

Distribution : Upper Guinea, Cape Verd Islands.

Euphorbia sp.—Specimens of a concrete milky juice collected from a species of *Euphorbia* on the River Niger are exhibited in the Kew Museum.

Euphorbia sp.—According to Mr. Barter a species of *Euphorbia* is used by the natives at Nupe to poison their arrows.—Kew Museum.

Oro Plant of Sierra Leone (*Euphorbia* sp. ?).—It has recently come under the notice of the Colonial Office that a poisonous herb has been used by the prisoners of Freetown Gaol, Sierra Leone, for the purpose of malingering. The fact was discovered as

the result of an enquiry made into the cause of an unusual rate of mortality among the prisoners. It appears that the young shoots when eaten produce sickness and act as an irritant poison, cumulative in its effects. It is said to be well known to the natives, and that a most powerful purgative prepared by them, and called "agoomoo," consists of a dried extract of the juice.—*Pharmaceutical Journal*, August 1, 1885, p. 105.

Phyllanthus Niruri, L.—Annual. In India this species, together with *P. urinaria*, L., are held in considerable repute by the natives as diuretics, and as such are much employed in dropsical affections, gonorrhœa, &c., but they do not appear to possess any special claims to notice.—'Pharmacopœia of India,' Waring, p. 205.

Distribution: Common in Tropical Africa.

African Oak or African Teak (*Oldfieldia africana*, Bth.).—Large tree. The wood is extremely heavy, and is imported into this country from the West Coast of Africa for ship-building purposes. It is very useful for beams, keelsons, waterways, shelf-pieces, &c., and particularly in steamboats, as it will stand a great degree of heat in the wake of fires where there is a free current of air; but when in confined situations it decays rapidly. The heart-wood does not escape the attacks of large larvæ, or from being perforated

by teredos.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea.

Ile (*Uapaca Heudelotii*, Baill.).—The fruit has a pleasant flavour somewhat resembling that of a medlar, and is known by the natives of Bonny as "Ile."—'Niger Expedition,' Coll. Mr. Barter, Kew Museum.

Jatropha multifida, L.—Ornamental shrub. The seeds are powerfully purgative and emetic. In Brazil an oil called "Pinhoen" is extracted from them and is used as an emetic.—'Materia Medica of Western India,' Dymock, p. 573.

Distribution: Upper Guinea.

Physic Nut, Mocassit Seeds (*Jatropha Curcas*, L.).—A soft-wooded evergreen shrub. The seeds are occasionally used by Hindu physicians as a purgative and alterative, but are said to have a very uncertain action. An oil obtained from them is considered to be a valuable external application in itch, herpes, and chronic rheumatism, and is also used for burning. The leaves are applied as a rubefacient and discutient, and warmed and rubbed with castor-oil are used as a suppurative. A viscid juice obtained from the stem by incision is painted over cuts and wounds to check bleeding and promote healing. In Goa the root-bark is applied externally in rheumatism. A sample of the seeds of this species

imported from Western Africa under the name of "Mocassit" are shown in the Kew Museum.

Distribution: Found here and there in Guinea.

Manioc, Mandioc, Cassava, Cassada (*Manihot utilissima*, Pohl.).—Herbaceous or semi-shrubby perennial, with very large cylindrical, tapering yellowish roots, reaching as much as three feet long and six to nine inches in diameter, and filled with a poisonous milky juice. This plant is universally cultivated in West Tropical Africa for its roots, known as Bitter Cassava, and which are difficult to distinguish from the Sweet Cassava (*Manihot Aipi*, Pohl.), but it is devoid of the tough, fibrous, or woody portions found in the centre of that root, and does not become soft like it in boiling or roasting. Cassava meal is obtained by subjecting the grated root to pressure to express the juice, and then drying and pounding the residual cake. Of this meal Cassava bread is made. Cassava starch or Tapioca meal is the meal deposited from the expressed juice of the roots after having been washed and dried in the air without heat. The sauce called Cassareep is made from the juice concentrated by heat, which dissipates its poisonous properties, and afterwards flavoured with aromatics. West Indian "Pepper Pot" is composed of Cassareep mixed with peppers and meat.—'Medicinal Plants,' Bentley and Trimen, No. 235.

Distribution: Cultivated in Western Tropical Africa.

Sweet Cassava (*Manihot Aipi*, Pohl.).—This plant resembles the Bitter Cassava in external appearance, but differs from it in being non-poisonous, and may be eaten with impunity. In the West Indies it is a common article of food when boiled or roasted, and is also eaten in some parts of South America. When boiled it is as mealy as a potato. The expressed juice of this root when fermented constitutes the intoxicating liquor drunk by the Indians, and called Piwarry. Cassava meal and bread and Cassava starch and tapioca are prepared from the Sweet as well as from the Bitter Cassava Root.—'Medicinal Plants,' Bentley and Trimen, No. 235.

Distribution : Upper Guinea.

(*Acalypha indica*, L.).—Small plant. The expressed juice of the leaves is in great repute in India as an emetic for children, and is safe, certain and speedy in its action ; it is also highly spoken of as an expectorant, being especially useful in the bronchitis of children. A cataplasm of the leaves is favourably spoken of as a local application to syphilitic ulcers, and to relieve pain and irritation attendant on the bites of venomous insects. The root is purgative.—'Pharmacopœia of India,' Waring, p. 205.

Distribution : Upper Guinea.

Castor Oil (*Ricinus communis*, L.).—A very variable plant, both in habit and appearance. In tropical countries it forms a tree reaching forty feet high, and

in warm temperate regions is a slender, woody, branching bush of twelve to fourteen feet. In England it forms a very large branched bush four to five feet high. The oil known in commerce as Castor-oil is obtained from the seeds. It is a mild and most efficient purgative, and in fact is one of the most reliable purgatives we possess for the relief of obstinate constipation; it has also been strongly recommended as an eliminant in malignant cholera. In India, Algeria, &c., this oil has been used for burning in lamps, and the inferior qualities are also employed in India for soap-making. Formerly the seeds were used as a purgative, but on account of their violent action are not now administered. The leaves have been recommended, in the form of a decoction or poultice, as an application to the breasts of women to increase the secretion of milk. The decoction has also been reputed to act as a lactagogue and emmenogogue when administered internally.—'Medicinal Plants,' Bentley and Trimen, No. 237.

Distribution: Cape Verd Islands.

Bomah Nut (*Pycnocoma macrophylla*, Bth.).—Small tree. The fruits are used in Natal for tanning purposes. The Bomah Nut, which is extensively cultivated by the natives near the Victoria Falls, and is also found in the Shire Valley, is a species of *Vitex*, and yields an abundance of a sweet bland oil

much used in native cookery.—Kew Museum. *The Technologist*, May 1, 1864, p. 475.

Distribution : Upper Guinea.

URTICACEÆ.

Maconia of Congo, Deïamba, Hemp, &c. (*Cannabis sativa*, L.).—Annual from three to ten feet high, cultivated in various parts of the world for its invaluable fibre. It is found, however, that the Hemp plant grown in tropical countries produces less valuable fibres than the plant of colder latitudes, but that the former is far more active as an intoxicating and medicinal agent from secreting a much larger quantity of the narcotic resin. In the East various forms and preparations of this plant are enormously used for smoking, with or without tobacco, or by swallowing them in combination with other substances, or by infusion in water, &c. Gunjah, Bhang, and Churrus are the principal forms of hemp found in India. In Arabia it is largely employed for similar purposes under the name of Hashish or Hashash. Deïamba, or Tobacco of Congo, is said to grow wild in the marshy districts of the Congo or Zaire. The flowers when dried are used for smoking, and soon produce a narcotic effect. The plant is well known to the Portuguese inhabitants of the African Coasts, who use it partly as an article of luxury and partly as a medicine. Hemp-seed is used for feeding birds,

and when submitted to pressure yields about 25 per cent. of a fixed oil, which is employed as a varnish and for other purposes. Hemp fibre is principally obtained from Russia, but the best is produced in Italy. Inferior hemp is also obtained from the United States and India. Its chief uses are for cordage, sacking, and sail-cloths. In 1873, 1,251,000 cwt. were imported into this country.—'Medicinal Plants,' Bentley and Trimen, vol. iv., No. 231; 'Pharmaceutical Journal,' vol. ix., 1849, p. 143.

Distribution: Cultivated in Upper Guinea, &c.

Roko, Iroko or Odum Tree (*Chlorophora excelsa*, Bth. & Hook. f.).—The wood, which has a finely-mottled grain, is much used in Western Africa for building purposes, on account of its resisting the attacks of white ants.—'Museum Guide,' Royal Gardens, Kew.

Distribution: Upper Guinea.

Ficus asperifolia, Miq.—The leaves are much used by the natives of Zanzibar, under the name of "Ursasa," for polishing sticks, to which they give a very fine finish; they have recently been tried in England, but will not compete with the finest glass-paper.—Kew Museum.

Distribution: Upper Guinea.

Liberian Rubber (*Ficus* [*Urostigma Vogelii*, Miq.]). —Tree twenty to thirty feet high. To obtain the

rubber the trees are tapped when about five years old, by making gashes or incisions in the trunk; the juice then exudes and is collected in vessels, the gum being separated from the sap by the use of acids; it is then made into balls of about the size of a large orange. In order to obtain as large a yield of juice as possible the natives pollard the trees when at a height of ten to twelve feet, and cut back the branches to prevent the strength being used up in growth. This causes a free and regular flow of sap. The rubber obtained from this tree is valued in the London market (1878) at 1*s.* 6*d.* per pound, and if sent home clean would no doubt command a higher price.—'New Commercial Plants,' Christy, No. 2, 1878, p. 10; 'Report of the Royal Gardens at Kew,' 1878, p. 39.

Distribution: Upper Guinea.

African Bread Fruit, or Okwa of Western Africa (*Treculia africana*, Dec.).—Tall tree. The fruit is about a foot in diameter, having numerous seeds buried in a spongy substance. The seeds are ground into a meal and used as food by the natives.—'Dictionary of Economic Plants,' Smith, p. 62.

Distribution: Upper Guinea.

Cork-wood (*Musanga Smithii*, Br.) Tree.—The wood is extremely light, and is used as cork by the Europeans on the Sierra Leone Coast. The fruits are edible.—Kew Museum.

Distribution: Upper Guinea.

HYDROCHARIDEÆ.

Vallisneria spiralis, L.—Aquatic perennial herb used in India by sugar refiners. The sugar is covered with a layer of the leaves, and the moisture from them drains slowly through the sugar, carrying with it the dark-coloured masses. Every several days the leaves are replaced by fresh ones, until the whole mass is refined, when it is dried in the sun.—'Useful Plants of India,' Drury, p. 374.

Distribution: Upper Guinea.

ORCHIDEÆ.

Vanilla planifolia, And.—The Kew Museum contains a bracelet said to be made of the roots of this plant, which is also the source of the vanilla pods of commerce. It was collected by Gustav Mann in West Tropical Africa.

SCITAMINEÆ.

Turmeric (*Curcuma longa*, L.).—Perennial herb. The rootstock or tubers form the turmeric of commerce, of which there are two sorts, known as the round and the long; but both are the produce of the same plant. Turmeric is not now used as a remedial agent, but is introduced into the Pharmacopœias as a test of the presence of alkalis. It is also employed as a condi-

ment, and is a constituent of the well-known curry powder, and of many other articles of Indian cookery. Turmeric is likewise used for dyeing wool, silk, &c., and is occasionally employed in pharmacy for colouring ointments and other preparations.—'Medicinal Plants,' Bentley and Trimen, vol. iv., No. 269.

Distribution: Cultivated in West Tropical Africa.

Grains of Paradise, Guinea Grains, Melegueta Pepper (*Amomum Melegueta*, Roscoe).—Herbaceous perennial. The seeds are of a hard texture and have a shining golden brown or reddish brown colour, and are marked with a somewhat beak-shaped hilum of a paler hue than the rest of the seed; when crushed and rubbed between the fingers their odour is feebly aromatic, and their taste very pungent and burning. The principal constituents of grains of paradise are a volatile oil, resin, and starch, and their properties are due to the resin and volatile oil which are essentially contained in the seed-coats. The pungency depends upon the resin. These seeds were formerly regarded in this country as very injurious, but this idea is quite erroneous. In Africa they are esteemed as the most wholesome of spices, and are generally used by the natives to season their food; and in Great Britain and the United States of America they are chiefly used in the preparation of cattle medicines, and to give pungency to cordials, and also to give an artificial strength to spirits, wine, beer and vinegar. Their

chief export is from the Gold Coast, and principally from the stations of Cape Coast Castle and Accra. The exports average nearly 2,000 cwt. annually, nearly half coming to Great Britain.—'Medicinal Plants,' Bentley and Trimen, vol. iv., No. 268.

Distribution: Upper Guinea.

Amomum citratum, Per.—The seeds of this species are angular, oblong, of a shining brownish yellow colour, are larger than the Malabar cardamoms, and have a large concave depression at one extremity; they have a warm aromatic flavour, and when crushed give off an odour somewhat analogous to that of lemon-grass oil (*Andropogon*). In Gabon the natives use them as an excitant and vermifuge.—'Pharmaceutical Journal,' vol. ix., 1850, p. 313; 'Catalogue des Produits des Colonies Françaises, Exposition Universelle de 1867,' p. 105.

Distribution: Upper Guinea.

Large or Grape-seeded Amomum (*Amomum latifolium*, Afz.).—This species commonly grows on the outskirts of thickets and amid the long grass on the elevated slopes in the vicinity of Kongo-town and Kissy, Sierra Leone, and consequently has obtained the title of the "grass-field Obro" among the Ako colonists. It is indigenous to the Foulah, Soosu and Timneh countries, and is scattered throughout the intermediate regions northward as far as the River Gambia, where it abundantly flourishes at Koto and

Jesswon, near Cape St. Mary's. Among the Timnehs it is called "Mabubu" or "Egbubu," while the Soosus term it Goguoi. Afzelius remarks that the root and entire plant are employed as medicinal agents by the native populations, principally to remove the debility which follows fevers. With this object they boil the plant, together with the leaves of *Morinda citrifolia*, L., and with the decoction wash the body every morning. The acid pulp is also used to relieve the thirst in febrile diseases, or when induced by long journeys.—'Pharmaceutical Journal,' vol. xvi., 1857, p. 470.

Black Amomum, Obro-duddu of Yoruba, &c. (*Amomum escapum*, Sims).—In favourable localities this Amomum attains a height of eight or ten feet. Under the name of "Massa amquona," Afzelius states that the leaves and stems are endowed with the finest aroma, both in respect to scent and taste. The seeds are enveloped in a whitish pulp, free from acidity, are numerous, and of a shining brown colour; they are extremely hot, peppery, and camphoraceous, and when chewed in any quantity leave a cool sensation on the palate like some of the oils of mint. Among the native tribes every portion of the plant is rendered available for medicinal purposes. A decoction of the roots, leaves, &c., is frequently used in colic, diarrhœa, dysentery, and other gastro-enteritic affections. The pulverised seeds applied to the temples constitute a

favourite mode of relieving headache and certain forms of ophthalmia; they have also been used as a substitute for cardamoms, as a carminative and stimulant in flatulent colic, dyspepsia, visceral irritations, and as an adjunct with purgatives, and with results uniformally favourable.—'Pharmaceutical Journal,' vol. xvi., 1857, p. 467.

Distribution: Upper Guinea.

Yellow Amomum, Massa-aba of the Timnehs, Obro-wawa of Yorubas, Longouze of Madagascar (*Amomum Danielli*, Hook. f.).—This plant differs more or less in development, according to the elevation at which it exists. It flourishes in a swampy situation, but in mountainous localities the reduction in its size is considerable. The pulp of the fruit is eaten with avidity by the negro races of Guinea for its agreeable acid flavour and refrigerant qualities. The women and children of the Timneh and Soosu countries often wander in the woods in search of the ripe capsules, both for edible purposes and as an ingredient for some of their medicinal decoctions. The roots and entire plant are also used by them in medicine.—'Pharmaceutical Journal,' vol. xvi., 1857, p. 511.

Distribution: Upper Guinea.

Swamp or Water Amomum Parlancunpon (Mandingo), Massa-egbané (Timneh), Kumbulu (Soosu), (*Amomum palustre*, Afz.).—This species is usually

limited to swampy lowlands or margins of lagoons, and seldom attains six feet in height. The portions of the plant held mostly in requisition by the negroes are the seeds, which are employed more as an article of perfumery than of medicine. The Timneh women pulverise the fresh seeds between two stones, and when reduced to a fine powder triturate with Bambatulu or Donah Butter (*Butyrospermum Parkii*, Kotschy), and then use it to anoint their bodies. Afzelius states that the powdered seeds are applied to the forehead, temples and neck in pains of the head. It may however be considered doubtful whether this is their legitimate use, as the native doctors invariably prefer the pungent and peppery seeds of *Amomum Melegueta* or *A. escapum* for rubefacient purposes.—'Pharmaceutical Journal,' vol. xvi., 1857, p. 513.

Distribution: Upper Guinea.

Ginger (*Zingiber officinale*, Roscoe).—Perennial herb. The dried rhizomes of this plant are known as ginger. Two forms enter into commerce and are respectively termed uncoated or scraped ginger, and coated or unscraped ginger; the latter is alone official in the British and Indian Pharmacopœias. For the preparation of the uncoated or scraped ginger the rhizomes are dug up when about a year old, then washed and scraped so as to remove their cortical integument or skin, after which they are dried in the sun; this kind has been sometimes termed "white

ginger." The coated or unscraped sort is similarly prepared, excepting that the rhizomes are unscraped; this is sometimes called Black Ginger. The varieties now commonly found in British commerce are Jamaica, Cochin, Bengal, and African. The African is a coated ginger; but the three others are scraped or uncoated. Ginger is used in medicine as a stimulant, aromatic, and carminative, and as a rubefacient to relieve toothache and headache; it is also extensively used as a condiment, and is sometimes imported in a green state. Preserved ginger of the shops is prepared by carefully picking the young rhizomes or the young shoots of the old rhizomes, which after being washed and scraped are preserved in jars with syrup.—'Medicinal Plants,' Bentley and Trimen, vol. iv., 270.

Distribution: Upper Guinea. (Cultivated.)

Costus afer, Ker.—The plant is used by the natives of Sierra Leone as a specific againt nausea.—Kew Museum.

Distribution: Upper Guinea.

Arrowroot (*Maranta arundinacea*, L.).—Herbaceous perennial, valued for its rhizomes, from which a starch is extracted known as Arrowroot. The process of extraction adopted in Jamaica is as follows. The rhizomes are dug up, well washed in water, and then beaten to a pulp in large deep wooden mortars, and thrown into a large tub of clean water; the whole is

then well stirred and the fibrous parts wrung out by hand and thrown away, the milky liquor is afterwards pressed through a hair sieve or coarse cloth and allowed to settle, the clear water being drained off. At the bottom of the vessel is left a white mass of starch which is again mixed with clean water and drained ; lastly the mass is dried on sheets in the sun and is pure starch. The rhizomes yield about one-fifth of their weight of starch. Arrowroot or Maranta starch is white, odourless and tasteless, and enters commerce either in the form of a powder, or of more or less aggregated masses which rarely exceed a pea in size. Arrowroot possesses demulcent and nutritious properties, and is a valuable demulcent in bowel complaints and diseases of the urinary organs, and is also an agreeable article of food. The mashed rhizomes have been employed by the South American Indians and others to counteract the effects of wounds caused by poisoned arrows. The expressed juice has also been stated to be an antidote to poisons taken into the stomach, and to the bites of venomous insects and reptiles.—' Medicinal Plants,' Bentley and Trimen, vol. iv., No. 265.

Distribution : Cultivated in West Tropical Africa.

Kātēmfe or Kātemphe of the Akoos and other Yoruba tribes, Miraculous fruit of the Soudan (*Thaumatococcus* [*Phrynium Danielli*, Bennett]).—The fruits of this plant are commonly used by the

natives of Sierra Leone to render sweet and palatable an acidulated kind of bread called Aggadé, prepared from maize, sour fruit and bad palm wine. The seeds are enveloped in a thick viscid mucilage, which contains the dulcificant property; when this substance is placed in contact with the tongue an indescribable yet intense degree of dulcidity is immediately conveyed to the palate, the influence of it remaining unimpaired for a considerable period. Under this abnormal effect sour oranges and every species of unripe fruit, however acid or austere they may be, become transmuted into a pleasant and delicious sweetness.—'Pharmaceutical Journal,' vol. xiv., 1855, p. 159.

Distribution: Upper Guinea.

Banana (*Musa sapientum*, L.).—Perennial, with a stem four to fifteen or more feet high, and usually marked with purple spots. The fruit is three to six inches long, with yellowish flesh, a thinner skin and a more fragrant odour than that of the Plaintain, and fit to eat without cooking. In many parts of the world this fruit forms the chief article of food and is very nutritious. The leaves afford a valuable fibre, which is fine, white, silky, long, light and strong, and is said to make a good paper and to bear ink without being sized. The quality of the fibre depends in a very great measure upon the mode of cultivation and preparation.—'Spon's Encyclopædia of the Industrial

Arts, Manufactures and Commercial Products,' p. 983, &c.

Distribution : Cultivated in the Cape Verd Archipelago.

Musa sp.—According to Mr. Barter the strung seeds of a species of *Musa* are worn round the wrist by the natives of Sierra Leone to prevent sickness.—Kew Museum.

BROMELIACEÆ.

Pine Apple (*Ananas sativa*, L.).—Perennial, cultivated in various parts of the world for its well-known fruits. The West Indies is the chief seat of Pine Apple culture, and is mostly carried on in Eleuthera, Abacos, and San Salvador. Two kinds are grown—"Sugar-loaf," the best, principally shipped to England ; and Spanish, or "Red Pine," for the American market. New York in 1879 imported 2,740,002, of which 26 per cent. perished. In 1874 the value of the total shipments from the West Indies was £40,066. Pine Apples grown in the Azores are much finer than West Indian, and are more carefully packed. Great quantities of this fruit are produced in Assam, and the gardens of Malacca and Singapore yield enormous specimens ; but these do not enter into commerce. Fruit for exportation is gathered while green, and allowed to ripen during the voyage Large quantities of the canned fruit now arrive from

the West Indies. The leaves yield a valuable fibre, which is woven into textile fabrics in the Philippines, Singapore, and Malacca. The fibre intended for similar purposes is a large article of commerce between Singapore and China. Fishing-lines and ropes are made of this fibre ; and in Bengal the leaves are retted for four or five days, and the fibres are converted into twine, which is used by local shoemakers. The fibre works "wet" in pulping ; but makes a good strong paper, which bears ink well.—'Spon's Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' pp. 918 and 1027.

Distribution : Cultivated in Upper Guinea.

HÆMODORACEÆ.

African Bowstring Hemp, Blaw of Akkrah (*Sanseviera guineensis*, Willd.).—Stemless perennial plant, having lance-shaped leaves from one to four feet long, and three to four inches wide. The natives of Akkrah prepare a useful fibre from this plant in the following manner. With the view of obtaining fibre of the length necessary for their purposes they select the exterior or largest leaves in preference to the others ; these in the first instance are well beaten between two stones, then placed in water or in holes dug out of the ground, and closely covered over with moist soil for three days ; at the expiration of this

period the mass has become fully softened, and is removed and subjected to another pounding in order to dissever the fibres from the pulpy portions of the leaves, and is then thoroughly cleansed in fresh water and dried in the sun ; it is subsequently made up for sale in small bundles containing each about a dozen lesser portions twisted at one end, and seldom exceeding a foot in length, and of a light brown hue. The natives use this fibre in the manufacture of fishing-lines, nets, thread, and other kinds of cordage, and consider them to be better capable of resisting the destructive action of continual immersions in sea-water than other vegetable substances similarly prepared.—'Pharmaceutical Journal,' vol. xii., 1852, p. 130, &c.

Distribution : Upper Guinea.

IRIDEÆ.

Barcá (*Irideæ*).—The corms of a species of *Irideæ*, together with bitter cola, onions, &c., are, according to Mr. Venn, reduced to a powder by beating or grinding, and then drunk with lime juice or warm water as a vermifuge in Sierra Leone. Mr. Barter also mentions a species of *Irideæ* as being used medicinally in Sierra Leone.—Kew Museum.

TACCACEÆ.

Tacca involucrata, S. and T.—Perennial herb. The

tubers are edible, and from them a starch is prepared by the natives of the West Coast of Africa.—Kew Museum.

Distribution : Upper Guinea.

DIOSCOREACEÆ.

Yam (*Dioscorea sativa*, L.).—Climbing plant, extensively cultivated in Asia, Africa and America for its tuberous root, which is flat and palmated, about a foot in breadth, white within, and externally of a dark-brown colour, almost approaching to black : it is nutritious, of a good flavour, and is eaten either roasted or boiled as a substitute for bread, and somewhat resembles the potato, but is of a closer texture.—'Vegetable Substances Used for the Food of Man,' Lankester, p. 167.

Distribution : Cultivated in Sierra Leone.

White Bockra or Winged Yam (*Dioscorea alata*, L.).—Square-stemmed climbing plant. The roots of this species afford a much more delicate and agreeable food than those of *D. sativa*, and on account of their lightness and easy digestion are preferred to bread by many of the inhabitants of the West Indies. There are several varieties, distinguished principally by the size and shape of the roots, all of which, if well dried in the sun and covered with ashes or sand, or put into casks, will keep well in a dry situation for

many months.—'Hortus Jamaicensis,' Lunan, vol. ii., p. 309.

Distribution : Cultivated in Sierra Leone.

Yam (*Dioscorea* sp.).—Dried slices of the root of a species of Yam are sold in the markets of Tsadda for making a favourite dish of the natives.—Kew Museum. Coll., Dr. Baikie.

Liliaceæ.

Smilax sp.—The seeds of an unknown species of *Smilax* are used by the natives of Lagos to make bird-lime.—Kew Museum. Coll., Mr. Barter.

Aloe spp.—The negroes of Western Africa are said to make nets and cord of fibre obtained from various species of *Aloe*.—'Treasury of Botany,' Lindley and Moore.

Gloriosa superba, L.—Climbing plant. In Hindu medicine a paste made from the fresh root is used in childbirth ; sometimes the application is made to the palms of the hands and soles of the feet. The starch obtained from the root by washing is given internally in gonorrhœa. A small piece of the root is said to be a certain remedy for worms in cattle. The plant is supposed to be poisonous.—'Materia Medica of Western India,' Dymock, p. 677.

Distribution : Upper Guinea.

FLAGELLARIEÆ.

Flagellaria indica, L.—Perennial. The leaves of this plant are said to be astringent and vulnerary.—'Lindley's Vegetable Kingdom,' p. 188.

Distribution: Upper Guinea.

JUNCACEÆ.

Juncus acutus, L.—Glabrous herb. The culms are extensively used for making chair bottoms, hassocks, mats, baskets, etc., and the pith is used as wicks for "rushlights" or night candles.—'Domestic Botany,' Smith, p. 130.

Distribution: Cape Verd Islands.

PALMÆ.

Podococcus Barteri, M. and W.—Slender palm, five to eight feet high. The fruits are edible.—'Treasury of Botany,' Lindley and Moore.

Distribution: Upper Guinea.

Sclerosperma Mannii, Wendl.—Stemless palm. The leaves are used by the natives for roofing and constructing the walls of huts, being tied between the petioles of *Raphia*.—'On the Palms of Western Tropical Africa,' Mann and Wendland; 'Transactions of the Linnean Society,' vol. xxiv., p. 426.

Distribution: Upper Guinea.

Phœnix spinosa, Thon.—According to Mr. Barter the natives of Yoruba and Nupe dye the leaves yellow, black with iron and charcoal, and red with liquala of Dawa (*Sorghum vulgare*, Pers.). The very young leaflets before the leaves expand are used for the plaiting of hats and caps at Accra. Wine is obtained from this species, and the fruits are much liked by the natives.—'On the Palms of Western Tropical Africa,' Mann and Wendland (as above), p. 426, &c.

Distribution: Upper Guinea.

Date Palm (*Phœnix dactylifera*, L.).—A jigidah or waistband said to be made of the seeds of the Date Palm from Sierra Leone is exhibited in the Kew Museum.

Calamus sp.—According to Mr. Barter the stems of a species of *Calamus* are prepared for basket-making by the natives on the Niger.—Kew Museum.

Ukot of Old Calabar (*Raphia Hookeri*, M. and W.).—The pleasant taste of the wine obtained from this palm has caused the natives of Old Calabar to cultivate it. The wine is procured by cutting out the terminal inflorescence as soon as it makes its appearance; the wine is then produced in large quantities. The natives also manufacture cloths, &c., from the epidermis of the leaflets, and the natives on the Sherboro make hammocks from it, as

well as all sorts of basket-work, mats, &c. The leaves are also used for roofing.—'On the Palms of Western Tropical Africa,' Mann and Wendland (as above), p. 425.

Distribution: Upper Guinea, and cultivated.

Raphia Welwitschii, Wendl.—The epidermis of the leaflets is used by the natives of South West Tropical Africa in the manufacture of cloths, &c.—'On the Palms of Western Tropical Africa,' Mann and Wendland (as above), p. 425.

Distribution: Upper Guinea.

Bamboo Palm (*Raphia vinifera*, Beauv.).—The petioles of this palm are employed as poles on which to carry palanquins, and roofing made of the leaflets is said to last for three years. A loom formed of the petioles from the Gold Coast, and a broom made of the midribs of the leaves from Sierra Leone are shewn in the Kew Museum, as are also some neatly made baskets of the leaves, collected by the Niger Expedition. The seeds are occasionally imported into this country as oil seeds.—'On the Palms of Western Tropical Africa,' Mann and Wendland (as above), p. 425. Kew Museum.

Distribution: Upper Guinea.

Ancistrophyllum secundiflorum, M. and W. (*Calamus secundiflorus*, Beauv.).—The Bafan people take large quantities of Ancistrophyllum with them as food

when they go into the hills of Sierra del Crystal to procure the rubber. For this purpose they select the extremities of the stem, cutting off the leaves to make the bundles more portable; when required for use they simply roast the whole in the fire and then eat the soft central part, which is, however, rather bitter and tough to persons not accustomed to such primitive fare.—'On the Palms of Western Tropical Africa,' Mann and Wendland (as above), p. 425.

Distribution: Upper Guinea.

Palmyra or Black Run Palm, Sibboo Colono of Gambia, etc. (*Borassus flabelliformis*, L. [*B. æthiopum*, Mart.]).—Tree attaining from sixty to seventy feet high. The uses to which this palm is applied are manifold. The young germinating bud is cooked and eaten as a vegetable by the Nupe people, who call it Morintshi; and it is likewise used in Ceylon under the name of Kelingoos. Toddy is procured from the spathes in very large quantities in India, and also in Ceylon, where it is extensively used as yeast by the bakers; large quantities of it are also converted into vinegar, but by far the greatest quantity is boiled down for jaggery or sugar. The leaves and cuticle of the leaves are used wherever the tree is found for thatching purposes and for making baskets, mats, hammocks, and various other articles. The hollowed-out stems are used in India as water-pipes, and split in half, for gutters and open water channels.

The hard outer wood is used for posts, rafters, and other purposes, and is imported into Europe for the manufacture of umbrella-handles, walking-sticks, rulers, fancy-boxes, &c.—'Popular History of Palms,' Seemann, p. 100, &c.

Distribution: Upper Guinea.

Doum Palm of Egypt, or Gingerbread Tree (*Hyphæne Thebaica*, Mart. [*H. guineensis*, Thon.]).—Tree about thirty feet high. The wood is used in Africa for various domestic purposes. The rind of the fruit is eaten, and the seeds turned into beads for rosaries. —'Popular History of Palms,' Seemann, p. 214.

Distribution: Upper Guinea.

African Oil Palm (*Elæis guineensis*, Jacq.).—This palm attains a height of from twenty to thirty feet, and is the source of the celebrated palm oil. The natives use the oil which is obtained from the mesocarp of the fruit very largely in their food, and for oiling their bodies. The Bubis or Boobees of the Island of Fernando Po make an excellent poultice of it, which they apply when the hand of any person found guilty of adultery has, in accordance with the usage of these people, been cut off. Among the more civilized natives this oil is used in the manufacture of soap and for lighting their huts, but for this latter purpose the oil from the kernel is generally preferred. The harvest of nuts fit for use is biennial, but the chief quantity of commercial oil is obtained

from nuts gathered during the rainy season. The kernels now form a distinct article of trade not less important than the oil itself. 27,873 tons were shipped from Lagos in 1878; 100,000 tons from Sierra Leone in 1870; 104 tons from the Gambia in 1877, and 87 tons and 91 bags in 1878. The meal left after the expression of the oil from the kernels is one of the most valuable fat-producing foods for cattle. The industrial applications of the oil in Great Britain are for the manufacture of candles and soap, and in the manufacture of tin-plate in South Wales and elsewhere. For this latter purpose its non-drying qualities render it valuable as a preservative of the surfaces of the heated iron sheet from oxidation, until the moment of dipping into the bath of melted tin, the sheets being rapidly transferred to that from the hot oil bath—which consists almost entirely of palm oil. The softest, purest and most neutral oil is preferred for this purpose, and the kind known as Lagos is much used therefor. The exports of palm oil from Lagos were 3,304,967 gallons, value £239,133, in 1877; and 1,570,638 gallons, value £139,094, in 1878. Elæis wine, a drink much liked by the natives of Western Africa, is obtained by cutting off the male flower-spike. The Europeans use it as yeast for making bread. The main nerves of the exterior of the pinna, and the exterior of the petiole, are used for basket-work, for brooms, &c. At S. Paul de Loango the fibre at the base of the leaves, and also

that of the spathe, is used for stuffing cushions, &c. The soft centre of the upper part of the stem, consisting of the undeveloped petioles, is much relished as a vegetable. Finger-rings, bracelets, necklaces and other ornaments are cut from the endocarp of the seed.—'On the Palms of Western Africa,' Mann and Wendland; 'Transactions of the Linnean Society,' vol. xxiv., p. 424; 'Spon's Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' pp. 1359 and 1407, &c.

Distribution: All along the Coast.

Cocoa-nut (*Cocos nucifera*, L.).—This palm has a cylindrical trunk, sometimes as much as two feet in diameter, and attaining the height of sixty to one hundred feet. Every part of the tree is put to some useful purpose. The wood is commercially known as Porcupine wood, and is used in India for rafters and ridge poles, house-posts, and other building purposes, also for spear-handles, walking-sticks, and fancy work. The leaves are used for thatching, and the net of fibres at the base of the petioles is made into bags and paper, and is used in Ceylon for straining Toddy. The cut flower-stalks yield Toddy, which is fermented or made into sugar. The kernels of the nuts are eaten, and the sweet fluid of the young nut is a pleasant drink. The thick fibrous rind of the fruit affords "Coir" fibre, which is used for ropes, mats, &c.; and the shell of the nut is made into spoons, cups,

&c., and is often very beautifully carved; while the oil obtained from the fruit is an important article of trade, and is used for burning, for cooking, and in the manufacture of candles and soap. In fact the uses of the cocoa-nut tree are innumerable.—'A Manual of Indian Timbers,' Gamble, p. 422, &c.

Distribution: Cultivated on the West Coast of Africa.

Pandaneæ.

Pandanus sp.—The split leaves of a species of *Pandanus* are used on the Niger for making pouches, specimens of which are in the Kew Museum.

Typhaceæ.

Typha angustifolia, L.—Aquatic plant. The Kew Museum contains a specimen of fibre prepared from this plant in Melbourne; it is said to be a first-rate paper material. A specimen of paper made from this fibre, and a sample of down obtained from the plant, and said to be used in Victoria, Australia, for stuffing beds, cushions, &c., are also in the Museum.

Distribution: Upper Guinea.

Aroideæ.

Pistia stratiotes, L.—Aquatic plant, considered by the Hindus to be cooling and demulcent, and is

prescribed in cases of dysuria. The leaves are made into a poultice for the piles. The ashes are applied to ringworm of the scalp, and in some parts of India are known as "Pānā salt."—'Materia Medica of Western India,' Dymock, p. 661.

Distribution: Upper Guinea.

Taro (*Colocasia antiquorum*, Schott [*Caladium esculentum*, Vent.]).—The pressed juice of the petioles of this Aroid is highly styptic, and is said to arrest arterial hæmorrhage. In Bengal the leaves and petioles are eaten by the natives. The young leaves may be eaten like spinach, but like the root they require to be well cooked in order to destroy the acridity peculiar to Aroidaceous plants; the leaves also afford a fibre, and the corms a starch. A considerable number of varieties are cultivated in India. —'The Useful Plants of India,' Drury, p. 154, &c.

Distribution: Cultivated in Upper Guinea.

CYPERACEÆ.

Motha of the Hindus (*Cyperus rotundus*, L. [*C. hexastachyus*, Rottb.]).—The tubers are sweet and slightly aromatic, and are sold in the Indian bazaars. They are used by perfumers on account of their fragrance, and also in medicine as a tonic and stimulant, and have been employed in the treatment of cholera; in a fresh state they are given in infusion as

a demulcent in fevers, and are also used in dysentery and diarrhœa. Hogs are very fond of the tubers, and cattle eat the culms. In Ceylon the roots are used in medicine under the name of "Kallandooroo," and also in Japan, where they are known as "Hamasugi."—'The Useful Plants of India,' Drury, p. 173; Kew Museum.

Distribution: Upper Guinea.

Adouro root of West Indies (*Cyperus articulatus*, L.).—An infusion of the roots is occasionally employed to check irritability of the stomach in the endemic fever of the West Indies.—Kew Museum.

Distribution: Upper Guinea.

Cyperus exaltatus, Retz.—This plant yields a fibre. —'Economic Products of India,' Watt, vol. i., part iii., No. 75.

Distribution: St. Thomas.

Papyrus (*Cyperus Papyrus*, L.).—This plant afforded the substance used as paper by the ancient Egyptians. The paper was made from thin slices cut vertically from the apex to the base of the stem, between its surface and centre; these slices were placed side by side according to the size required, and then, after being watered and beaten with a wooden instrument until smooth, were dressed and dried in the sun. This species is said to contain about 40 per cent. of strong fibre, excellent for paper-making, and very easily bleached. In Madagascar the plant is burnt

to ashes and mixed with lard, and is made into an ointment used by the Malagasy doctors under the name of Zozòro for cuts and bruises.—'Treasury of Botany,' Lindley and Moore; 'Pharmaceutical Journal,' vol. xv., 1856, p. 237; and vol. xi., 1881, p. 854.

Distribution: Upper Guinea.

Chefa, Chufa or Earth Almond, Tiger or Rush Nut (*Cyperus esculentus*, L.).—Rush attaining three feet in height. The tubers, which are about the size of an ordinary bean, may be eaten either raw or cooked. In Spain they are commonly sold in the markets for making a refreshing acid drink in hot weather. For this purpose the tubers are soaked for two days in water, then pounded, and the liquid frozen. They are also eaten by the natives of Sierra Leone, and will yield by expression a mild inodorous oil.—'Pharmaceutical Journal,' vol. vi., 1876, pp. 748 and 772, &c.

Distribution: Upper Guinea.

Scirpus maritimus, L.—Marsh plant, one to three feet high. When fresh it is said to make a fair forage.—'Punjab Plants,' Dr. Stewart.

Distribution: Upper Guinea.

GRAMINEÆ.

Kodon of India (*Paspalum scrobiculatum*, L.).—Smooth, herbaceous, annual grass, extensively cultivated in India by the natives for the grain, which

forms a cheap article of diet with the poorer classes, but is not considered wholesome, as it produces diarrhœa. A curious fact connected with this grass is its liability to produce a sort of intoxication, which is vouched for by many authorities. The straw is given to cattle, and is readily eaten by them, whether green or dry.—'Economic Products of India,' Watt, part vi., No. 557, &c.

Distribution : Cape Verd Islands, Upper Guinea.

Fundi, Fundungi or Hungry Rice, Sierra Leone Millet (*Paspalum exile*, Kippist).—Slender grass, much cultivated and esteemed in Sierra Leone and other places on the African Coast, where it is known by the Foulahs, Joloffs and other native tribes under the name of Hungry Rice. When cut down it is tied up in small sheaves and placed in a dry situation within the hut. The grain is trodden out with the feet, and is then parched or dried in the sun, to allow the more easy removal of the chaff in the process of pounding, which is performed in wooden mortars; it is afterwards winnowed with a kind of cane fanner or mats. The grain is prepared for food in various ways; but it should be well washed in cold water and afterwards washed in boiling water, in which case the grain will be white and perfectly free from gritty matter.—'Simmonds's Commercial Products of the Vegetable Kingdom,' p. 310.

Distribution : Upper Guinea.

Paspalum distichum, Burm.—A creeping swamp grass. It keeps beautifully green throughout the year, and affords a sufficiently tender blade for feed. —'Select Plants,' Mueller, p. 157.

Distribution: Upper Guinea, St. Thomas.

Sawan or Sanwan of India (*Panicum frumentaceum*, Roxb.).—Annual herbaceous grass. The grain is wholesome and nourishing, and is a favourite one for home consumption amongst the poorer classes of India. The Hindus consider it to be a very pure grain, and use it for religious offerings in preference to all others. The stalks are used as fodder for cattle. —'Field and Garden Crops of the N. W. Provinces and Oudh,' Duthie and Fuller, part ii., p. 3, &c.

Distribution: Upper Guinea. (Cultivated.)

Panicum sanguinale, L. (*P. horizontale*, Mey.).—Annual tufted grass. Stock is said to relish this grass.—'Select Plants,' Mueller, p. 154.

Distribution: Upper Guinea.

Many-flowered tall Millet or Guinea Grass (*Panicum maximum*, L.).—Perennial grass, attaining the height of eight feet in the tropics. It is highly nutritious.— 'Select Plants,' Mueller, p. 153.

Distribution: Upper Guinea.

Setaria verticillata, Beauv. (*Panicum verticillata*, L.). —Annual grass. Cattle eat it when young, before the flower spikes are formed. The seeds are eaten

by small birds.—'Economie Products of India,' Watt, part vi., No. 727.

Distribution: Cape Verd Islands.

Bur Grass of Jamaica (*Cenchrus echinatus*, L.).—Annual. This species is considered to be a wholesome and pleasant food for all sorts of cattle.—'Hortus Jamaicensis,' Lunan, p. 126.

Distribution: Upper Guinea.

Dhaman of Punjab (*Pennisetum cenchroides*, Rich.).—This grass is esteemed extremely fattening for cattle. In the dry parts round Multan the seeds are used by the natives as food.—'Punjab Products,' Powell, p. 245; 'Economic Products of India,' Watt, part vi., No. 559.

Distribution: Cape Verd Islands.

Kous of Gambia, Gero, Afriean Millet, Bajra of India, &c. (*Pennisetum typhoidium*, Rich. [*Penicillaria spicata*, Willd.]).—Tall, ereet grass, cultivated in Western Africa for the grain. On the Gold Coast the natives reduce it to a fine meal with grinding stones, and then make it into a kind of bread resembling the kankie; it is mostly eaten by the upper ranks, or is confined in other localities for use at sacred festivities. At Bathurst the Joloffs and neighbouring races prepare a favourite dish from this millet, and in Bornou, where it is known under the name of "gussub," it is eaten either raw or after having been parehed in the sun;

bruised and steeped in water it forms the travelling stock of pilgrims and soldiers. Independently of an inebriating liquor, another pleasant drink is made from "gussub," and is highly prized by travellers for its tonic and refrigerant properties. Animals and birds also feed on the seed.—'Pharmaceutical Journal,' vol. xi., 1852, p. 396, &c.

Distribution: Upper Guinea.

Pennisetum dichotomum, Delil.—In Bornou and other adjacent kingdoms the seeds of this grass are known under the name of "kasheia," and are prepared for food by being denuded of their husks, dried in the sun and well pounded or bruised, after which they are converted into a kind of bazeen, or eaten like rice. In Egypt and Arabia this plant constitutes the common fodder of camels and asses, and is also employed to thatch the native huts. Birds are said to be very partial to the grain.—'Pharmaceutical Journal,' vol. xi., 1852, p. 399.

Distribution: Western Africa.

Job's Tears (*Coix Lachryma*, L.).—Erect grass. The round shining fruits are used as beads for necklaces in Sierra Leone, and also in other countries where the plant grows. Its medicinal properties are said to be strengthening and diuretic.—'Treasury of Botany,' Lindley and Moore, &c.

Distribution: Cultivated in Sierra Leone.

Maize, Ebru (Fante), Abblé (Akkrah), Birrie or Abirrie (Popo), Agbahdo (Yoruba), Beakpa (Bonny), Ebocboat (Old Calabar), M'bah (Gabon), Massah (Congo), (*Zea Mays*, L.).—Annual cane-like grass, growing to a height of four to five feet. Maize possesses the nutritive properties of the cereal grains generally; but it is especially remarkable amongst them for its fattening quality, which depends on its containing a larger amount of fatty matter than any other of these grains. It is enormously used in warm countries as we use wheaten flour, and on the West Coast of Africa is prepared into a kind of bread called "kankie," and also a favourite beverage known as "pitto," or "peto." In India the green cobs are gathered and cooked like peas or asparagus, and afford a very agreeable article of food; and the mature cobs are also roasted and eaten. In South America a kind of beer called Chica or Maize beer is made from the grain, and is extensively used. The finer qualities of Maize starch are largely used as a substitute for arrowroot, and for making biscuits; while the lower grades serve for laundry purposes. Maize also yields a limpid yellowish oil which burns well and is a good lubricant. The leaves afford a fibre capable of being spun and woven like flax, and ultimately a pulp from which a most beautiful paper can be produced.—'Pharmaceutical Journal,' 1852, vol. xi., p. 348; 'Medicinal Plants,' Bentley and Trimen, No. 296; 'Spon's Encyclopædia of the

Industrial Arts, Manufactures and Commercial Products,' pp. 1415 and 1823, &c.

Distribution : Cultivated largely in W. Africa.

Rice (*Oryza sativa*, L.).—This plant is cultivated in various countries of Western Africa. In Haussa, Nufe, and Yoruba considerable quantities are annually reared for the native markets. In the vicinity of Rabbah and other Fellata towns near the confluence of Tsadda, extensive tracts of land are constantly irrigated for its production, while the swampy expansions and fertilized banks of the Kowara and its tributaries are rendered available for its cultivation. The Kroo coasts yield the largest amount of this important grain, and the numerous rivers intersecting the country between them and the Senegal northwards, where it is so plentifully sown as to comprehend the chief article of food on which the inhabitants of many localities have to subsist. Converted by the Fantes into kankie-cakes, and by the Mandingoes into various preparations, it is considered to be one of the most healthy and nutritious of farinaceous products consumed by the natives. In the East, rice is one of the most important articles of food of the poorer classes. In India a coarse kind of confection is made from it and sold in the bazaars, and in many districts rice-straw is almost the only food which cattle have. In medicine rice makes an excellent demulcent refrigerant drink in febrile and inflam-

matory diseases, dysuria, &c.; and poultices of it are often used, and form an excellent substitute for linseed meal. Starch is an important product of rice, and sometimes has a percentage of as much as 85 per cent. In Japan a spirit known under the name of "Sake" is very extensively distilled from this grain, and forms an important article of commerce of that country.—'Pharmaceutical Journal,' vol. xi., 1852, p. 400; 'The Useful Plants of India,' Drury, p. 321, &c.

Distribution: Generally cultivated in West Tropical Afrcia.

Imperata arundinacea, Cyrill.—Small grass much used by the Bengalese for thatching. The Telingas use it in their marriage ceremonies. As a fodder plant it is not of much use, as cattle refuse it, except when it is quite young and when none other can be obtained.—'Economic Products of India,' Watt, part vi., No. 411.

Distribution: Upper Guinea.

Sugar-cane (*Saccharum officinarum*, L.).—A very large perennial herb cultivated in all suitable countries throughout the world, and especially in the West Indies, Mauritius, British Guiana, &c. There are many varieties recognised by cultivators, depending upon the thickness, texture, and colour of the stem. Sugar is the expressed juice of the stem, which by boiling and other processes becomes crystallised, and is called

Brown sugar; after having been refined and cast in conical moulds it is known as Lump or Loaf sugar, the uncrystallised portion being Treacle or Molasses; from the scum and rough portions of the latter Rum is distilled. The domestic uses of sugar are very numerous; it is a powerful antiseptic, and is largely used for preserving meat and fruit, but is considered of little importance from a medical point of view. Treacle is used in pharmacy to give cohesiveness to pill-masses, to preserve them in a softened state, and to prevent mouldiness, &c. Megasse or Bagasse, the refuse cane after the juice has been extracted and which has hitherto been used only as fuel, contains a fibre that may be utilized for paper-making. A ton of Bagasse will yield about 650 pounds of fibre, while every ton of the latter can be converted into 1500 pounds of pulp; numerous experiments have satisfactorily ascertained that paper of an excellent quality can be made from this substance.—'Dictionary of Economic Plants,' Smith; 'Medicinal Plants,' Bentley and Trimen, No. 298; 'The Paper-maker's Monthly Journal,' March 19, 1884, &c.

Spear Grass (*Heteropogon contortus*, R. and S. [*Andropogon contortus*, L.]).—Stems erect, one to two feet high. Cattle are said to eat this grass when fresh; it also makes good hay when the seeds fall off. The leaves afford a fibre suitable for paper-making; the yield is 50 per cent. of half stuff, and

25 per cent. of paper pulp bleached.—Kew Museum, &c.

Distribution : Upper Guinea, Cape Verd Islands.

Ginger or Lemon Grass, &c. (*Andropogon Schœnanthus*, L.).—Erect perennial plant. An essential oil known as Lemon grass, often also as "rusa" or rose, and Geranium oil is the produce of this species. The leaves are distilled in the Khandesh collectorate of the Bombay Presidency. The oil produced in the Namar district of the Nerbudda Valley is sometimes called grass oil of Namar. The export of the oil from Bombay during the year ending March, 1867, was 41,643 lbs; it is shipped to England and the Ports of the Red Sea, and its largest consumption is for the adulteration of Otto of Rose. The fresh leaves are much used in India as a substitute for tea, and the fully-developed leaves roasted are considered by Indian practitioners as an excellent stomachic. The white succulent centre of the culms is often put into curries as a flavouring agent. The whole plant has an aromatic bitter flavour, and is said to be much liked by cattle.—'Spon's Encyclopædia of the Industrial Arts, Manufactures and Commercial Products,' p. 1422 ; Lindley's 'Flora Medica,' p. 612, &c.

Distribution : Upper Guinea.

Sangare-Sangue (*Andropogon* sp.).—The fruiting

spikes of this plant are used in medicine at Bembi.—Kew Museum.

Indian Millet or Guinea Corn, Dawa of Nupe, &c. (*Sorghum vulgare*, Pers.).—A tall handsome grass, bearing numerous small corn grains which are very valuable as food. In the Nupé country Dawa is sown in April, and the crop ripens about Christmas, and forms a considerable part of the food of the natives. The sheathing leaves often assume a purple tint, and are then employed by the natives as a crimson dye for mats, nets, and cotton fabrics. Baskets, brushes, &c. are made of the spikelets, and brushes are made of the roots. In India the dry stalks and leaves are chopped up into small pieces, and used as fodder.—'Field and Garden Crops of India,' Duthie and Fuller, part i., p. 25.—Kew Museum.

Distribution: Generally cultivated in Guinea.

Johnson Grass (*Sorghum halepense*, Pers.).—Perennial. This grass is being introduced on the low wet prairie lands of Texas, and the reports are quite favourable. It is essentially a hay grass, and may be cut three or four times a year. It should always be cut before the seed stalks run up, else it will be too coarse. It is also said to make a good pasture grass. —'Department of Agriculture Report,' 1881 and 1882, Washington, p. 239, &c.

Distribution: Upper Guinea.

Dog's-tooth Grass (*Cynodon Dactylon*, Pers.).—Annual creeping grass. The long rhizomes or runners and the rapid growth of this species render it an excellent sand-binder. The leaves yield a tolerable fodder for cattle and sheep. In India it is considered the best pasture grass, and is known as Doorba or Durva. From the roots a cooling drink is said to be made, and at Naples they are used as food for horses. This plant has also been recommended as a substitute for sarsaparilla.—'The Useful Plants of Great Britain,' Sowerby, p. 291; 'The Vegetable Kingdom,' Robert Hogg, p. 821, &c.

Distribution: Cape Verd Islands.

Sangala-la (*Eragrostis fascicularis*, Trin.)—The internodes of this grass are used on the Coast of Angola by the natives for making bird-cages.—Kew Museum.

Distribution: Lower Guinea.

Filices.

Maiden-hair Fern (*Adiantum Capillus Veneris*, L.)—In Italy a syrup is made from the fronds of this fern, and is known as Capillaire. Many medicinal virtues are ascribed to Capillaire by Dioscorides and ancient writers, but as a medicine it is now obsolete, except as a remedy for coughs. Capillaire is used at the present day as a hair producer, but its chief use is for

making a refreshing drink, which is diluted with water before use. Most of the Capillaire sold in London is composed of syrup flavoured with orange flowers.—'Dictionary of Economic Plants,' Smith, p. 91.

Distribution: Cape Verd Islands.

LICHENS.

Ramalina scopulorum, Ach.—This lichen has been used to yield a red dye. So high an opinion did Lightfoot form of its tinctorial qualities, that he spoke of it as a formidable rival to *Roccellæ*.—'Popular History of British Lichens,' Lindsay, p. 142.

Distribution: Cape Verd Islands.

Orchella Weed, Dyer's Weed, Rock Moss (*Roccella tinctoria*, DC.).—Perennial thallophyte, two to six inches high. Litmus, a colouring matter obtained from this and other species of *Roccella*, is prepared chiefly if not exclusively in Holland, and usually enters commerce in the form of rectangular cakes, from a quarter of an inch to an inch in length, which are light, friable, finely granular, and of an indigo-blue or deep violet colour. Litmus is used as a test for acids and alkalis, for which purpose it is made officinal in the British Pharmacopœia and the Pharmacopœia of India. Orchil, Archil and Cudbear are colouring matters which are also prepared from the same lichens as those from which litmus is manufactured, and are used for staining and

dyeing purple and red colours, and also occasionally as tests for acids and alkalis. A decoction of Orchella weed is said to possess mucilaginous, emollient and demulcent properties, and to be useful in coughs and catarrhs and in other cases where such properties are required.—'Medicinal Plants,' Bentley and Trimen, vol. iv., No. 301.

Distribution: Upper Guinea, Cape Verd Islands.

APPENDIX I.

INSTRUCTIONS FOR COLLECTING PLANTS AND SEEDS FOR THE GARDEN AND THE HERBARIUM, AND THE USEFUL PRODUCTS OF VEGETABLES.—ROYAL GARDENS, KEW.

I. HORTICULTURAL DEPARTMENT.

PLANTS for *cultivation* may be introduced,—1. As SEEDS, BULBS, and TUBERS, which are easily collected and transmitted: the *Seeds* to be gathered when quite ripe and each kind folded in dry paper, then enclosed as a parcel, or placed in a box, and kept in an airy part of the cabin during the voyage. *Bulbs* and *Tubers* to be taken, if possible, when the foliage is withered, and similarly packed.—2. CUTTINGS. Most *succulent* plants, should be severed where there is a constriction or articulation in the stem; and these, when carefully freed from extraneous moisture, will bear a long voyage, packed in a box, with paper wrapped about them, or any dry elastic substance to keep them steady.—3. ROOTED PLANTS: some of these, such as *small Cactuses*, *Aloes*, *Tillandsias*, *Zamias*, and the various epiphytal tropical *orchidaceous* plants will travel safely if placed in a box, like the cuttings just noticed, the larger kinds packed with straw. But others require a Wardian case, forming a small portable greenhouse. In it the young rooted plants

should be established, in soil about six inches deep, the surface of the mass secured by a little moss and transverse splints (to confine the roots in the event of the box being overturned); moderately watered; the glazed lid fastened on with screws and putty. The case must be placed on deck during the voyage, occasionally protected from the too powerful rays of the sun, and the contents will require no watering or attention unless the glass should be broken during the voyage.

II. MUSEUM DEPARTMENT.

The Commissioners of Her Majesty's Works, &c., having been pleased to form a Museum of Economic Botany within the Royal Gardens, the Director solicits the co-operation of Her Majesty's Ministers and Consuls in foreign countries, of the Governors of Her Majesty's Colonies, of Officers in the Army and Navy, Merchants and Travellers generally, to aid in contributing specimens towards so desirable an object.—The design is to bring together in one spot and to exhibit such interesting vegetable products from all parts of the world, as cannot be shewn in the *living* plants of a garden, nor in the preserved ones of an *Herbarium*. The public may indeed see in our stoves the rare *Lace tree* of Jamaica, the still rarer *Ivory Palm-nut* of the Magdalena, the *Bread-fruit tree* from the Friendly Islands, &c.; but the interest of these is greatly enhanced, if, within the walls of the same Establishment, the curious and beautiful Lace of the first, the fruit and ivory-like seeds of the second, and the celebrated bread-fruit of the third, can also be inspected.—Among the objects, therefore, which are to be collected and deposited, arranged and named in the Museum, are—1. FRUITS and SEEDS, especially those which are of *large* size, or possess any peculiarity of form or structure entitling them to notice. Many of these are naturally dry and require little care (except to be freed from moisture) previous to packing. Those that, when ripe, burst open into valves, or separate by their scales, as *Pine-cones*, &c., should be bound round with pack-thread. The soft and fleshy fruits can only be preserved in wide-mouthed bottles, or jars, or casks, (ac-

cording to size,) in alcohol, as rum, arrack, or in diluted pyroligneous acid or strong brine.—2. ENTIRE PLANTS, or parts of them. Many have a very *fleshy* character, and ought to be preserved entire, in alcohol; or portions of the stem and branches (according to their size) with flowers and fruit; such as those of *Palms*, *Stapelia*, *Rafflesia*, and others of a similar kind.—3. TRUNKS of TREES, portions and sections of them, especially when they exhibit any remarkable structure; as *Palms*, and many other *Monocotyledonous* plants, and *Tree Ferns*. Specimens of Wood should be in sections, a foot or more long, and about the average diameter of the tree. The kinds used in commerce for veneering, cabinet-work, or other useful purposes, or such as recommend themselves by their beauty, hardness, or any other valuable quality, are particularly desired. *The scientific or other names should be attached, and specimens of the leaves and flowers to identify them.*—4. GUMS and RESINS, VEGETABLE WAXES, especially those employed in the Arts or in Domestic Economy.—5. DYE STUFFS of various kinds.—6. MEDICINAL SUBSTANCES. These latter are of vast importance, and merit the attention of travellers in every country. Of many it is not yet known, except to the natives who collect and prepare them, what are the particular plants that afford them, nor how they are prepared. —7. GENERAL PRODUCTS of VEGETABLES; *in the state of the raw material, and manufactured.* It would be extremely difficult, not to say impossible, to enumerate all of these which a Museum ought to contain; but the enlightened traveller can form a pretty correct judgment. Such as are *useful to mankind* cannot fail to be interesting. It would be idle to send every *well-known* object of this kind, *Tea*, *Sugar*, *Coffee*, *Cocoa*, *Chocolate*, *Paper*, *Textiles*, *Platting*, *Basket-work*, *Clothing*, *&c.;* but there are states, even of these familiar articles, which will prove both useful and instructive. Paper, for example, is made from an infinite variety of vegetable substances, and the different sorts are well worth collecting; from that afforded by the *Papyrus* of the ancients (which gives the name) to what is manufactured out of the inner bark of an East Indian *Daphne* (or Spurge-laurel), and another from the pith of a little known plant in

China (the so-called *Rice-paper*), or the leaves of a *Palm* in India, or *Straw* in North America. Of all such, the several states of preparation should be collected and exhibited, not only as objects of curiosity, but as exemplifying the progress of Art and Science.

In case of samples of timber, of various fibres, dye-stuffs, drugs, or any other vegetable product, it is of the first importance that there should be sent along with each example a dried specimen of the leaves and flowers of the tree or plant affording the same, marked distinctly with a corresponding number, so that the source of the product may be scientifically determined. Through want of such dried specimens accompanying the timbers, drugs, fibres, &c., which have been sent to the Royal Gardens, and to the International Exhibition, a large number are absolutely useless.

III. HERBARIUM DEPARTMENT.

In preserving *Plants* for the Herbarium, or Hortus Siccus, the object is to prepare specimens in such a manner that they may be thoroughly dried, the colours as far as possible retained, and such a degree of pressure given that they do not curl up in drying. For this purpose provide a quantity of paper of a common folio size, brown, or stout grey, moderately absorbent, 16 inches by 10, folded. Two boards are requisite, of the size of the paper, one for the top, the other for the bottom, of each mass of papers. Pieces of paste- or mill-board placed between the papers, if the specimens are numerous or particularly thick or woody, are very useful. For pressure, nothing is better than a heavy weight on the topmost board, or, while travelling, three leathern straps and buckles; two to bind the boards and papers transversely, and one longitudinally. Thus provided, gather your specimens, if small, root and stem—if large, cut off portions of the branches, a foot or rather more in length, always selecting those in flower and in a more or less advanced state of fruit. Long, slender plants, as *Grasses*, *Sedges* and many *Ferns*, may be doubled once or twice. Place them, before they wither, side by side, but never one upon

the other on the same sheet, taking care that one part is not materially thicker than the other, and lay over the specimens one, two, three, or more sheets of paper, according to its thickness or the thickness of your plants; and so on, layer above layer of paper and specimens, subjecting them then to pressure. In a day or two, according to the more or less succulent nature of the plants, or to the nature of the climate, remove them successively into fresh papers till the moisture is absorbed, and dry the spare papers in the sun or by a fire for future use.

A tin box or *Vasculum* is essential, made to shut close, to prevent evaporation, in which the plants will, if required, remain uninjured a day and night, especially if the box is well filled. Some very succulent plants, and those of the Heath and Pine tribe, are the better for being plunged into boiling water for an instant before they are pressed. A portfolio slung over the shoulder and containing a few quires of drying paper to receive the plant as gathered, is employed by many collectors.

When sufficiently dry, the specimens should be put into papers; one sheet or folio (more if the specimens be thick) between each layer of plants; and thus a great many may be safely arranged in a small compass: and are ready for transport covered with oil-cloth or packed in boxes. *Mosses* and other *Cryptogamic* plants may be generally dried in the common way, those which grow in tufts being separated by the hand, so as to form neat specimens. Most *sea-weeds* require a slight washing in fresh water, and common blotting paper is the best for removing the moisture from this tribe of plants.

Parcels or packages which may come by Her Majesty's ships, or by any of the Royal Mail, or Peninsular and Oriental Company's Steamers, should be addressed:

"On *Her Majesty's Service.* For the Royal Gardens, Kew.
"W. T. Thiselton Dyer, Director;
"Royal Gardens, Kew,
"LONDON."

APPENDIX II.

ORNITHOLOGY OF THE GAMBIA.

By Captain G. E. Shelley, F.Z.S., &c.

ORDER I. ACCIPITRES.

Suborder I.—Falcones.

Fam. Falconidæ.

1. Polyboroides typicus, Smith, S. Afr. Q. J. 1830, p. 107; id. Ill. Zool. S. Afr. pls. 81, 82; Hartl. W. Afr. pp. 2, 269; Sharpe, Cat. B. Brit. Mus. i. p. 48; Rochebrune, Seneg. p. 35.

2. Circus macrurus (Gm. *Accipiter*), N. Comm. Petrop. xv. 1877, p. 439, pl. 8; Sharpe, Cat. B. Brit. Mus. i., p. 67; Rochebrune, Seneg. p. 37; *Circus swainsonii*, Hartl. W. Afr. p. 16; Dresser B. Eur. v. p. 441, pl. 330.

3. Melierax monogrammicus (Temm. *Falco*), Pl. Col. 1824, pl. 314; *Astur monogrammicus*, Swains B. W. Afr. i. p. 114, pl. 4; Hartl. W. Afr. p. 13. *Asturinula monogrammica*, Sharpe, Cat. B. Brit. Mus. i. p. 275. *Kaupifalco monogrammicus*, Rochebrune, Seneg. p. 45.

4. Gypohierex Angolensis (Gm. *Falco*), S. N. i. 1788, p. 252; Gray Gen. B. i. pl. 4; Hartl. W. Afr. pp. 1,

246; Sharpe, Cat. B. Brit. Mus. i. p. 312; Rochebrune, Seneg. p. 58.

5. Milvus Ægyptius (Gm. *Falco*), S. N. i. 1788, p. 261; Sharpe, Cat. B. Brit. Mus. i. p. 320; Rochebrune, Seneg. p. 59. *Le Parasite*, Levaill. Ois. Afr. i., pl. 22. *Milvus parasiticus*, Hartl. W. Afr. p. 10.

6. Elanus cæruleus (Desf. *Falco*), Mem. Ac. R. Sciences, 1787, p. 503, pl. 15; Sharpe, Cat. B. Brit. Mus. i. p. 336; Dresser, B. Eur. v. p. 663, pl. 363; Rochebrune, Seneg. p. 61. *Elanus melanopterus*, Hartl. W. Afr. p. 11.

7. Falco ardesiacus, Vieill. Euc. Méth. i. 1823, p. 1238; Hartl. W. Afr. p. 9. *Falco concolor*, Swains, W. Afr. i. p. 112, pl. 3. *Cerchneis ardesiaca*, Sharpe, Cat. B. Brit. Mus. i. p. 446; Rochebrune, Seneg. p. 67.

Suborder II.—Striges.

Fam. 1. Bubonidæ.

8. Scops leucotis (Temm. *Strix*), Pl. Col. pl. 16; Hartl. W. Afr. p. 20; Sharpe, Cat. B. Brit. Mus. ii. p. 97; Rochebrune, Seneg. p. 73.

9. Glaucidium perlatum (Vieill. *Strix*), N. Dict. vii. p. 26; Sharpe, Cat. B. Brit. Mus. ii. p. 209; Rochebrune, Seneg. p. 74. *La Chevêchette perlée*, Levaill. Ois. Afr. vi. pl. 284. *Athene perlata*, Hartl. W. Afr. p. 17.

Fam. 2. Strigidæ.

10. Strix flammea, Linn. S. N. i. 1766, p. 133; Hartl. W. Afr. p. 21; Sharpe, Cat. B. Brit. Mus. ii. p. 291; Dresser, B. Eur. v. p. 237, pl. 302; Rochebrune, Seneg. p. 79. *Strix insularis et S. poensis*, Rochebrune, t. c.

ORDER II. PSITTACI.

11. Palæornis docilis (Vieill. *Psittacus*), N. Dict. xxv. 1817, p. 343; Reichenow, J. f. O. 1881, p. 236. *Palæornis torquatus*, Swains. W. Afr. ii. p. 174, pl. Vignette; Hartl. W. Afr. p. 166. *Palæornis parvirostris*, Rochebrune, Seneg. p. 81.

12. Pæocephalus senegalus (Linn. *Psittacus*), S. N. i. 1766, p. 149; Reichenow, J. f. O. 1881, p. 384; id. Vogelb. pl. 7, fig. 2; Rochebrune, Seneg. p. 88; *Psittacus senegalus*, Hartl. W. Afr. p. 168.

ORDER III. PICARIÆ.

Fam. 1. Picidæ.

13. Mesopicus goertan (P. L. S. Müll, *Picus*), S. N. Suppl. 1776, p. 91; Malh. Monogr. Pic. ii. pl. 63, figs. 1, 2; Hargitt, Ibis, 1883, p. 412; Rochebrune, Seneg. p. 92; *Dendropicus goertan*, *D. poliocephalus et D. immaculatus*, Hartl. W. Afr. pp. 179, 180. *Mesopicus immaculatus*, Rochebrune, Seneg. p. 91.

14. Campothera punctata (Valenc. *Picus*), Dict. Sc. Nat. xl. 1826, p. 171; Hargitt, Ibis, 1883, p. 463; *Dendromus punctuligerus*, Hartl. W. Afr. p. 180. *Chryspicus punctuligerus*, Malh. Monogr. Pic. ii. p. 92, figs. 4–6; Rochebrune, Seneg. p. 95.

Fam. 2. Capitonidæ.

15. Pogonorhynchus dubius (Gm. *Bucco*), S. N. i. 1788, p. 109; Marshall's Monogr. Capit. p. 7, pl. 4; Rochebrune, Seneg. p. 106. *Pogonias dubius*, Hartl. W. Afr. p. 169.

16. P. vieilloti (Leach, *Pogonias*), Zool. Misc. 1815, p. 97; Marshall's Monogr. Capit. p. 21, pl. 11; Rochebrune, Seneg. p. 108. *Pogonias vicilloti*, Hartl. W. Afr. p. 170.

Fam. 3. Alcedinidæ.

17. Corythornis cyanostigma (Rüpp. *Alcedo*), Neue Wirb. 1835–40, p. 70, pl. 24, fig. 2; Rochebrune, Seneg. p. 141. *Alcedo cristata*, Hartl. W. Afr. p. 36. *Corythornis cristata*, Sharpe, Monogr. Alced. p. 35, pl. 11.

18. Ceryle rudis (Linn. *Alcedo*), S. N. i. 1766, p. 181; Hartl. W. Afr. p. 37; Sharpe, Monog. Alced. p. 61, pl. 19; Rochebrune, Seneg. p. 142.

19. C. maxima (Pall. *Alcedo*), Spic. Zool. fasc. iv. 1769, p. 14; Hartl. W. Afr. p. 37; Sharpe, Monogr. Alced. p. 67, pl. 20; Rochebrune, Seneg. p. 143.

20. Halcyon Senegalensis (Linn. *Alcedo*), S. N. i. 1766, p. 180; Hartl. W. Afr. p. 31; Sharpe, Monogr. Alced. p. 191, pl. 70; Rochebrune, Seneg. p. 146.

21. H. Malimbica (Shaw, *Alcedo*), Gen. Zool. viii. 1812, p. 66; Sharpe, Monogr. Alced. p. 195, pl. 72; Rochebrune, Seneg. p. 146; *Halcyon cinereifrons*, Hartl. W. Afr. p. 32.

Fam. 4. Bucerotidæ.

22. Tockus nasutus (Linn. *Buceros*), S. N. i. 1776, p. 154 *Buceros nasutus*, Hartl. W. Afr. p. 163. *Lophoceros nasutus*, Elliot, Monogr. Bucerotidæ, pl. 47; Rochebrune, Seneg. p. 119.

23. T. semifasciatus (Hartl. *Buceros*), J. f. O. 1885, p. 356; Elliot Monogr. Bucerotidæ, pl. 50, fig. 2; Rochebrune, Seneg. p. 120. *Buceros semifasciatus*, Hartl. W. Afr. p. 163.

24. T. erythrorhynchus (Temm. *Buceros*), Pl. Col. 1824, texte to pl. 283; Elliot, Monogr. Bucerotidæ, pl. 56; Rochebrune, Seneg. p. 121; *Buceros erythrorhynchus*, Hartl. W. Afr. p. 165.

Fam. 5. Upupidæ.

25. Irrisor Senegalensis (Vieill. *Falcinellus*), N. Dict. xxviii. p. 168; Hartl. W. Afr. p. 43; *Promerops Senegalensis*, Swains. W. Afr. ii. p. 117; *Irrisor melanorhynchus*, Gray Gen. B. i. pl. 31. *Irrisor erythrorhynchus*, Rochebrune, Seneg. p. 154.

Fam. 6. Meropidæ.

26. Merops Nubicus, Gen. S. N. i. 1788, p. 464; Hartl. W. Afr. p. 41; Rochebrune, Seneg. p. 149; Dresser, Monogr. Meropidæ, p. 86, pl. 20; *Merops cæruleocephalus*, Swains. W. Afr. ii. p. 87, pl. 9.

27. M. Persicus, Pall. Reise Russ. Reichs. ii. Anh. 1773, p. 708; Dresser, Monogr. Meropidæ, p. 63, pl. 14; *Merops savigni*, Swains. W. Afr. ii. p. 77, pl. 7; Hartl. W. Afr. p. 38. *Merops superciliosus*, Rochebrune, Seneg. p. 147.

28. Melittophagus pusillus (P. L. S. Müll. *Merops*), S. N. Suppl. 1776, p. 95; Dresser, Monogr. Meropidæ, p. 111, pl. 25. *Merops erythropterus*, Swains. W. Afr. ii. p. 88; Hartl. W. Afr. p. 40; *Merops variegatus*, Hartl. p. 39. *Melittophagus erythropterus*, Rochelbrune, Seneg. p. 150.

29. M. bullocki (Vieill. *Merops*), N. Dict. xiv. 1817, p. 13; Dresser, Monogr. Meropidæ, p. 133, pl. 32; Rochebrune, Seneg. p. 151. *Merops cyanogaster*, Swains. W. Afr. ii. p. 80, pl. 7. *Merops bullockii*, Hartl. W. Afr. p. 41.

Fam. 7. Coraciidæ.

30. Coracias nævia, Dand. Traité Orn. ii. 1880, p. 259; Sharpe, Ibis, 1871, p. 190; Rochebrune, Seneg. p. 133; *Le Rollier varié dans son jeune âge*, Levaill. Rolliers, pl. 29; *Coracias nucalis*, Swains. W. Afr. ii. p. 110; Coracias pilosa, Hartl. W. Afr. p. 30.

31. C. GARRULA, Linn. S. N. i. 1766, p. 159; Hartl. W. Afr. p. 29; Sharpe, Ibis, 1871, p. 189; Dresser, B. Eur. v. p. 141, pl. 293; Rochebrune, Seneg. p. 132.

32. C. ABYSSINICA, Bodd. Tabl. Pl. Enl. 1783, p. 626; Hartl. W. Afr. p. 30; Sharpe, Ibis, 1871, p. 197; Rochebrune, Seneg. p. 132; *Le Rollier à longs brins d'Afrique*, Levaill. Rolliers, pl. 25.

33. C. CYANOGASTRA, Cuv. Règne Anim. i. 1817, p. 401; Swains. W. Afr. ii. p. 108, pl. 13; Hartl. W. Afr. p. 30; Sharpe, Ibis, 1871, p. 202; Rochebrune, Seneg. p. 135.

34. EURYSTOMUS AFER (Lath. *Coracias*), Ind. Orn. i. 1790, p. 172; Hartl. W. Afr. p. 28; Sharpe, Ibis, 1871, p. 274; Rochebrune, Seneg. p. 135. *Le petit Rolle violet*, Levaill. Rolliers, pl. 35. *Eurystomus rubescens*, Swains. W. Afr. ii. p. 112.

Fam. 8. CUCULIDÆ.

35. CUCULUS GULARIS, Steph. Gen. Zool. ix. pt. 1, 1815, p. 83, pl. 17; Hartl. W. Afr. p. 189; Sharpe P. Z. S. 1873, p. 585; Rochebrune, Seneg. p. 97; *Cuculus lineatus*, Swains. W. Afr. ii. p. 178, pl. 18; *Cuculus aurantiirostris*, Sharpe P. Z. S. 1873, p. 591.

36. CHRYSOCOCCYX CUPREUS (Bodd. *Cuculus*), Tabl. Pl. Enl. 1783, p. 40; Rochebrune, Seneg. p. 100; *Le Coucou Didric*, Levaill. Ois. Afr. v. pls. 210, 211; *Chalcites auratus*, Swains. W. Afr. ii. p. 187; *Chrysococcyx auratus*, Hartl. W. Afr. p. 190; *Cuculus cupreus*, Sharpe, P. Z. S. 1873, p. 591.

37. C. KLAASI (Steph. *Cuculus*), Gen. Zool. ix. pt. 1, 1815, p. 129; Hartl. W. Afr. p. 190; Rochebrune, Seneg. p. 101; *Chalcites klaasi*, Swains. W. Afr. ii. p. 189, pl. 21; *Cuculus klaasi*, Sharpe, P. Z. S. 1873, p. 592.

38. COCCYSTES AFER (Licht. *Cuculus*), Cat. Ber. Nat. Hamb. 1793, p. 14; Sharpe, P. Z. S. 1873, p. 596; Roche-

brune, Seneg. p. 102; Variété du Coucu Edolio, Levaill. Ois Afr. v. pl. 209; *Oxylophus vaillauti*, Swains. W. Afr. ii. p. 182; *Oxylophus ater*, Hartl. W. Afr p. 188.

39. Centropus Senegalensis (Linn. *Cuculus*), S. N. i. 1766, p. 169; Swains. W. Afr. ii. p. 185, pl. 20; Hartl. W. Afr. p. 187; Sharpe, P. Z. S. 1873, p. 617: Rochebrune, Seneg. p. 104.

Fam. 9. Musophagidæ.

40. Schizorhis Africanus (Lath. *Phasianus*), Ind. Orn. ii. 1790, p. 631; Hartl. W. Afr. p. 160; Rochebrune, Seneg. p. 125; Schalow, J. f. O. 1886, p. 67; *Chizærhis variegata*, Swains. W. Afr. i. p. 223, pl. 20.

41. Corythaix persa (Linn. *Cuculus*), S. N. i. 1766, p. 171; Hartl. W. Afr. p. 156; Rochebrune, Seneg. p. 127; Schalow, J. f. O. 1886, p. 21.

42. Musophaga violacea, Isert. Schrift. Berlin. Nat. Fr. ix. 1789, p. 18, pl. 1; Swains. B. W. Afr. i. p. 218, pl. 19; Hartl. W. Afr. p. 159; Rochebrune, Seneg. p. 123; Schalow, J. f. O. 1886, p. 13.

Fam. 10. Caprimulgidæ.

43. Caprimulgus ruficollis, Temm. Man. Orn. i. 1820, p. 428; Dresser, B. Eur. iv. p. 635, pl. 273.

44. Scotornis climacurus (Vieill. *Caprimulgus*), Gal. Ois, 1805, p. 195, pl. 122; Swains. W. Afr. ii. p. 66; Hartl. W. Afr. p. 23; *Scotornis longicauda*, Rochebrune, Seneg. p. 160.

45. Macrodipteryx longipennis (Shaw, *Caprimulgus*) Nat. Misc. pl. 265; Hartl. W. Afr. p. 23; Rochebrune, Seneg. p. 160. *Macrodipteryx Africanus*, Swains. W. Afr. ii. p. 62, pl. 5.

Fam. 11. CYPSELIDÆ.

46. CYPSELUS AFFINIS, J. E. Gray, Ill. Ind. Zool. i. 1832, pl. 35, fig. 2; Dresser, B. Eur. iv. p. 59, pl. 267; Rochebrune, Seneg. p. 157. *Cypselus Abyssinicus*, Hartl. W. Afr. p. 24.

ORDER IV. PASSERES.

Fam. 1. HIRUNDINIDÆ.

47. HIRUNDO RUSTICA, Linn. S. N. i. 1766, p. 343; Hartl. W. Afr. p. 26; Sharpe, Cat. B. Brit. Mus. x. p. 126; Dresser B. Eur. iii. p. 477, pl. 160, fig. 1; Rochebrune, Seneg. p. 217.

48. H. SENEGALENSIS, Linn. S. N. i. 1766, p. 345; Swains. W. Afr. ii. p. 72, pl. 6; Hartl. W. Afr. p. 27; Sharpe, Cat. B. Brit. Mus. x. p. 168; Rochebrune, Seneg. p. 219.

Fam. 2. MUSCICAPIDÆ.

49. PLATYSTIRA CYANEA (P. L. S. Mull. *Muscicapa*), S. N. Suppl. 1776, p. 170; Sharpe, Cat. B. Brit. Mus. iv. p. 145; Rochebrune, Seneg. p. 213; *Platystira lobata*, Swains. W. Afr. ii. p. 49: *Platystira melanoptera*, Hartl. W. Afr. pp. 93, 272.

50. TERPSIPHONE CRISTATA (Gm. *Muscicapa*), S. N. i. 1788, p. 938; Sharpe, Cat. B. Brit. Mus. iv. p. 354. *Muscipeta melanogastra*, Swains. W. Afr. ii. p. 55. *Tchitrea melanogathra*, *T. Senegalensis*, *et T. melampyra*, Hartl. W. Afr. pp. 90, 91, 96, 272. *Muscipeta duchailui et M. speciosa*, Cass. Jour. Philad. Ac. iv. pl. 50; *Terpsiphone cristata*, *T. melanogastra*, *et T. Senegalensis*, Rochebrune, Seneg. p. 214.

51. T. NIGRICEPS, Hartl. J. f. O. 1855, pp. 355, 361; Hartl. W. Afr. p. 91; Sharpe, Cat. B. Brit. Mus. iv. p. 359; Rochebrune, Seneg. p. 215.

52. ELMINIA LONGICAUDA (Swains. *Myiagra*), Monogr.

Flyc. in Nat. Libr. x. 1838, p. 210, pl. 25; Hartl. W. Afr. p. 93; Sharpe, Cat. B. Brit. Mus. iv. p. 363; Rochebrune, Seneg. p. 215.

Fam. 3. CAMPOPHAGIDÆ.

53. GRAUCALUS PECTORALIS, Jard. & Selby, Ill. Orn. ii. p. 57, Swains. W. Afr. i. p. 249; Sharpe, Cat. B. Brit. Mus. iv. p. 29; Rochebrune, Seneg. p. 200; *Campephaga anderssoni*, Sharpe, P. Z. S. 1870, pl. 4.

Fam. 4. DICRURIDÆ.

54. DICRURUS ASSIMILIS (Bechet. *Corvus*), Lath, Allg. Uebers. Vög. ii. p. 562. *Edolius lugubris*, Hempr. & Ehr. Symb. Phys. fol. s. pl. 8, fig. 3. *Dicrurus canipennis*, Swains. W. Afr. i. p. 254. *Dicrurus musicus et D. divaricatus*, Hartl. W. Afr. p. 100. *Buchanga assimilis*, Sharpe, Cat. B. Brit. Mus. iii. p. 247. *Buchanga musicus*, Rochebrune, Seneg. p. 200.

Fam. 5. LANIIDÆ.

55. PRIONOPS PLUMATUS (Swains. *Lanius*), Gen. Zool. vii. pt. 2, 1809, p. 290; Swains. W. Afr. i. p. 246, pl. 26; Hartl. W. Afr. p. 107; Sharpe, Cat. B. Brit. Mus. iii. p. 320.

56. CORVINELLA CORVINA (Shaw, *Lanius*), Gen. Zool. vii., pt. 2, 1809, p. 337; Hartl. W. Afr. p. 104; Gadow, Cat. B. Brit. Mus. viii. p. 231; Rochebrune, Seneg. p. 206. *La Grande Piegrieche*, Levaill. Ois. Afr. ii. pl. 78. *Lanius cissoides*, Swains. W. Afr. i. p. 233.

57. LANIUS AURICULATUS, P. L. S. Müll. S. N. Suppl. 1776, p. 71; Gadow, Cat. B. Brit. Mus. viii. p. 283: Dresser, B. Eur. iii. p. 407, pl. 151; *Lanius rufus*, Swains. W. Afr. i. p. 231; Hartl. W. Afr. p. 102; Rochebrune, Seneg. p. 209.

58. TELEPHONUS SENEGALUS (Linn. *Lanius*), S. N. i. 1766, p. 137; Hartl. W. Afr. p. 105; Gadow, Cat. B. Brit. Mus. viii. p. 124; Rochebrune, Seneg. p. 205;

Telephonus erythropterus, Swains. W. Afr. i. p. 235 ; Hartl. W. Afr. p. 106.

59. Dryoscopus Gambensis (Licht. *Lanius*), Verz. Doubl. 1823, p. 48 ; Hartl. W. Afr. p. 110 ; Gadow, Cat. B. Brit. Mus. viii. p. 146 ; Rochebrune, Seneg. p. 204 ; *Malaconotus mollissimus*, Swains. W. Afr. i. p. 240, pl. 23.

60. Laniarius barbarus (Linn. *Lanius*), S. N. i. 1766, p. 137 ; Hartl. W. Afr. p. 107 ; Gadow, Cat. B. Brit. Mus. viii. p. 153 ; Rochebrune, Seneg. p. 201 ; *Malaconotus barbarus*, Swains. W. Afr. i. p. 343, pl. 29.

61. L. poliocephalus (Licht. *Lanius*), Verz. Doubl. 1823, p. 45 ; Gadow, Cat. B. Brit. Mus. viii. p. 156 ; *Malaconotus olivaceus*, Swains. W. Afr. i. p. 237, pl. 22 ; *Laniarius icterus*, Hartl. W. Afr. p. 110 ; Rochebrune, Seneg. p. 204.

Fam. 6. Crateropidæ.

62. Hypergus atriceps (Less. *Moho*), Traité Orn. 1831, p. 646 ; Hartl. W. Afr. p. 80 : Sharpe, Cat. B. Brit. Mus. vii. p. 353 ; Rochebrune, Seneg. p. 167 ; *Crateropus orioloides*, Swains. W. Afr. i. p. 280, pl. 31.

63. Crateropus platycercus, Swains. W. Afr. i. 1837, p. 274 ; Hartl. W. Afr. p. 79 ; Sharpe, Cat. B. Brit. Mus. vii. p. 471 ; Rochebrune, Seneg. p. 166.

64. C. reinwardti, Swains. Zool. Ill. 2nd ser. ii. 1831, pl. 80 ; id. W. Afr. i. p. 276 ; Hartl. W. Afr. p. 79 : Sharpe, Cat. B. Brit. Mus. vii. p. 470 ; Rochebrune, Seneg. p. 166.

Fam. 7. Timeliidæ.

65. Criniger barbatus (Temm. *Trichophorus*), Pl. Col. 1824, pl. 28 ; Sharpe, Cat. B. Brit. Mus. vi. p. 82 ; Rochebrune, Seneg. p. 194 ; *Trichophorus strigilatus*, Swains. W. Afr. i. p. 267 ; *Trichophorus barbatus*, Hartl. W. Afr. p. 82.

66. Pycnonotus barbatus (Desf. *Turdus*), Mem. Ac. R. Sciences, 1787, p. 50, pl. 13; Dresser, B. Eur. iii. p. 353, pl. 142; Sharpe, Cat. B. Brit. Mus. vi. p. 146; Rochebrune, Seneg. p. 197; *Ixos inornatus et I. ashanteus*, Hartl. W. Afr. p. 88; *Pycnonotus ashanteus*, Rochebrune, Seneg. p. 197.

67. Cossypha verticalis, Hartl. Beitr. Orn. W. Afr. in Abh. Geb. Nat. Hamb. ii. pt. 2, 1852, p. 23; id. W. Afr. p. 77; Sharpe, Cat. B. Brit. Mus. vii. p. 45; Rochebrune, Seneg. p. 163; *Petrocincla albicapilla*, Swains. (nec. v.) W. Afr. i. p. 284, pl. 32.

68. Melænornis edolioides (Swains. *Melasoma*) B. W. Afr. i. 1837, p. 257, pl. 27; Hartl. W. Afr. p. 102; Sharpe, Cat. B. Brit. Mus. iii. p. 315; Rochebrune Seneg. p. 211.

Fam. 8. Nectarinidæ.

69. Nectarinia pulchella (Linn. *Certhia*) S. N. i. 1766, p. 187; Hartl. W. Afr. p. 52; Shelley, Monogr. Sun-birds, p. 9, pl. 4; Rochebrune, Seneg. p. 222; *Cinnyris pulchella*, Swains. W. Afr. ii. p. 123, pl. 14.

70. Cinnyris cupreus (Shaw, *Certia*), Gen. Zool. viii. 1812, p. 201; Shelley, Monogr. Sun-birds, p. 191, pl. 58; Rochebrune, Seneg. p. 225; *Cinnyris erythronotus*, Swains. W. Afr. p. 130, pl. 15; *Nectarinia cuprea*, Hartl. W. Afr. p. 48.

71. C. splendidus (Shaw, *Certhia*), Gen. Zool. viii. 1812, p. 191; Swains. W. Afr. ii. p. 125; Shelley, Monogr. Sun-birds, p. 201, pl. 62; Rochebrune, Seneg. p. 223; *Nectarinia splendida*, Hartl. W. Afr. p. 46.

72. C. Senegalensis (Linn. *Certhia*), S. N. i. 1766, p. 186; Swains. W. Afr. ii. p. 127; Shelley, Monogr. Sun-birds, p. 267, pl. 83; Rochebrune, Seneg. p. 224; *Nectarinia Senegalensis*, Hartl. W. Afr. p. 49.

73. C. verticalis (Lath. *Certhia*), Ind. Orn. i. 1790, p. 198; Shelley, Monogr. Sun-birds, p. 301, pl. 97; *Cinnyris chloronatus*, Swains. W. Afr. ii. p. 136,

pl. 16; *Nectarinia cyanocephalus et N. verticalis*, Hartl. W. Afr. pp. 49, 50.

Fam. 9. Motacillidæ.

74. Motacilla alba, Linn. S. N. i. 1766, p. 331; Dresser, B. Eur. iii. p. 233, pl. 126; Sharpe, Cat. B. Brit. Mus. x. p. 464; Rochebrune, Seneg. p. 190: *Motacilla gularis*, Swains. W. Afr. ii. p. 38; Hartl. W. Afr. p. 72.

75. M. campestris, Pall. Reis. Russ. Reichs. iii. Auhang. 1776, p. 697; Sharpe, Cat. B. Brit. Mus. x. p. 510, pl. 6, figs. 1, 2; *Budytes rayi*, Hartl. W. Afr. p. 72; Rochebrune, Seneg. p. 191; *Motacilla raii*, Dresser, B. Eur. iii. p. 277, pl. 131.

76. Anthus pyrrhonotus (Vieill. *Alauda*), N. Dict. i. 1816, p. 361; Sharpe, Cat. B. Brit. Mus. x. 1885, p. 555; *L'Alouette à dos roux*, Levaill. Ois. Afr. iv. pl. 197; *Authus gouldii*, Hartl. W. Afr. p. 73; Rochebrune, Seneg. p. 193.

Fam. 10. Alaudidæ.

77. Galerita cristata (Linn. *Alauda*), S. N. i. 1766, p. 288; Dresser, B. Eur. iv. p. 285, pls. 228, 229; *Alauda Senegalensis*, Hartl. W. Afr. p. 153; *Galerita Senegalensis*, Rochebrune, Seneg. p. 261.

Fam. 11. Fringillidæ.

78 Passer occidentalis, Shelley Ibis, 1883, p. 548; *Pyrgita simplex*, Swains. (nec. Licht.) W. Afr. i. p. 208; *Passer simplex*, Hartl. W. Afr. p. 150; Rochebrune, Seneg. p. 256.

79. Crithagra ictera (Vieill. *Fringilla*), N. Dict. xii. 1817, p. 170; *Crithagra chrysopyga*, Swains. W. Afr. i. p. 206; Hartl. W. Afr. p. 154.

Fam. 12. Ploceidæ.

80. Spermestes cucullatus, Swains. B. W. Afr. i. 1837, p. 201 ; Hartl. W. Afr. p. 147 ; Rochebrune, Seneg. p. 248 ; Shelley Ibis, 1886, p. 309.

81. Lagonosticta senegala (Linn. *Fringilla*), S. N. i. 1766, p. 320; Shelley Ibis, 1886, p. 323; *Petit Sénégali rouge*, Vieill. Ois. Chant. pl. 10; *Estrelda senegala et E. minima*, Hartl. W. Afr. pp. 143, 144; *Lagonosticta senegala et L. minima*, Rochebrune, pp. 254, 255.

82. Estrelda melpoda (Vieill. *Fringilla*) N. Dict. xii. 1817, p. 177 ; Hartl. W. Afr. p. 141 ; Rochebrune, Seneg. p. 251 ; Shelley Ibis, 1886, p. 332 ; *Bengali à joues orangées*, Vieill. Ois. Chant. pl. 7.

83. Hypochera chalybeata (P. L. S. Mull. *Fringilla*), S. N. Suppl. 1776, p. 166 ; Shelley, Ibis, 1886, p. 338 ; *Combac-sou*, Vieill. Ois. Chant. pl. 21 ; *Amadina nitens*, Swains. W. Afr. i. p. 199 ; *Hypochera nitens et H. ultramarina*, Harll. W. Afr. p. 149 ; *Hypochera ænea* et *H. ultramarina*, Rochebrune, Seneg. p. 245.

84. Vidua principalis (Linn. *Emberiza*), S. N. i. 1766, p. 313 ; Hartl. W. Afr. p. 136 ; Rochebrune, Seneg. p. 244 ; Shelley, Ibis, 1886, p. 341 ; *Vidua erythrorhyncha*, Swains. B. W. Afr. i. p. 176, pl. 12.

85. Coliuspasser macrourus (Gm. *Loxia*), S. N. i. 1788, p. 845 ; Shelley, Ibis, 1886, p. 348. *Fringilla flavoptera*, Vieill. Ois. Chant., pl. 41. *Vidua chrysonotus*, Swains. W. Afr. i. p. 178. *Vidua macroura*, Hartl. W. Afr. p. 137. *Penthetria macroura*, Rochebrune, Seneg. p. 242.

86. Pyromelana franciscana (Isert, *Loxia*), Schrift. Berlin Nat. Tr. ix. p. 332 ; Shelley, Ibis, 1886, p. 353. *Euplectes ignicolor*, Swains. W. Afr. i. p. 184. *Euplectes franciscanus*, Hartl. W. Afr. p. 128 ; Rochebrune, Seneg. p. 241.

87. P. Afra (Gm. *Loxia*), S. N. i. 1788, p. 857 ; Shelley

Ibis, 1886, p. 355. *Warabée*, Vieill. Ois. Chant., pl. 28. *Euplectes melanogastra*, Swains. W. Afr. i. p. 182 ; Hartl. W. Afr. p. 128 ; Rochebrune, Seneg. p. 242.

88. Quelea Æthiopica (Sund *Ploceus*), Œfv. K. Vet. Ak. Förh. Stockh. 1850, p. 126; Shelley, Ibis, 1886, p. 358. *Quelea occidentalis*, Hartl. W. Afr. p. 129. *Quelea occidentalis* et *Q. orientalis*, Rochebrune, Seneg. p. 237.

89. Ploceus brachypterus, Swains. W. Afr. i. 1837, p. 168, pl. 10 ; Shelley, Ibis, 1887, p. 23. *Hyphantornis brachypterus*, Hartl. W. Afr. p. 121 ; Rochebrune, Seneg. p. 238.

90. Ploceus melanocephalus (Gm. *Loxia*), S. N. i. 1788, p. 859, Shelley, Ibis, 1887, p. 33. *Ploceus cucullatus*, Swains. (nec Müll.) W. Afr. p. 261. *Hyphantornis capitalis*, Hartl. (nec Licht.) W. Afr. p. 124 ; *Hyphantornis cucullatus*, Hartl. t. c. p. 125 ; Rochebrune, Seneg. p. 240.

91. Ploceus cucullatus (P. Z. S. Müll. *Oriolus*), S. N Suppl. 1776, p. 87 ; Shelley, Ibis, 1887, p. 36. *Ploceus textor*, Swains. W. Afr. p. 167. *Hyphantornis textor*, Hartl. W. Afr. p. 124 ; Rochebrune, Seneg. p. 240.

92. Pextor albirostris (Vieill. *Coccothraustes*), N. Dict. xiii., 1817, p. 534 ; Shelley, Ibis, 1887, p. 43. *Textor alecto*, Temm. Pl. Col. pl. 446 ; Hartl. W. Afr. p. 131 ; Rochebrune, Seneg. p. 235. *Dertroides albirostris*, Swains. W. Afr. i. p. 163.

Fam. 14. Oriolidæ.

93. Oriolus auratus, Vieill. N. Dict. xviii. p. 194 ; Swains. W. Afr. ii. p. 33 ; Sharpe, Cat. B. Brit. Mus. iii., p. 195 ; Rochebrune, Seneg. p. 198. *Le Loriodor*, Levaill. Ois. Afr. vi. pl. 260. *Oriolus bicolor*, Hartl. W. Afr. p. 80.

Fam. 15. Sturnidæ.

94. Buphaga Africana, Linn. S. N. i. 1766, p. 154; Swains. W. Afr. ii. p. 200; Hartl. W. Afr. p. 120; Rochebrune, Seneg. p. 232; Le Pique-bœuf, Levaill. Ois. Afr. ii. p. 97.

95. Lamprotornis caudatus (P. L. S. Müll. *Turdus*), S. N. Suppl. 1776, p. 144. *Lamprotornis longicauda*, Swains. W. Afr. i. p. 148, pl. 7. *Lamprotornis æneus*, Hartl. W. Afr. p. 115; Rochebrune, Seneg. p. 228.

96. Lamprocolius splendidus, Vieill. Enc. Méth. 1823, p. 658; Hartl. W. Afr. p. 117; Rochebrune, Seneg. p. 229. *Lamprotornis chrysonotus*, Swains. W. Afr. i. p. 143, pl. 6.

97. L chalybeus (Henspr. & Ehr. *Lamprotornis*), Symb. Phys. 1828, pl. 10; Rochebrune, Senegal, p. 230.

98. L. purpureus (P. L. S. Müll. *Turdus*), S. N. Suppl. 1776, p. 143. *Le Couignop*, Levaill. Ois. Afr. ii. pl. 90. *Lamprocolius auratus*, Hartl. W. Afr. p. 117; Rochebrune, Seneg. p. 236.

99. Pholidanges leucogaster (Gm. *Turdus*), S. N. i. 1788, p. 819; Hartl. W. Afr. p. 120; Rochebrune, Seneg. p. 231. *Lamprocolius leucogaster*, Swains. W. Afr. i. p. 152, pl. 8.

Fam. 16. Corvidæ.

100. Corvus scapulatus, Dand. Traité. Orn. ii. 1800, p. 232; Sharpe, Cat. B. Brit. Mus. iii. p. 22; Rochebrune, Seneg. p. 234. *Corvus leuconotus*, Swains. W. Afr. i. p. 133, pl. 5. *Corvus curvirostris*, Hartl. W. Afr. p. 114.

101. Cryptorhina Afra (Linn. *Corvus*), S. N. i. 1766, p. 157; Sharpe, Cat. B. Brit. Mus. iii. p. 75; Rochebrune, Seneg. p. 233. *Le Piapiac*, Levaill. Ois. Afr. ii. p. 54. *Ptilostomus Senegalensis*, Swains. W. Afr. i. p. 135; Hartl. W. Afr. p. 113.

ORDER V. Columbæ.

102. Treron calva (Temm. & Knip, *Columba*), Pig. i. 1808–11, p. 35, pl. 7; Hartl. W. Afr., p. 192; Shelley, Ibis, 1883, p. 267: Rochebrune, Seneg. p. 263. *Vinago nudirostris*, Swains. W. Afr. ii. p. 205. *Treron crassirostris* et *T. nudirostris*, Hartl. W. Afr. p. 192.

103. Turtur semitorquatus (Rüpp. *Columba*), Neue Wirb. 1835, p. 66, pl. 23, fig. 2; Shelley, Ibis, 1883, p. 303; Rochebrune, Seneg. p. 266. *Turtur erythrophrys*, Swains. W. Afr. ii. p. 207; Hartl. W. Afr. p. 195; Rochebrune, Seneg. p. 267.

104. T. vinaceus (Gm. *Columba*), S. N. i. 1788, p. 782; Hartl. W. Afr. p. 195; Shelley, Ibis, 1883, p. 311; Rochebrune, Seneg. p. 266. *Turtur semitorquata*, Swains. (see Rüpp.) W. Afr. ii. p. 208; Hartl W. Afr. p. 196.

105. Œna capensis (Linn. *Columba*), S. N. i. 1766, p. 286; Swains. W. Afr. ii. p. 214; Hartl. W. Afr. p. 198; Shelley, Ibis, 1883, p. 328.

ORDER VI. Pterocletes.

106. Pterocles quadricincta, Temm. Pig. et Gall. iii. 1815, p. 252; Hartl. W. Afr. p. 205; Rochebrune, Seneg. p. 270. *Pterocles tricinotus*, Swains. W. Afr. ii. p. 222, pl. 23.

ORDER VII. Gallinæ.

Fam. 1. Numidæ.

107. Numida meleagris, Linn. S. N. i. 1766, p. 273, Hartl. W. Afr.; Rochebrune, Seneg. p. 271. *Numida maculipennis*, Swains. W. Afr. ii. p. 226.

Fam. 2. Perdicidæ.

108. Francolinus bicalcaratus (Linn. *Tetrao*), S. N. i. 1766, p. 277; Hartl. W. Afr. p. 201; Rochebrune, Seneg. p. 274. *Chætopus adansoni*, Swains. W. Afr. ii. p. 217.

109. Coturnix coturnix (Linn. *Tetrao*) S. N. i. 1766, p. 278. *Coturnix communis*, Hartl. W. Afr. p. 203; Dresser, B. Eur. vii. p. 143, pl. 476; Rochebrune, Seneg. p. 275.

ORDER VIII. Fulicariæ.

Fam. 1. Parridæ.

110. Parra Africana, Gm. S. N. i. 1788, p. 709; Swains. Zool. Ill. pl. 43; Hartl. W. Afr. p. 240; Rochebrune, Seneg. p. 315.

111. Crex egregia, Peters, Mosalb. K. Ak. Wissensch, Berlin, 185, p. 134. *New to the Gambia.*

Fam. 3. Heliornithidæ.

112. Podoca Senegalensis, Less. Traité, 1831, p. 596; Hartl. W. Afr. p. 249; Rochebrune, Seneg. p. 320, pl. 25.

ORDER IX. Herodiones.

Fam. 1. Plataleidæ.

113. Ibis hagedash (Lath. *Tantalus*), Ind. Orn. ii. 1790, p. 709; *Ibis chalcoptera*, Vieill. Gal. Ois. p. 245. *Geronticus hagedash*, Hartl. W. Afr. p. 231. *Hagedasia chalcoptera*, Elliot, P. Z. S. 1877, p. 500; Rochebrune, Seneg. p. 307.

Fam. 2. Ciconidæ.

114. Pseudotantalus ibis (Linn. *Tantalus*), S. N. i. 1766,

p. 241. *Tantalas ibis*, Hartl. W. Afr. pl. 230; Rochebrune, Seneg. p. 305.

Fam. 3. Ardeidæ.

115. Ardea ardesiaca, Wagl. Syst. Av. 1827, sp. 20; Hartl. W. Afr. p. 222; Du. Bus., Acad. Brux. iv. pl. 3. *Demigretta ardesiaca*, Rochebrune, Seneg. p. 291.

116. A. bubulcus, Audouin Expl. somm Pl. Ois. Egypte i. 1825, p. 298; Hartl. W. Afr. p. 222; Dresser, B. Eur. vi. p. 245, pl. 400, fig. 1. *Bubulcus ibis*, Rochebrune, Seneg. p. 293.

117. A. ralloides, Scop. Ann. I. Hist. Nat. 1769, p. 88; Dresser, B. Eur. vi. p. 251, pl. 400, fig. 2. *Ardea comata*, Hartl. W. Afr. p. 223. *Buphus comatus*, Rochebrune, Seneg. p. 293.

118. A. atricapilla, Afzel. Acta Stockh. 1804; Hartl. W. Afr. p. 223. *Butorides atricapilla*, Rochebrune, Seneg. p. 294.

Fam. 4. Scopidæ.

119. Scopus umbretta, Gm. S. N. i. 1788, p. 618; Hartl. W. Afr. p. 229; Rochebrune, Seneg. p. 300; Des Murs & Grandid. Hist. Madag. Ois. Atlas, iii. pl. 208.

ORDER X. Limicolæ.

Fam. 1. Œdicnemus.

120. Œ. Senegalensis, Swains. W. Afr. ii. 1837, p. 228; Hartl. W. Afr. p. 208; Rochebrune, Seneg. p. 280.

Fam. 2. Charadriidæ.

121. Lobivanellus Senegalus (Linn. *Parra*), S. N. i. 1766, p. 259; Hartl. W. Afr. p. 213; Rochebrune,

Seneg. p. 283. *Vanella strigilatus*, Swains. B. W. Afr. ii. p. 241, pl. 27.

122. HOPLOPTERUS SPINOSUS (Linn. *Charadrius*), S. N. i. 1766, p. 256; Hartl. W. Afr. p. 214; Dresser, B. Eur. vii. p. 539, pl. 530; Rochebrune, Seneg. p. 283. *Vanellus melasomus*, Swains. W. Afr. ii. p. 237, pl. 26.

123. SARCIOPHORUS TEXTUS (Bodd) Hengl. Orn. N. O. Afr. p. 1,008. *Sarciophorus pileatus*, Hartl. W. Afr. p. 215; Rochebrune, Seneg. p. 284.

124. STREPSILAS INTERPRES (Linn. *Tringa*), S. N. i. 1766, p. 248; Hartl. W. Afr. p. 217; Dresser, B. Eur. vii. p. 555, pl. 532. *Cinclus interpres*, Rochebrune, Seneg. p. 286.

Fam. 3. SCOLOPACIDÆ.

125. CALIDRIS ARENARIA (Linn. *Tringa*), S. N. i. 1766, p. 251; Hartl. W. Afr. p. 238; Dresser, B. Eur. viii. p. 101, pls. 559, 560; Rochebrune, Seneg. p. 313.

126. TRINGOIDES HYPOLEUCUS (Linn. *Tringa*), S. N. i. 1766, p. 250; Rochebrune, Seneg. p. 311. *Actitis hypoleucus*, Hartl. W. Afr. p. 235. *Totanus hypoleucus*, Dresser, B. Eur. viii. p. 127, pl. 563.

127. TOTANUS TOTANUS (Linn. *Scolopax*), S. N. i. 1766, p. 245. *Totanus glottis*, Hartl. W. Afr. p. 235. *Totanus canescens*, Dresser, B. Eur. viii. p. 173, pl. 570.

128. TOTANUS CALIDRIS (Linn. *Scolopax*), S. N. i. 1766, p. 245; Hartl. W. Afr. p. 234; Dresser, B. Eur. viii., p. 157, pls. 568 fig. 1, 569 fig. 2; Rochebrune, Seneg. p. 310.

129. NUMENIUS PHÆOPUS (Linn. *Scolopax*), S. N. i. 1766, p. 243; Hartl. W. Afr. p. 232; Dresser, B. Eur. viii. p. 227, pl. 576; Rochebrune, Seneg. p. 308.

ORDER XI. Anseres.

Fam. Anseridæ.

130. Nettapus auratus (Bodd. *Anas*), Tabl. Pl. Eul. 1783, p. 48; Des Murs & Grandid. Hist. Madag. Atlas, iii. pl. 264; Rochebrune, Seneg. p. 324. *Nettapus Madagascariensis*, Hartl. W. Afr. p. 247.

ORDER XII. Gaviæ.

Fam. Laridæ.

131. Larus fuscus, Linn. S. N. i. 1766, p. 225; H. Saunders, P. Z. S. 1878, p. 173; Rochebrune, Seneg. p. 334.

132. L. ridibundus, Linn. S. N. i. 1766, p. 225; H. Sanders, P. Z. S. 1878, p. 200; Rochebrune, Seneg. p. 334.

133. L. cirrhocephalus, Vieill. N. Dict. xxi. 1818, p. 502, H. Saunders, P. Z. S. 1878, p. 204. *Larus poicephalus*, Swains. W. Afr. ii. p. 245, pl. 29; Hartl. W. Afr. p. 252; H. Saunders, P. Z. S. 1878, p. 204. *Larus hartlaubi*, Rochebrune, Seneg. p. 334.

ORDER XIII. Stiganopodes.

134. Phalacocorax Africanus (Gm. *Pelecanus*), S. N. i. 1788, p. 177; Hartl. W. Afr. p. 260; *Carbo longicauda*, Swains. W. Afr. ii. p. 255, pl. 31. *Graculus Africanus*, Rochebrune, Seneg. p. 347.

APPENDIX III.

COLEOPTERA OF THE GAMBIA.

By Captain G. E. Shelley, F.Z.S., &c.

(The numbers in brackets refer to the pages in Dr. Gemminger and Harold's "Catalogus Coleoptorum.")

Fam. 1. Cicindelidæ.

(8) *Cicindela*, Linn. . . 1. *C. littoralis*, Linn.
2. *C. Chiloleuca*, Fsch.

Fam. 2. Carabidæ.

(92) *Galerita*, Fabr. . . 3. *G. Africana*, Dej.
(102) *Pleropsophus*, Sol. . 4. *P. marginatus*, Dej.
(161) *Siagona*, Latr. . . 5. *S. brunniceps*, Dej.
(166) *Graphipterus*, Latr. . 6. *G. obsoletus*, Oliv.
(183) *Tæniolubus*, Chaod. . 7. *T. gagalinus*, Dej.
(207) *Fefflus*, Latr. . . . 8. *T. megerlii*, Fabr.
(208) *Eudema*, Cast. . . 9. *E. brevicollis*, Dej.
(214) *Chlænius*, Bonn. . 10. *C. cæcus*, Dej.
11. *C. Dusaultii*, Duf.
(265) *Selenophorus*, Dej. . 12. *S. exaratus*, Dej.
(267) *Pangus*, Lec. . . 13. *P. Senegalensis*, Dej.
(268) *Hypolithus*, Dej. . 14. *H. tomentosus*, Dej.
15. *H. pulchellus*, Dej.

Fam. 3. DYTISCIDÆ.

(458) *Trogus*, Leach . . 15. *T. immarginatus*, Fabr.
16. *T. Africanus*, Castl.
17. *T. congestus*, Klug.
18. *T.* sp. ?

Fam. 4. HISTERIDÆ.

(765) *Hister*, Linn. . . 19. *H.* sp. ?
20. *H.* sp. ?

Fam. 5. DERMESTIDÆ.

(913) *Dermestes*, Linn. . 21. *D. felinus*, Fabr.

Fam. 6. SCARABÆIDA.

(985) *Gymnopleurus*, Ill. . 22. *G. smaragdifer*, Walk.
23. *G. cyaneus*, Fabr.
24. *G. fulgidus*, Oliv.
(1012) *Heliocopris*, Hope . 25. *H. antenor*, Fabr.
(1012) *Catharsius*, Hope. . 26. *C. achates*, Fabr.
27. *C. pithecius*, Fabr.
28. *C. ammon*, Fabr.
(1021) *Onitis*, Fabr. . . 29. *O. inuus*, Fabr.
(1024) *Onthophagus*, Latr.. 30. *O. auratus*, Fabr.
31. *O. gazella*, Fabr.
(1042) *Aphodius*, Ill. . . 32. *A. bohemanni*, Harold
? 33. sp. ?
(1087) *Trox*, Fabr. . . 34. *T. squalidus*, Oliv.
35. *T. gemmatus*, Oliv.
(1118) *Serica*, McLeay . 36. *S.* sp. ?
(1158) *Schizonycha*, Blanch 37. *S. crenata*, Gyll.
(1198) *Anomala*, Sam. . 38. *A. distinguenda*, Blanch
39. *A. crenata*, Sch.
(1232) *Trigonostomum*, Burm. 40. *T. clypeatum*, Burm.
(1256) *Phyllognathus*, Esch. 41. *P. orion*, Oliv.
(1257) *Oryctes*, Ill.. . . 42. *O. boas*, Oliv.
(1276) *Ceratorrhina*, West.. 43. *C. daphnis*, Buq.
(1280) *Plæsiorhinus*, Burm. 44. *P. abbreviatus*, Fabr.

(1303)	*Gnathocera*, Kirby	45. *G. varians*, Gory and Perch.
(1308)	*Gametes*, Burm. .	46. *G. sanguinolenta*, Oliv.
		47. *G. æquinoctialis*, Oliv.
(1320)	*Cetonia*, Fabr. . .	48. *C. consentanea*, Schaum.
(1332)	*Diphlognatka*, Gory	49. *D. gagates*, Fabr.

Fam. 7. BUPRESTIDÆ.

(1347)	*Sternocera*, Esch. .	50. *S. interrupta*, Fabr.

Fam. 8. ELATERIDÆ.

(1508)	*Tetralobus*, Serv. .	51. *T. goryi*, Hope
(1552)	*Cardiotarsus*, Esch.	52. *C. acuminatus*, Guér.

Fam. 9. MALACODERMIDÆ.

(1626)	*Lycus*, Fabr. . .	53. *L. xanthomelas*, Dalm.

Fam. 10. BOSTRYCHIDÆ.

(1788)	*Apate*, Fabr. Fabr.	54. *A. francisca*, Fabr.
(1789)	*Sinoxylon*, Dej.. .	55. *S. decora*, Ch.

Fam. 11. TENEBRIONIDÆ.

(1831)	*Thalpophila*, Sol. .	56. *T. abbreviata*, Fabr.
(1841)	*Himantismus*, Er. .	57. *H. vestatus*, Dej.
(1845)	*Pogonobasis*, Sol. .	58. *P. rugosula*, Guér.
(1890)	*Pimelia*, Fabr. . .	56. *P. Senegalensis*, Oliv.
(1901)	*Phrynocolus*, Lac. .	57. *P. spinoläe*, Sol.
		58. *P. dentatus*, Sol.
(1929)	*Pachypterus*, Lucas.	59. *P. elongatus*, Muls.
(1930)	*Opatrum*, Fabr. .	60. *O. pubescens*, Beauv.
		61. *O. micans*, Germ.
		62. *O. proteum.*
		63. *O. ovalis*, Muls.
(2039)	*Prœugena*, Cast. .	64. *P. beneuensis*, Dej.
		65. *P. melanornis*, Dej.

Fam. 12. CANTHARIDÆ.

(2133) *Mylabris*, Fabr. . 66. *M. bifasciata.*
67. *M.* sp. ?
68. *M.* sp. ?
(2147) *Epicauta*, Redtenb. 69. *E. flavicornis*, Dej.
70. *E. vestita*, Duf.
71. *E. melanocephala*, Fabr.
72. *E.* sp. ?

Fam. 13. CURCULIONIDÆ.

(2411) *Lixus*, Fabr. . . 73. *L. acuminatus*, Bohn.
(2641) *Rhynchophorus*, Herb. 74. *R. phœnicis*, Fabr.
(2646) *Sphenophorus*, Sch. 75. *S. senegalensis*, Gylh.

Fam. 14. ANTHROTRIBIDÆ.

(2723) *Phlæotragus*, Schönh. 75. *P. imhoffi*, Bohem.

Fam. 15. CERAMBYCIDÆ.

(2759) *Tithoes*, Thomson. . 76. *T. maculatus*, Fabr.
(2770) *Mallodon*, Serville. 77. *M. downsi*, Hope.
(2840) *Obrium*, Serville. . 78. *O. fuscatum*, Chevr.
(2804) *Pachydissus*, Newman. 79. *P.* sp.
(3055) *Phryneta*, Cast.. . 80. *P. aurocincta*, Guér.
81. *P. spinator*, Fabr.
(3058) *Petrognatha*, Leach. 82. *P. gigas*, Fabr.
(3094) *Apomecyna*, Serv. . 83. *A. binubila*, Pasc.

Fam. 16. CHRYSOMELIDÆ.

(3413) *Chrysomela*, Linn. . 84. *C.* sp. ?
85. *C.* sp. ?
(3464) *Entomoscelis*, Chevr. 86. *E. cincta*, Oliv.
(3491) *Haltica*, Geoff. . . 87. *H.* sp. ?
(3647) *Aspidomorpha*, Hope. 88. *A. cincta*, Fabr.
(3651) *Cassida*, Linn. . . 89. *C. hybrida*, Dej.

APPENDIX IV.

DIURNAL LEPIDOPTERA OF THE GAMBIA.

By Captain G. E. Shelley, F.Z.S., &c.

(The numbers in brackets refer to the pages in Mr. W. F. Kirby's "Synonymic Catalogue of Diurnal Lepidoptera.")

Fam. 1. Nymphalidæ.

Subfam. 1. Danainæ.

(3) *Danais*, Latr. . . 1. *D. leonora*, Butt.
2. *D. alcippus*, Cram.

Subfam. 2. Satyrinæ.

(43) *Melanitis*, Fabr.. . 3. *M. leda*, Linn.
(87) *Mycalesis*, Hübn. . 4. *M. safitza*, Hew.
5. *M. saga*, Butt.
6. *M.* sp. ?
7. *M. angulosa*, Butt.
8. *M. desolata*, Butt.
(94) *Ypthima*, Hübn.. . 9. *Y. itonia*, Hew.
10. *Y. delata*, Kirby.
11. *Y.* sp. ?

Subfam. 3. ACRÆINÆ.

(130) *Acræa*, Fabr.	12. ? *A. lycia*, Fabr. var.
	13. *A. cæcilia*, Fabr.
	14. *A. zetes*, Linn.
	15. *A. bonasia*, Fabr.
	16. *A. serena*, Fabr.
	17. *A. egina*, Cram.
	18. *A. umbra*, Dru.

Subfam. 4. NYMPHALINÆ.

(154) *Atella*, Doubl. . .	19. *A. eurytis*, Doubl.
(181) *Vanessa*, Hübn. . .	20. *V. cardui*, Sp.
(185) *Junonia*, Hübn. . .	21. *J. clelia*, Cram.
	22. *J. œnone*, Linn.
	23. *J. orithya*, Linn.
(189) *Precis*, Hübn. . .	24. *P. terea*, Dru.
	25. *P. sophia*, Fabr.
	26. *P. chorimene*, Guér.
	27. *P. cuama*, Hew.
	28. *P. cloantha*, Cram.
(196) *Hypanis*, Boisd. . .	29. *H. ilithyia*, Dru.
(224) *Hypolimnas*, Hübn. .	30. *H. misippus*, Linn.
	31. *H. anthedon*, Doubl.
(239) *Neptis*, *Fabr.* . .	32. *N. agatha*, Cram.
(246) *Euryphene*, Boisd. .	33. *E. cocalia*, Fabr.
	34. *E. plautilla*, Hew.
(247) *Euphædra*, Hübn. .	35. *E. agnes*, Butt.
(249) *Hamanumida*, Hübn.	36. *H. dædalus*, Fabr.
(250) *Aterica*, Boisd. . .	37. *A. cupavia*, Cram.
(267) *Charaxes*, Ochs. . .	38. *C. epijasius*, Reiche.
	39. *C. viola*, Butt.
(273) *Palla*, Hübn. . .	40. *P. varanes*, Cram.

Fam. 2. LYCÆNIDÆ.

(335) ? *Liptena*, Doubl. Hew.	41. *L.* sp. ?
(345) *Cupido*, Schrank. .	42. *C. calice*, Hopff.
	43. *C. lingeus*, Cram.

	44. *C. jesous*, Guér.
	45. *C. moriqua*, Wallengr.
	46. *C.* sp. ?
	47. *C. amarah*, Guér.
	48. *C. telecanus*, Hübn.
	49. *C. trochilus*, Frey.
	50. *C. knysna*, Trim.
	51. *C. pulchra*, Murr.
	52. *C.* sp. ?
(379) *Thecla*, Fabr. . .	53. *T. larydas*, Cram.
(406) *Hypolycæna*, Feld. .	54. *H. philippus*, Fabr.
	55. *H. lacides*, Hew.
	56. *H. princeps*, Butt.
(409) *Iolaus*, Hübn. . .	57. *I. ismenias*, Klug.
	58. *I. iasis*, Hew.
(416) *Deudorix*, Hew.. .	59. *D. anta*, Trim.

Fam. 3. Papilionidæ.

Subfam. 1. Pierinæ.

(439) *Pontia*, Fabr. . .	60. *P. alcesta*, Cram.
	61. *P. sylvicola*, Boisd.
(441) *Terias*, Swains. . .	62. *T. brigetta*, Cram.
	63. *T. Senegalensis*, Hübn.
(450) *Pieris*, Schrank.	64. *P. Larima*, Boisd.
	65. *P. mesentina*, Cram.
	66. *P. creone*, Cram.
	67. *P. gidica*, Godt.
	68. *P. calypso*, Dru.
	69. *P. lacteipennis*, Butt.
(463) *Tachyris*, Wall. . .	70. *T. chloris*, Fabr.
	71. *T. saba*, Fabr.
(479) *Eronia*, Hübn. . .	72. *E. thalassina*, Boisd.
(481) *Catopsilia*, Hübn. .	73. *C. florella*, Fabr.
(500) *Callosune*, Doubl. .	74. *C. anteupompe*, Feld.
	75. *C. zera*, Luc.
	76. *C. evippe*, Linn.
	77. *C. epigone*, Feld.
(517) *Papilio*, Linn. . .	78. *P. leonidas*, Fabr.

79. *P. demoleus*, Linn.
80. *P. pylades*, Fabr.
81. *P. nireus*, Linn.
82. *P.* sp.?

Fam. 5. HESPERIDÆ.

(581) *Ismene*, Swains. . .	83. *J. forestan*, Cram.
(589) *Carystus*, Hübn.. .	84. *C. cerymica*, Hew.
(596) *Pamphila*, Fabr.. .	85. *P. mohopaani*, Wallengr.
	86. *P. hottentota*, Latr.
	87. *P. cylinda*, Hew.
(611) *Hesperia*, Fabr. . .	88. *H. spio*, Linn.
(628) *Nisoniades*, Hübn. .	89. *N. djælælæ*, Wallengr.
(634) *Tagiades*, Hübn. ·	90. *T. flesus*, Fabr.

APPENDIX V.

LEPIDOPTERA HETEROCERA.

By Herbert Druce, F.L.S., F.Z.S., &c.

(All the species are from the Gambia unless otherwise noted.)

Fam. 1. Sphingidæ.

Subfam. 1. Macroglossinæ.

Genus *Hemaris*, Dalman.

1. *H. hylas*, Linn. Mant. i. p. 539.

Genus *Aëllopus*, Hübner.

2. *A. hirundo*, Gerst. V. d. Decken, Reisen in Ost Afrika, p. 375, t. xv. f. 7.

Subfam. Chærocampinæ.

Genus *Basiothea*, Walker.

3. *B. idricus*, Drury. Ill. Nat. Hist. 3, p. 2, t. 2, f. 2.

Genus *Chærocampa*, Duponchel.

4. *C. eson*, Cram. Pap. Exot. iii. t. 226, f. c.
5. *C. celerio*, Linn. Syst. Nat. 1, 2, p. 800.

6. *C. osiris*, Dalm. Anal. Ent. p. 48.
7. *C. balsaminæ*, Walk. Cat. viii. p. 138.

Genus *Daphnis*, Hübner.

8. *D. nerii*, Linn. Syst. Nat. 1, 2, p. 798.

Genus *Clanus*, Hübner.

9. *C. postica*, Walk. Cat. viii. p. 237.

Subfam. SMERINTHINÆ.

Genus *Lophostethus*, Butler.

10. *L. demolinii*, Anyas, Kaffirs Ill. t. xxx. f. 11.

Genus *Triptogon*, Bremer.

11. *T. rosea*, Druce, Ent. Mo. Mag. 19, p. 17.

Subfam. ACHERONTIINÆ.

Genus *Acherontia*, Hübner.

12. *A. atropos*, Linn. Mus. Lud. Ulr., p. 348.

Subfam. SPHINGINÆ.

Genus *Protoparce*, Burmister.

13. *P. solani*, Boisd. Faun. ent. de Madag., p. 76, t. xi., f. 2.
14. *P. convolvuli*, Linn. Syst. Nat. i. ii., p. 789.

Genus *Nephele*, Hübner.

15. *N. æquivalens*, Walk. Cat. viii., p. 191.
16. *N. rosæ*, Butl. P.Z.S. 1875, p. 14.
17. *N. variegata*, Butl. P.Z.S. 1875, p. 15.
18. *N. peneus*, Cram. Pap. Exot. i. p. 139, t. 88, f. D.
19. *N. comma*, Hopff. in Peters's Reise nach Mossambique, Ins., p. 424, t. 27, f. 12.
20. *N. viridescens*, Walk. Cat. viii., p. 192.

Fam. Agaristidæ.

Genus *Ægocera*, Latr.

21. *Ægocera rectilinea*, Guér. Icon. Reigne Anim. Ins. t. 84, f. 2.
22. *Æ. magna*, Walk. Cat. i. p. 56.

Genus *Charilina*, Walk.

23. *C. intercis*, Feld. Reise Nov. Lep. t. 107, f. 17.

Fam. Zygænidæ.

Genus *Syntomis*, Ochs.

24. *S. tomasina*, Butl. Jour. Linn. Soc. Zool. xii. p. 348.

Genus *Hydrusa*, Walk.

25. *H. bivittata*, Walk. Cat. xxxi. p. 66.

Genus *Euchromia*, Hübn.

26. *E. sperchius*, Cram. Pap. Exot. ii. p. 79, t. 146, f. c.

Genus *Thyretes*, Boisd.

27. *T. caffra*, Wlgn. Wien. Ent. Mon. vii. p. 138.
28. *T.* sp.

Fam. Arctiidæ.

Genus *Anace*, Walk.

29. *Anace* (?) *perpusilla*, Walk. Cat. vii. p. 1720.

Genus *Areas*, Walk.

30. *Areas moloneyi*, Druce, n. sp.

Genus *Euchætes*, Harris.

31. *Euchætes Madagascarensis*, Butl. Cist. Ent. iii. p. 3.

Genus *Phissama*, Moore.

32. *P. mundata*, Walk. Cat. xxxi. p. 309.

Genus *Seirarctia*, Packard.

33. *S. scita*, Walk. Cat. xxxi. p. 302.
34. *S.* sp.

Genus *Leucaloa*, Butl.

35. *L.* sp.

Genus *Alpenus*, Walk.

36. *A. maculosus*, Cr. Pap. Exot. iv. p. 156, t. 370, f. D.

Fam. LITHOSIIDÆ.

Genus *Lithosia*, Fabr.

37. *L. bipunctigera*, Wlgn. Wien. Ent. Mon. vii. p. 146.

Genus *Atteva*, Walk.

38. *A.* sp.

Genus *Deiopeia*, Steph.

39. *D. pulchella*, Linn. Syst. Nat. 1, 2, p. 884.

Genus *Argina*, Hübn.

40. *A. ocellina*, Walk. Cat. ii. p. 571.
41. *A. cingulifera*, Walk. Cat. ii. p. 569.
42. *A. leonina*, Walk. Cat. xxxi. p. 262.

Subfam. HYPSINÆ.

Genus *Hypsa*, Hübn.

43. *H. speciosa*, Drury, Exot. Ent. ii. p. 10, t. 5, f. 2.
44. *H. subretracta*, Walk. Cat. vii. p. 1676.

Genus *Godasa*, Walk.

45. *G. maculatrix*, Walk. Cat. xxxi. p. 272.

Fam. Liparidæ.

Genus *Crorema*, Walk.

46. *C. mentiens*, Walk. Cat. iv. p. 811.

Genus *Porthisia*, Steph.

47. *P. producta*, Walk.

Genus *Lælia*, Steph.

48. *L.* (*anthora*) *subrosea*, Walk. Cat. iv. p. 801.

Genus *Artaxa*, Walk.

49. *A. pygmæa*, Walk. Cat. iv. p. 793.

Genus *Anaphe*, Walk.

50. *A. infracta*, Walsingham, Trans. Linn. Soc. Zool. ii., p. 422, t. xlv., f. 8.
51. *A. moloneyi*, n. sp. Druce.

Genus *Aroa*, Walk.

52. *A. discalis*, Walk. Cat. iv. p. 792.
53. *A. crocata*, Her-Schf. Lep. Exot. f. 112.

Genus *Polymona*, Walk.

54. *P. rufifemur*, Walk. Cat. iii. p. 768.

Genus *Dasychira*, Steph.

55. *D. crausis*, Druce, P.Z.S. 1884, p. 228, t. xvii., f. 5.
56. *D. remota*, Druce, n. sp.

Genus *Phiala*, Wallgr.

57. *P. xanthosoma*, Wallgr. Wien. Ent. Mon. iv. p. 165.

Fam. SATURNIIDÆ.

Genus *Antheræa*, Hübn.

58. *A. obscura*, Butl. ?

Genus *Attacus*, Hübn.

59. *A. bauhiniæ*, Guér. Icon. Règne Anim. Ins., p. 506, t. 86, f. 1.

Genus *Ctenogyna*, Feld.

60. *C. Natalensis*, Feld. Reise Nov. Lep. t. 85, f. 4.

Fam. LASIOCAMPIDÆ.

Genus *Phyllalia*, Walk.

61. *P. unicolor*, Walk. Cat. vi. p. 1414.

Genus *Chrysopoloma*, Wallgr.

62. *C. rudis*, Walk. Cat. xxxii. p. 561.

Genus *Odenestis*, Germar.

63. *O. directa*, Walk. Cat. xxxii. p. 566.

64. *O. (?) honrathii*, Dewitz. Nova Acta Acad. C.L.C.G., Nat. Cur., vol. xlii. p. 73, t. 11, f. 11.

Genus *Pachypasa*, Walk.

65. *P. subfascia*, Walk. Cat. vi. p. 1426. Lagos.

Fam. LIMACODIDÆ.

Genus *Miresa*, Walk.

66. *M.* sp.

Genus *Woerdenia*, Snell.

67. *W. weyenberghi*, Snell. Tijdsch. voor Ent. xv. p. 43, t. iii., f. 9.

Fam. Bombycidæ.

Genus *Naroma*, Walk.

68. *N. signifera*, Walk. Cat. vii. p. 1744.

Genus *Trilocha*.

69. *T.* sp.

Fam. Psychidæ.

Genus *Eumeta*, Walk.

70. *Eumeta cervina*, sp. n., Druce.

Fam. Cossidæ.

Genus *Cossus*, Fabr.

71. *C. moloneyi*, sp. n., Druce.

Fam. Notodontidæ.

Genus *Antheua*, Walk.

72. *A. cinerea*, Walk. Cat. iii. p. 767.
73. *A. simplex*, Walk. Cat. iii. p. 687.

Genus *Oræsia*, Guén.

74. *O. emarginata*, Fabr. Ent. Syst. iii. 2, p. 240.

Fam. Leucaniidæ.

Genus *Leucania*, Ochs.

75. *L. curvula*, Walk. Cat. ix. p. 102.

Fam. Glottulidæ.

Genus *Polytela*, Guén.

76. *P. florifera*, Walk. Cat. xv. p. 1666.

Genus *Glottula*, Guén.

77. *G. pancratii*, Cyrillo. Ent. Neap. t. 12, f. 4.

Subfam. Xylophasides.

Genus *Laphygma*, Guén.

78. *L. cycloides*, Guen. Noct. i. p. 157.

Genus *Prodenia*, Guén.

79. *P. retina*, Feiv. Herr-Schaf. Eur. Schmett. ii. t. 29, f. 145.
80. *P. infecta*, Walk. Cat. ix. p. 196.

Fam. Noctuidæ.

Genus *Agrotis*, Ochs.

81. *A. spiculifera*, Guen. Noc. i. p. 266.
82. *A. decipiens*, Feld. Reise Nov. Lep. t. 90, f. 17.

Fam. Heliothidæ.

Genus *Heliothis*, Ochs.

83. *H. peltigera*, Wien. Verz. p. 89.

Fam. Acontiidæ.

Genus *Acontia*, Ochs.

84. *A. insocia*, Walk. Cat. xii. p. 788.
85. *A. concinnula*, Walk. Cat. xii. p. 789.
86. *A. pyralina*, Walk. Cat. xii. p. 789.
87. *A. bipunctata*, Walk. Cat. xii. p. 798.
88. *A. luminosa*, Walk. Cat. xv. p. 1759.
89. *A. formosa*, Walk.
90. *A.* sp.

Genus *Xanthodes*, Guen.

91. *X. fimbriata*, Walk. Cat. xxxiii. p. 777.

Fam. Plusiidæ.

Genus *Plusia*, Ochs.

92. *P. Ni*, Hübn. Eur. Schmett. Noct. t. 58, f. 284.
93. *P. acuta*, Walk. Cat. xii. p. 922.

Fam. Toxocampidæ.

Genus *Baniana*, Walk.

94. *B.* sp.

Fam. Polydesmidæ.

Genus *Pandesma*, Guén.

95. *P. Quenavadi*, Guén. Noc. ii. p. 438.

Genus *Polydesma*, Boisd.

96. *P. laudula*, Guén. Noc. ii. p. 441.

Fam. Ophideridæ.

Genus *Ophideres*, Boisd.

97. *O. materna*, Linn. Syst. Nat. ii. p. 840.
98. *O. divitosa*, Walk. Proc. Nat. Soc. Glasgow i. p. 357, t. vii. f. 11.

Subfam. Phyllodidæ.

Genus *Miniodes*, Guén.

99. *M. discolor*, Guen. Noc. iii. p. 119.

Fam. Ommatophoridæ.

Genus *Patula*, Guén.

100. *P. Walkeri*, Butl. Ann. and Mag. Nat. Hist. s. iv. vol. xvi. p. 406.

Genus *Cyligramma*, Boisd.

101. *C. latona*, Cram. Pap. Exot. i. t. 13, f. B.

102. *C. fluctuosa*, Drury, Ill. Exot. Inst. ii. t. 14, f. 1.
103. *C. limacina*, Guér. Icon. Règne Anim. t. 89, f. 2.

Fam. Hypopyridæ.

Genus *Hypopyra*, Guén.

104. *H. Capensis*, Herr-Schaff. Lep. Ex. f. 121, 122.

Genus *Entomogramma*, Guén.

105. *E. mediocris*, Walk. Cat. xxxiii. p. 949.

Fam. Bendidæ.

Genus *Homœa*, Guén.

106. *H. clathrum*, Guen. Noc. iii. p. 207.

Fam. Ophiusidæ.

Genus *Sphingomorpha*, Guén.

107. *S. chlorea*, Cram. Pap. Exot. ii. t. 104, f. c.

Genus *Ophiodes*, Guén.

108. *O. Hottentota*, Guen. Noc. iii. p. 229.

Genus *Ophisma*, Guén.

109. *O. albicilia*, Walk. Cat. xiv. p. 1374.
110. *O. rivularis*, Butl. Ann. Mag. Nat. Hist. s. iv. vol. xvi. p. 407.

Genus *Achœa*, Hübn.

111. *A. ezea*, Cram. Pap. Exot. iii. t. 239, f. D.
112. *A. mormoides*, Walk. Cat. xiv. p. 1393.
113. *A. illustrata*, Walk. Cat. xiv. p. 1392.
114. *A. melicerta*, Drury, i. t. 23, f. 1.

Genus *Serrodes*, Guén.

115. *S. nigha*, Guén. Noc. iii. p. 253.

Genus *Ophiusa*, Ochs.

116. *O. festina*, Walk. Cat. xiv. p. 1425.

Genus *Grammodes*, Guén.

117. *G. stolida*, Fab. Sp. In. ii. p. 218.
118. *G. geometrica*, Rossi, Faun. Etr. ii. p. 179.

Fam. EUCLIDIIDÆ.

Genus *Trigonodes*, Guén.

119. *T. acutata*, Guen. Noc. iii. p. 283.
120. *T. hyppasia*, Cram. Pap. Exot. iii. t. 250, f. E.

Fam. REMIGIDÆ.

Genus *Remigia*, Guén.

121. *R. pellita*, Guen. Noc. iii. p. 319.
122. *R. inconcisa*, Walk. Cat. xxxiii. p. 1013.
123. *R. congregata*, Walk. Cat. xv. p. 1847.

Fam. THERMESIIDÆ.

Genus *Azazia*, Walk.

124. *A. rubricans*, Boisd. Faun. Madag. t. 16, f. 1.

Genus *Girpa*, Walk.

125. *G. aliena*, Walk. Cat. xv. p. 1849.

Fam. POAPHILIDÆ.

Genus *Poaphila*, Guén.

126. *P. reversa*, Walk. Cat. xxxiii. p. 991.

Genus *Barcia*, Walk.

127. *B. incidens*, Walk. Cat. xv. p. 1840.

Fam. HYPENIDÆ.

Genus *Hypena*, Schr.

128. *H. jussalis*, Walk. Cat. xvi. p. 52.
129. *H. obacerralis*, Walk. Cat. xvi. p. 53.
130. *H. echionalis*, Walk. Cat. xvi. p. 230.
131. *H.* sp.
132. *H.* sp.
133. *H.* sp.

Fam. ENNOMIDÆ.

Genus *Hyperythra*, Guén.

134. *H. leucicolor*, Butl. Ann. Mag. Nat. Hist. s. iv. vol. xvi. p. 417.

Fam. BOARMIIDÆ.

Genus *Hypochroma*, Gn.

135. *H. attenuans*, Walk. Cat. xxi. p. 430.

Fam. GEOMETRIDÆ.

Genus *Geometra*, Linn.

136. *G. leucospilata*, Walk. Cat. xxvi. p. 1554.
137. *G. latilineata*, Walk. Cat. xxxv. p. 1605.
138. *G.* sp.

Genus *Nemoria*, Hübn.

139. *N. stillata*, Feld. Reise Nov. Lep. t. 127, f. 17.

Fam. ACIDALIIDÆ.

Genus *Acidalia*, Treit.

140. *A. illiturata*, Walk. Cat. xxvi. p. 1602.
141. *A. intervulsata*, Walk. Cat. xxii. p. 745.
142. *A. reconditaria*, Snell. Tijdschrift v. Ent. xv. p. 76, t. 6, f. 8, 9.
143. *A.* sp.

Fam. Mecoceridæ.

Genus *Rhamidava*, Walk.

144. *R. fulvata*, Drury, Exot. Ins. iii. p. t. 21, f. 4.

Fam. Micronidæ.

Genus *Micronia*, Guén.

145. *M. erycinaria*, Guen. Phol. ii. p. 30.

Fam. Macariidæ.

Genus *Macaria*, Curt.

146. *M. lataria*, Walk. Cat. xxiii. p. 921.
147. *M. Gnophosata*, Walk. Cat. xxvi. p. 1645.
148. *M. postvittata*, Walk. Cat. xxvi. p. 1646.
149. *M.* sp.
150. *M. Angolaria*, Snell. Tijdschrift v. Ent. xv. p. 81, t. 6, f. 12, 13.

Fam. Asopidæ.

Genus *Desmia*, Westw.

151. *D. afflictalis*, Guen. Delt. et Pyral. p. 190.

Genus *Daraba*, Walk.

152. *D. idmonealis*, Walk. Cat. xvii. p. 385.

Genus *Leucinodes*, Guén.

153. *L. splendens*, n. sp., Druce.

Genus *Hymenia*, Hübn.

154. *H. fascialis*, Cram. Pap. Exot. v. t. 36, f. 13.

Fam. Steniadæ.

Genus *Stenia*, Guén.

155. *S.* sp.

Fam. Spilomelidæ.

Genus *Phalangiodes*, Guén.

156. *P. geometralis*, Guén. Delt. et Pyral. p. 278.

Genus *Zebronia*, Hübn.

157. *Z. phenicealis*, Cram. Pap. Exot. iv. t. 382, f. G.
158. *Z. salomealis*, Walk. Cat. xvii. p. 476.
159. *Z. cassusalis*, Walk. Cat. xvii. p. 477.

Genus *Diathraustæ*.

160. *D. timaralis*, Feld. Reise Nov. Lep.

Fam. Margarodidæ.

Genus *Glyphodes*, Guén.

161. *G. stolalis*, Guén. Delt. et Pyral. p. 293.
162. *G.* sp.

Genus *Phakellura*, Guild.

163. *P. indica*, Saund. Zool. ix. n. 3070.
164. *P.* sp.

Genus *Tobata*, Walk.

165. *T. elealis*, Walk. Cat. xviii. p. 516.

Genus *Margaronia*, Hübn.

166. *M. transvisalis*, Guén. Delt. et Pyral. p. 304.
167. *M. sericeolalis*, Guén. Delt. et Pyral. p. 307.
168. *M. pomonalis*, Guén. Delt. et Pyral. p. 309.
169. *M.* sp.
170. *M.* sp.

Genus *Maruca*, Walk.

171. *M. aquatilis*, Boisd. Guer. Icon. Regne Anim. Ins. t. 90, f. 9.

Fam. Botididæ.

Genus *Botys*, Latr.

172. *B. creonalis*, Walk. Cat. xviii. p. 579.
173. *B. marginalis*, Guen. Delt. et Pyral. p. 343.
174. *B. sarronalis*, Walk. Cat. xviii. p. 636.
175. *B. ovialis*, Walk. Cat. xviii. p. 636.
176. *B. triarialis*, Walk. Cat. xviii. p. 639.
178. *B. monesusalis*, Walk. Cat. xviii. p. 653.
179. *B. intactalis*, Walk. Cat. xxxiv. p. 1402.
180. *B.* sp.
181. *B. aegrotalis*, Snell. Tijdschrift voor Ento. xv. p. 90, t. vii., f. 8.
182. *B.* sp.

Fam. Scoparidæ.

Genus *Stenopteryx*, Guén.

183. *S. hybridalis*, Hübn. Pyral. t. 17, f. 114.

Genus *Scopula*.

184. *S. massalis*, Walk. Cat. xviii. p. 792.

CRAMBITES.

Fam. Galleriidæ.

Genus *Anerastia*, Hübn.

185. *A. phycidella*, Rag.

Genus *Eticella*, Tr.

186. *E. zincenella*, Rag.

Fam. CRAMBIDÆ.

Genus *Chilo*, Zk.

187. *C. discellus*, Walk. Cat. xxvii. p. 141.

Genus *Jartheza*, Walk.

188. *J. chrysographella*, Klr. Walk. Cat. xxvii. p. 184.

About thirty species of obscure *Noctuadæ* and *Pyralidæ* are in to be identified. Descriptions of the new species will shortly be published.

APPENDIX VI.

LIST OF THE SHELLS COLLECTED IN 1884-5 AT THE MOUTH OF THE RIVER GAMBIA, WEST AFRICA, BY CAPTAIN MOLONEY.

CEPHALOPODA.

Sepia sp. (shell only).

GASTROPODA.

Muricidæ.

Murex cornutus, Linn. *M. saxatilis*, Linn. *M. varius*, Sowerby. *M. megaceros*, Sowerby.

Buccinidæ.

Purpura coronata, Lamarck. *P. hæmastoma*, Lamk. *Melongena morio*, Linn.

Olividæ.

Oliva subulata, Lamarck. *O. hiatula*, Lamarck.

Cassididæ.

Cassis spinosa, Gronovius.

Conidæ.

Conus prometheus, Hwass. *C. mercator*, Linn. *C. guinaicus*, Hwass.

Pleurotomidæ.

Pusionella aculeiformis, Lamk. *Clavatula muricata*, Lamk. *C. sacerdos*, Reeve.

Volutidæ.

Cymbium neptuni, Gmelin. *C. porcinum*, Lamk. *C. proboscidalis*, Lamk. *Marginella glabella*, Linn. *M. adansoni*, Kiener. *M. crassilabrum*, Sowerby. *M.* (*Persicula*) *cornea*, Lamarck. *M.* (*Persicula*) *cingulata*, Dillwyn.

Cypræidæ.

Cypræa stercoraria, Linn. *C. zonata*, Chemnitz. *C. nebulosa*, Solander. *Radius seminulum*, Sowerby.

Naticidæ.

Natica fulminea, Lamarck. *N. variabilis*, Réclez. *N. maroccana*, Chemnitz.

Cerithiidæ.

Tympanotomus fuscatus, Linn. *T. radulus*, Linn.

Terebridæ.

Terebra senegalensis, Lamarck. *T. micans*, Hinds.

Turritellidæ.

Turritella ungulina, Linn. *T. annulata*, Kiener. *T. candida*, Reeve. *Mesalia varia*, Kiener.

Vermetidæ.

? *Vermetus varians*, d'Orbigny.

Ampullariidæ.

Lanistes ovum, Peters.

Littorinidæ.

Littorina ahenea, Reeve.

Calyptræidæ.

Crypta porcellana, Linn. *C.* (*Mitrella*) *sinensis*, Linn.

Ianthinidæ.

Ianthina communis, Lamk. *I. globosa*, Swainson.

Fissurellidæ.

Fissurella obtusa, Sowerby.

Neritidæ.

Nerita atrata, Chemnitz.

Siphonariidæ.

Siphonaria venosa, Reeve.

Helicidæ.

Limicolaria adansoni, Pfr. *L. flammea*, Müller.

Auriculidæ.

Melampus liberianus, H. & A. Adams.

Bullidæ.

Bulla striata, Bruguière.

PELECYPODA.

Ostreidæ.

Ostrea parasitica, Gmelin. *O. lacerans*, Hanley.

Pectinidæ.

Pecten gibbus, Linn. *P. pseudamusium*, Klein.

Aviculidæ.

Avicula argentea, Reeve.

Mytilidæ.

Modiola atropurpurea, Dunker. *M.* sp.?

Arcidæ.

Arca (*Barbatia*) *gambiensis*, Reeve. *A.* (*Senilia*) *senilis*, Linn. *Pectunculus rubens*, Lamarck.

Chamidæ.

Chama sp.?

Cardiidæ.

Cardium costatum, Linn. *C. ringens*, Chemnitz. *C. rusticum*, Linn.

Lucinidæ.

Lucina columbella, Lamarck.

Astartidæ.

Crassatella contraria, Lamarck.

Carditidæ.

Cardita ajar, Bruguière.

Veneridæ.

Venus plicata, Gmelin. *Cytherea* (*Tivela*) *tripla*, Linn. *C.* (*Tivela*) *bicolor*, Gray. *C.* (*Callista*) *tumens*, Gmelin. *C.* (*Callista*) *africana*, Phil. *Tapes dura*, Gmelin. *Dosinia africana*, Gray. *D. isocardia*, Dunker.

Mactridæ.

Mactra adansoni, Philippi. *M. nitida*, Schrœter.

Tellinidæ.

Tellina wroblewskyi, Bock. *T. nymphalis*, Lamk. *Semele radiata?* Say. *Scrobicularia plebeia*, Hanley. *S. lacunosa*, Chemnitz. *Donax rugosa*, Linn. *Iphigenia altior*, Sowerby.

Ungulinidæ.

Diplodonta senegalensis, Reeve.

Solenidæ.

Solen guineensis, Gray. *Tagelus caribæa*, Lamk.

Myidæ.

Tugonia guineensis, Chemnitz.

Pholadidæ.

Talona explanata, Spengler.

APPENDIX VII.

LIST OF REPTILES, BATRACHIANS, AND FISHES COLLECTED BY CAPTAIN MOLONEY IN 1884–5 AT THE GAMBIA.

Reptiles.

Tarentola ephippiata, O'Sh.
Varanus exanthematicus, Bosc.
Chamæleon senegalensis, Daud.
Typhlops liberiensis, Hallow.
Python regius, Merr.
Naia haie, L.

Batrachian.

Rana adspersa, Bibr.

Fishes.

Batrachus didactylus, Schn.
Periophthalmus koelreuteri, Schn.
Echeneis naucrates, L.
Chromis microcephalus, Blkr.
C. latus, Gthr.
Alestes wytsii, Stdr.
Ophichthys semicinctus, Rich.
O. rostellatus, Rich.
O. sp. (near *O. imberbis*).
Hippocampus guttulatus, Cuv.
Protopterus annectens, Ow.
Pristis perrotetii, M. & H.

INDEX TO LIST OF ECONOMIC PLANTS.

INDEX.

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