TRAVELS

IN

PERU AND INDIA

WHILE SUPERINTENDING THE COLLECTION OF CHINCHONA
PLANTS AND SEEDS IN SOUTH AMERICA, AND
THEIR INTRODUCTION INTO INDIA.

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WITH MAPS AND ILLUSTRATIONS.

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CHINCHONA-PLANTS AT OOTACAMUND,

In August 1871 (from a Photograph). A flowering branch of Chinchona in the foreground.

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FRONTISPIECE.

PREFACE.

THE introduction of quinine-yielding Chinchona-trees into India, and the cultivation of the "Peruvian Bark" in our Eastern possessions, where that inestimable febrifuge is almost a necessary of life, has for some years engaged the attention of the Indian Government. In 1859 the author of the present work was intrusted, by the Secretary of State for India in Council, with the duty of superintending all the necessary arrangements for the collection of Chinchona-plants and seeds of the species esteemed in commerce, in South America, and for their introduction into India. This important measure has now been crowned with complete success, and it is the object of the following pages to relate the previous history of the Chinchona-plant; to describe the forests in South America where the most valuable species grow; to record the labours of those who were engaged in exploring them; and to give an account of all the proceedings connected with the cultivation of Chinchona-plants in India.

In the performance of this service it was a part of

my duty to explore the forests of the Peruvian province of Caravaya, which has never yet been described by any English traveller; and the first part of the work is occupied by an account of the various species of Chinchona-plants and their previous history, a narrative of my travels in Peru, and a record of the labours of the agents whom I employed to collect plants and seeds of the various species of Chinchonæ in other parts of South America.

The traveller who ascends to the lofty plateau of the Cordilleras cannot fail to be deeply interested in the former history and melancholy fate of the Peruvian Indians; and some account of their condition under Spanish colonial rule, and of the insurrection of Tupac Amaru, the last of the Incas, will, I trust, not be unwelcome. I have devoted three chapters to these subjects, which will form a short digression on our way to the Chinchona forests. I am indebted to the late General Miller, and to Dr. Vigil, the learned Director of the National Library at Lima, for much new and very curious material throwing light on that period of Spanish colonial history which includes the great rebellion of the Peruvian Indians in 1780.

The second part of the work contains a narrative of my travels in India, a description of the sites

selected for Chinchona-plantations, and an account of the progress of the experimental cultivation of those inestimable trees, from the arrival of the plants and seeds, early in 1861, to the latest dates.

In conducting the operations connected with the collection of Chinchona-plants and seeds in South America, I obtained the services of Mr. Spruce, Mr. Pritchett, Mr. Cross, and Mr. Weir; and it affords me great pleasure to have this opportunity of publicly recording their perseverance in facing many dangers and hardships, and in doing the work that was allotted to them so ably, and with such complete success.

To Mr. Richard Spruce, an eminent botanist who has for eight years been engaged in exploring the basin of the Amazons, from Para to the peaks of the Quitenian Andes, and from the falls of the Orinoco to the head-waters of the Huallaga, the largest share of credit, so far as the South American portion of the enterprise is concerned, undoubtedly belongs. I have endeavoured to do justice to his untiring energy and zeal, and to the important service which he has rendered to India.

But the collection of plants and seeds in South America, and their conveyance to the shores of India, would have been of little use if they had not been delivered into competent hands on arriving at their

destination. To the scientific and practical knowledge, the unwearied zeal, and skilful management of Mr. McIvor, the Superintendent of the Government Gardens at Ootacamund, on the Neilgherry hills, is therefore due the successful introduction of Chinchona-plants into India. His care has now been fully rewarded, and the experiment has reached a point which places it beyond the possibility of ultimate failure.

I am indebted to Sir William Hooker, who has, from the first, taken a deep interest in this beneficial measure, for many acts of kindness, and for his readiness to give me valuable advice and assistance while he has rendered most essential service in successfully raising a large number of Chinchona plants at Kew. To Dr. Weddell my thanks are due for much information most promptly and kindly supplied; and to Mr. Howard for the important suggestions and information with which he has frequently favoured me, and which no scientific man in Europe is better able to give. It is a fortunate circumstance that his invaluable and superbly illustrated work on the Chinchona genus should have been published just at the time when the Chinchonas are about to be planted out in India and Ceylon, for from no other source could the cultivators derive so large an amount of valuable information. My

Howard has likewise done good service by presenting the Indian Government with a fine healthy plant of *Chinchona Uritusinga*, a species which had not previously been introduced. I take this opportunity of expressing my thanks for much assistance from Dr. Seemann, the able Editor of the 'Bonplandia;' from Mr. Dalzell, the Conservator of Forests in the Bombay Presidency; from Dr. Forbes Watson, the Reporter on the vegetable products of India, at the India Office; from Mr. Veitch, of the Royal Exotic Nursery at Chelsea; and from many kind friends both in Peru and India. I am also indebted to Mr. Alexander Smith, son of Mr. John Smith, the Curator of the Royal Botanical Gardens at Kew, for an interesting note on the principal plants employed by the natives of India on account of their real or supposed febrifugal virtues, which will be found in an Appendix.

The botanical name for the plants which yield Peruvian bark was given by Linnæus, in honour of the Countess of Chinchon, who was one of the first Europeans cured by this priceless febrifuge. The word has been generally, but most erroneously, spelt *Cinchona;* and, considering that such mis-spelling is no mark of respect to the lady whose memory it is intended to preserve, while it defeats the intention of Linnæus to do her honour, I have followed the good example of Mr Howard and the Spanish

botanists in adopting the correct way of spelling the word—*Chinchona*.* The Counts of Chinchon, the hereditary Alcaides of the Alcazar of Segovia, do not hold so obscure a place in history as to excuse the continuance of this mis-spelling of their name.

After much anxiety, extending over a period of three years; after all the hardships, dangers, and toils which a search in virgin tropical forests entails; and after more than one disappointment, it is a source of gratification and thankfulness that this great and important measure, fraught with blessings to the people of India, and with no less beneficial results to the whole civilized world, should have been finally attended with complete success, in spite of difficulties of no ordinary character. How complete this success has been, will be seen by a perusal of the two last chapters of the present work, and of Mr. McIvor's very interesting Report in the Appendix; it is sufficient here to say that it has exceeded our most sanguine expectations.

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* The only valid argument against this change is that it may cause confusion, but the alteration is too slight for this to be possible; and it is not uncommon, among botanists, to correct the usual spelling of genera or species of plants, when it is found to be erroneous. Among other examples of such changes may be enumerated those of *Plumeria*, now altered to *Plumieria*; *Bufonia* to *Buffonia*; and *Gesneria* to *Gesnera*.

TRAVELS IN INDIA.

CHAPTER XXI.

MALABAR.

Calicut — Houses and gardens — Population of Malabar — Namburi Brahmins — Nairs — Tiars — Slaves — Moplahs — Assessment of rice-fields, of gardens, of dry crops — Other taxes — Voyage up the Beypoor river — The Conolly teak plantations — Wundoor — Backwood cultivation — Sholacul — Sispara ghaut — Black-wood — Scenery — Sispara — View of the Nellemboor valley — Avalanche — Arrival at Ootacamund.

HE who would desire to receive the most pleasant impression of India, on a first arrival, must follow in the wake of Vasco de Gama, and land on the coast of Malabar, the garden of the peninsula. Here Nature is clad in her brightest and most inviting robes, the scenery is magnificent, the fields and gardens speak of plenty, and the dwellings of the people are substantial and comfortable.

As we steamed into the anchorage at Calicut, on board the little yacht 'Pleiad,' no appearance of any town was visible, and no building except a tall white lighthouse. Thick groves of cocoanut-trees line the shore, and are divided from the sea by a belt of sand; while undulating green hills rise up behind, and the background of mountains was hidden by banks of clouds. The whole scene bore a close resemblance to one of the Sandwich or Society Islands, down to the canoes which came off to us the moment the anchor was let go. They are hewn out of the trunk of the jack-tree with an upper bulwark fastened with coir twine; and the canoe-men were naked athletic-looking fellows, with enormous hats made of a frond of the tallipot palm (*Corypha umbracu*

lifera). When we shoved off from the 'Pleiad' a handsome fish-hawk, with white head and breast, was perched on the fore-topsail yard-arm, and sea-snakes were playing in the water alongside. In-shore there were a few native craft, called *pattamars*, at anchor. Pattamars are the vessels which have carried on the coasting trade on the western side of India from time immemorial. As in the days of Sindbad the sailor, their planks are not nailed, but sewn together with coir-twine, and they have high sterns and bows sheering rapidly aft. The deepest part is at the stem, whence the bottom curves inwards to the stern. A pattamar has two masts raking forward, with long picturesque lateen yards slung with one-third part before the mast, and two-thirds abaft. They never attempt to tack, but always ware, and if taken aback there is no alternative but either to wait until she comes round, or to capsize.

On landing at Calicut, a carriage drawn by two white bullocks was, through the hospitality of Mr. Patrick Grant, the Collector of Malabar, waiting for us on the sandy beach, to convey us to his house; a drive of about two miles. The excellent road, of a bright red colour from the soil being composed of laterite, passes through groves of cocoanut-trees, interspersed with many houses, each surrounded by its garden of mangos, nux vomica trees, jacks with pepper-vines creeping over them, and palm-trees. The houses are all substantial and comfortable-looking, built of square blocks of laterite joined with *chunam*, or lime made from calcined sea-shells, and roofed with tiles. The laterite or iron-clay is a rock full of cavities and pores like coral, overlying the granite which forms the basis of Malabar. When excluded from the air it is so soft that any iron instrument can readily cut it, and is dug up in square masses with a pickaxe, and afterwards shaped into blocks with a knife or trowel. After exposure it soon becomes as hard, and is as durable as bricks.

Each house has a cocoanut safe or store-room on one side, of open wood-work. Many people were walking along the road, naked men with huge tallipot-palm hats, and women with nothing on but bright-coloured petticoats, looking picturesque in the foreground and middle distance of the palm-shaded vistas. At intervals the cocoanut groves were broken by fields of vivid green paddy, and tanks filled with red lotus-flowers.

From Mr. Grant's house, on the top of a rounded grassy hill, there is an extensive and very beautiful view of the undulating hills and dales of Malabar, generally covered with forest; with the ocean on one side, and the Wynaad mountains on the other. Malabar is 188 miles long, 25 miles broad in the northern, and 70 in the southern half, and contains 6262 square miles. It is divided into 17 *Talooks* or districts, and has a population of 1,602,914 souls; of whom 1,165,174 are Hindus, 414,126 Moplahs, and 23,614 Christians.

The people of Malabar are a thriving active race, the men well built and handsome, and the women remarkable for their beauty. The highest caste among the Hindus is that of the Namburi Brahmins, who claim all the land below the ghauts and appear to have actually possessed a large portion of it previous to the invasion of Hyder Ali of Mysore. They declare that when Parasu Rama, one of the incarnations of Vishnu hurled his axe from the mountains, the ocean receded, leaving the land of Kerala, as Malabar, Cochin, and Travancore were called; which he gave to the Namburi Brahmins. It is true that the undulating flat-topped hills, which cover the part of Malabar near Calicut, are like the waves of the sea, and appear as if the ocean in receding had forced channels, and thus formed the intervening valleys. The Namburis are fast dying out: they are landed proprietors, and perform such offices as bestowing holy water and ashes, or performing

poojah or worship for the other Hindus, but never enter the public service.

The most important portion of the population is included in the eleven classes of Nairs,[1] a race of pure Sudra caste They pretend to be born soldiers, and formed the armies of the Zamorin and Cochin Rajahs, the lower castes not being allowed to bear arms. The Nairs now hold most of the land in Malabar, and are frequently very rich. Both the Zamorin of Calicut and the Rajah of Cochin are Nairs and the origin of their rule is said to have been as follows About a thousand years ago, a Viceroy of the Sholum Rajah ruled over Malabar, named Cheruman Permal, who made himself independent, and divided the country among his nobles, of whom five were of the Kshatri caste, and seven were Nairs. After the division it was found that one of his bravest officers, the ancestor of the present Zamorin or Tamor Rajah, had been left out; Cheruman Permal, therefore gave him his sword, and all the territory in which a cock crowing at a certain small temple could be heard. Hence Calicut, from *Colicodu*, a cock-crowing.[2] Down to the time of Tippoo the whole of Malabar was governed by the descendants of the sisters of these thirteen Nair chiefs. The Zamorin of Calicut has some influence, though he is much reduced in wealth and importance since the days of Vasco de Gama.

The Nairs live under the remarkable institution called *Marroo-muka-tayum*. Sisters never leave their homes, but

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[1] These 11 classes are :—1. The *Kiriem Nairs*, who are agriculturists, clerks, and accountants, and do the talking on all public occasions, a sure mark of transcendent rank. 2. The *Sudra Nairs*. 3. The *Charnadus*. 4. The *Villiums*, who are palkee-bearers to Namburis and Rajahs. 5. The *Wattoddi*, or oil-makers. 6. The *Attiarchis*, or cultivators. 7. The *Wullacutras*, or barbers. 8. The *Wallatratas*, or washermen. 9. The *Tunan* or tailors. 10. The *Andoras*, or pot makers. 11. The *Turagons*, or weavers, who are very low in the scale for even a potter must purify himself if he chances to touch a weaver.—Buchanan, ii. p. 408.

[2] Buchanan.

eceive visits from male acquaintances, and the brothers go
ut to other houses, to their lady-loves, but live with their
isters. If a younger brother settles in a new house, he takes
is favourite sister with him, and not the woman who,
ccording to the custom in all other countries, should keep
ouse for him. The man's mother manages the house, and
fter her death his eldest sister takes her place; but no man
as any idea who his father is, and the children of his sisters
re his heirs. Moveable property is divided amongst the
hildren of the sisters of the deceased equally, and the land
s managed by the eldest male of the family, but each
ndividual has a right to a share in the income.

This strange custom gives the women an important posi-
ion; and as they are pretty, and take pains with their
ersonal appearance, their influence is very great. The
Nairs are addicted to drink, and may eat venison, fowls, and
ish; and the families are fond of gaiety, and of visiting among
people of their own rank, when there is much talking and
inging. Most of the men, as well as the women, read and
rite in their own character, and there is a Governmen
Gazette printed in the Malayalim language. The Collecto
was anxious, also, to establish a paper in Malayalim, contain
ing general information, which would no doubt have a
excellent effect, but the difficulty is to find a good nativ
editor.

Next in rank to the Nairs come the *Tiars* or *Shanars*,
stout, good-looking, hard-working race, who do not pretend
Sudra origin. Formerly the Nairs exacted deference fro
the Tiars with extreme cruelty and arrogance, treating the
more like brutes than men; and if a Tiar defiled a Nair
touching him, he was instantly cut down. But British ru
is gradually uprooting these caste barbarisms, and the positi
of the Tiars is improving. Some of them hold appointme
as clerks in Government offices, and they are protec

by just and equal laws. The Tiars form the mass of the field labourers; but the proper duty of their caste is to extract juice from the palm-tree, and either boil it into *jaggery* (unrefined sugar), or distil it. Their women are exceedingly pretty, with masses of long hair; but there is a prevalent custom for all the brothers of a family to have but one wife amongst them to save expense, which leads to most disastrous consequences. Below the Tiars there are several outcast tribes; among them the *Churmas* or slaves, a miserable and down-trodden race, possibly the remnant of the aboriginal inhabitants. Even now they are slow to understand that they are not slaves, and land on which there are most *Churmas* still sells at the highest price.

The *Moplahs*, or Mohammedans of Malabar, are descended from Arab mariners and traders by native women, and hence their name, from *Mah-pilla* "son of the mother." They have certainly been established in Malabar for a thousand years, if not more, as it is on record that the Viceroy Cheruman Permal, who then divided the country amongst his chiefs, was converted by a Moplah, and sailed for Mecca. All the sympathies of the Moplahs are with Arabia and the Red Sea, and they frequently undertake pilgrimages to Mecca. Respecting their creed they are fanatical, and are easily roused to fury by an insult, or an attempt on the part of the Nairs to treat them as a lower caste. On these occasions they run mucks but in ordinary times they are hard-working, intelligent abstemious, excellent boatmen, and capital backwoodsmen. Many of the Moplahs are very wealthy. Their mosques however, are poor edifices, not to be distinguished from ordinary dwelling-houses, and the temples of the Hindus are no better. There is no attempt at ornamental architecture in the religious buildings of Malabar.

One-fifth of the collectorate of Malabar is taken up with rice and garden cultivation, the remaining four-fifths being covered

th forest, or cleared for dry grains and coffee plantations. ıe land revenue, taking the average of five years ending in 58-59, is 255,000*l.* The assessment of the rice-lands is sentially the same as that fixed by the Government of ppoo Sultan of Mysore in 1783-84. Though unequal, and some places burdensome, it is on the whole light, and, cept in two of the Talooks,[3] it is lighter in the north than the south. As an example of the inequality of the land-x, I may mention that the district of Pattaumby, on the ver Ponany, is very highly and unfairly assessed, as it is id, from the following cause. Before the invasion of Tippoo l the land in Malabar was in the hands of feudal chiefs; ıere was no land-tax, and the Zamorin and other Rajahs ere supported by the produce of their own estates. Th rst ruler who imposed a land-tax was the Mysore conqueroı ny village which offended his officers was highly assessed ıd hence the present inequalities, which will, however, b rrected by the new Survey and Assessment Commission. I ıe case of Pattaumby the accountant quarrelled with th ındowners, and threatened to impose a heavy assessmen nd, when they attempted to murder him, he escaped Vynaad, and sent in his report to Tippoo.

All land in Malabar is private property, and the landlo gets 20 to 40 per cent. of the net rent, the remainder bei he Government demand. From the gross produce of t ice-fields 20 per cent. is deducted for reaping and otl mall charges called *puddum*, the remainder being availa gross rent. From the gross rent one-third is deducted he expense of cultivation, called *vitoo vally;* one third as ultivator's share, or *koshoo labon*, whether he be a *jemakar* roprietor, a *kanomkar* or mortgagee, or a *pattamkar* enter; and the remaining third is the *pattom*, net produ

or rent. Of this last third the Government share is 65 pe
cent., leaving 35 per cent. as the share of the proprietor
The Government share is thus a little less than a quarter o
the gross produce.

The assessment is not calculated on the extent of land
but on the amount of seed required to sow a given space
according to the quality of the soil, which is divided int
three classes, namely *pasma* (clay), *rasee pasma* (sand an
clay), and *rasee* (sand). On an average the soil does no
yield more than tenfold, and most of it bears only one crop
Some lands are sown in April or May, and the crops cu
n August or September. These are chiefly in the coas
Palooks. Others are sown in September and October, an
he crops cut in January and February. The seeds are raise
n small pieces of land, and the plants, when young, remove
y hand, and planted in the paddy-fields.

The garden assessment, as it is called, on cocoanut-tree
he great wealth of Malabar, betel-palms, and jacks, was fixe
1 1820.

The cocoanut-trees are divided according to their situatio
nd soils into five classes—the first and second classes beir
ttivepoo, or sea-coast; and the third, fourth, and fifth, *kar*
epoo, or inland cocoanut-trees. Each tree pays, on a
verage, eighteen pies,[4] those which are unproductive fro
ge or youth being excluded. The betel-nut palms pay, o
n average, six pies, and the jack-trees twenty-eight pie
nt the tax on gardens is not more than forty per cent. of th
ndlord's rent. A cocoanut-tree is estimated to bear
ast sixteen to forty nuts in the year, according to its sit
d the owner of a plantation derives profit from the leav
well as from the husks and shells of the nut. The leav
ed for covering houses, sell at two and a half to five Rs. th

[4] They range from 12 to 60 reas, or 6 pies to 2 annas 5 pies per tree.

thousand, each tree yielding ten to fifteen annually; and the husks, for coir ropes, fetch six annas the thousand.[5]

The betel-nut palm (*Areca catechu*), which is also taxed has a long slender smooth stem, and graceful curving fronds. I have seen palm-trees in the South Sea islands, many kinds in the forests of South America, and in India; but, of the whole tribe, the betel-nut palm is certainly the most elegant and beautiful. Dr. Hooker likens it "to an arrow shot from heaven, raising its graceful head and feathery crown in luxuriance and beauty above the verdant slopes." A tree will produce 300 nuts in the year, and continues to bear for twenty-five years. The nut is very hard, the size of a cherry, and is chewed by all the natives of India with the leaves of the betel-pepper (*Chavica betel*) spread with *chunam*. It is cut into long narrow pieces, and rolled up in the leaves of the betel-pepper or pawn. It makes the mouth and teeth red, and gives the chewer a disgusting appearance. The consumption must be enormous, for it is chewed by 50,000,000 of men, and, next to tobacco, is the most extensively used narcotic; but it has none of the excellent properties of the coca-leaf of the Peruvians.

The jack (*Artocarpus integrifolius*), the only other tree which is taxed in Malabar, grows to a considerable size, and the wood is much used for furniture of all kinds. The fruit, a favourite article of food, is of enormous dimensions, and grows out of the trunk. In Travancore they put the whole fruit in the ground, and, when the young shoots grow up, the stems are tied together with straw, and by degrees they form one stem, bearing fruit in six or seven years.[6] Besides the taxed trees, the gardens round Calicut generally contain mangos and nux vomica.

In addition to the rice or wet cultivation, and the above-

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[5] The value of the exported nuts, kernels, oil, and coir of the cocoanuts in 1859, was 157,995*l*.

[6] Drury's *Useful Plants of India*.

mentioned trees, the upland or dry cultivation of rice and sesame or gingelee oil-seed is assessed on an annual inspection: forty per cent. of the gross produce of the former being deducted, on account of the peculiar labour and probable loss, and twenty per cent. of the remainder being the Government share. The sesame cultivation has no deduction from the gross produce; and ginger, pepper, and some other dry crops are free of land-tax. The pepper cultivation is chiefly carried on in northern Malabar, and ginger in the Shernaad district, south of Calicut, by the Moplahs.[7]

The other taxes are *abkarry*, or the privilege of selling liquors, which is either farmed by public sale, or levied from the toddy-drawers, when it is called *kutty-chatty* (knife and pot) tax; *mohturfa* on houses, shops, fishing-boats, oil-mills, and looms; licences, stamps, and the salt monopoly; the whole revenue of Malabar in 1859 having been 266,860*l*. The income-tax had not yet been levied at the time of our visit but its nature had been carefully explained to the people, i had been stripped of everything that was offensive or inquisi torial, and no difficulty was anticipated in its introduction although it was very generally considered that it was un wise and impolitic, and that it would be unproductive. I the matter of taxes there was a striking contrast betwee Peru, whence we had just come, and where they are scarcel known, and this land of manifold imposts.

On the whole, however, Malabar is a splendid possession the people are very flourishing, the population increasin

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[7] The best soil for ginger-cultivation is red earth free from gravel. At the commencement of the monsoon beds of 10 or 12 feet by 3 or 4 are formed, in which holes are dug a foot apart, which are filled with manure. The roots, hitherto carefully buried under sheds, are dug out, chipped into suitable sizes for planting (1½ to 2 inches long), and buried in the holes. The bed is green leaves, which serve as manu while they keep the beds from t much dampness. Rain is requisit but the beds must be kept from inu dation, and drains are therefore c between them. The roots or rhizom when old, are scalded, scraped, a dried, and thus form the white ging of commerce.—Drury's *Useful Pla of India*.

nd cultivation rapidly encroaching on the forests. There is o gang robbery, but occasional housebreaking, and a good nany murders, often caused by jealousy, the criminals usually naking a full confession, and thus saving much trouble.

In the evening we embarked in a canoe which had been prepared for us near the fine timber bridge over the Calicut iver, on the road to Beypoor. The setting sun and banks of rosy clouds were visible through the graceful fronds of the ocoanut-trees as we drove along the shady road, with occaional glimpses of the sea. The canoe was very long, and ut out of one trunk, with raised bow and stern, ornamentally carved. It was pulled by four tall wiry-looking Moplahs, with nothing on but clouts and huge umbrella-hats, made of the tallipot palm;[8] and a fifth steered with a paddle. Their oars were long bamboos, with circular boards fastened to one end by neat coir seizings. We started a little after sunset, and passed from the Calicut river by a backwater into the Beypoor, where there were many shallow places, and the Moplahs had constantly to jump out and drag the canoe over them. The banks of the river are wooded down to the water's edge, with groves of slender betel-nut palms rising aloft, and standing out against the starry sky. The foliage was covered with brilliant fire-flies, and here and there we passed a hut, with its owner standing on the shore, waving a burning brand. All night the boatmen sang noisy glees, and in the morning we reached the landing-place at Eddiwanna, forty miles from Calicut, and near the Government teak plantations of Nelamboor.

These plantations were originated by Mr. Conolly, the late Collector of Malabar, with a view to the establishment

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[8] The tallipot or fan-palm (*Corypha umbraculifera*) has a stem 60 or 70 feet high, crowned with enormous fan-shaped leaves, with 40 or 50 pairs of ribs. These fronds, when dried, are very strong, and are used for hats and umbrellas. The petiole is seven feet long, and the blade six feet long and thirteen feet broad.

nurseries for replenishing the teak forests, as nearly all the fine timber had been felled many years ago. There is a great deal in North Canara of small size, and still more in Cochin and Travancore; but the reckless system of felling threatened the same results as has already overtaken the supply of chinchona-bark in South America. The only forests containing teak, in Malabar, in which Government has a proprietary right, are 25 square miles in the Palghat talook, where all the mature trees have long since gone to the Bombay dockyard; but in 1842 leases of forest-land were obtained from the Zamorin for the cultivation of teak, 70 to 80 square miles in extent, chiefly in the Ernaad talook, near Nellamboor. This most important and now successful measure is due to the zeal and perseverance of Mr. Conolly, and there is a good prospect of the stock of teak-timber in these forests being eventually replenished. The trees, however, require a growth of 60 or 80 years to reach a maturity fitting the wood for shipbuilding; but it is then unequalled by any other known timber; it does not injure iron, and is not liable to shrink in width.

It was some time before the method of inducing the teak-seeds to germinate was discovered, and several experiments were tried. In the forests it was observed that the seeds were prepared for growth by losing the hard outer shell through the warmth caused by fires which annually consume the brushwood. Mr. Conolly, therefore, burnt a coating of hay over the ground where the seeds were sown. This trial was unsuccessful, and in 1843 it was found that the best method was to steep the nuts in water for thirty-six hours then sow them in holes four inches apart, and half an inch under the surface, covering the beds with straw, so as to prevent evaporation, and gently watering them every evening. By following this plan the seeds germinated, and sprouted in from four to eight weeks. In 1844 as many a

50,000 young trees, raised in the adjacent nurseries, were planted, eight feet apart, in the cleared ground near Nellamboor, along the banks of the Beypoor river, which had been cleared of jungle. The seedlings are transplanted from the nursery at the age of three months, and for the first seven or eight years they sprout up very fast, but afterwards they grow slowly. From 1843 to 1859 as many as 1,200,000 trees have been put down, and they are now planted at the rate of 70,000 a year. Much care is required in systematic thinning and pruning, and, for the superintendence of this important work, an annual visit is paid to the plantations by Mr. McIvor, who is now so ably conducting the chinchona experiment on the Neilgherry hills.

We were met by Mr. McIvor at Eddiwanna, and started for the village of Wundoor, six miles distant, in *munshees* or hammocks, slung to bamboos with a shade over them and carried by six men, who kept up unearthly yells the whole time. The road leads through rice-cultivation and groves of betel-nut palms, jacks, and mangos. Wundoor is a pretty village, with an avenue of sumach-trees[9] leading to the post-house or travellers' bungalow. These post-houses which are erected by the Government at easy stages along all the roads in India, for the convenience of travellers, are exceedingly comfortable, and render travelling in India as easy and commodious as it is the reverse in Peru and other parts of South America. At Wundoor the first bungalow we had seen put an end to all idea of having to rough it while travelling in India. The building contained several clean rooms, with cane-bottom sofas, arm-chairs, and tables, and outside there was a pleasant verandah, with a glorious view of the Koondah mountains, which it was necessary

[9] The sumach-tree (*Cæsalpinia coriaria*) was introduced into India from America, by Dr. Wallich, in 1842. The pods are much used for tanning purposes.

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ascend on our road to the Neilgherries. A clump of trees, consisting of jacks, mangos, and peepuls, formed a huge arch, through which there was an enchanting landscape of smiling hill and dale, with the dense forest beyond, crowned by the broken outline of the distant mountains.

We set out from Wundoor at daybreak, and passed a house just outside the village, where, a few days before, a tiger had carried off a child before the eyes of its parents. Next day the brute had the temerity to come again and try to force open the door, when a man shot it from the window. For some hours we rode through a country where the jungle alternated with cultivation in open glades, which in their natural state are covered with *Pandanus*, but the people here, as in other parts of Malabar, are fast encroaching on the forest, and converting these glades into paddy-fields. As we approached the foot of the mountains cultivation at last entirely ceased, and the road led through a dense forest of enormous bamboos, teak-trees with their large coarse leaves, black-wood, and other fine timber. At noon we reached the post-house of Sholacul, at the foot of the Sispara ghaut, which leads up to the summit of the Koondahs, a western continuation of the Neilgherries.

The building at Sholacul was surrounded by a very stout palisade, to protect it from the wild elephants, who strongly object to all encroachments on their domain; and even take the trouble of pulling up the wooden milestones by the side of the roads. We found all the roads which we travelled over in Malabar excellent, and the ascent of the Sispara ghaut, though only a zigzag bridle-path, is in very good order. After leaving Sholacul the road first passes through a region of gigantic reeds, and then through a belt of black wood, palms, and tree-ferns, with an undergrowth of *Curcumas* and a brilliant purple flower (*Torenia Asiatica*). The black or rose-wood tree (*Dalbergia latifolia*) grows

eight of about fifty feet, with handsome spreading branches, nd pinnate leaves. The timber is very valuable; it is exten-ively used in Bombay for making beautiful carved furniture, nd planks are sometimes obtained four feet broad, after the ap-wood has been removed. In consequence of the in-reasing price, Dr. Cleghorn, the able and energetic Conser-ator of Forests in the Madras Presidency, has caused a umber of seedlings to be planted at Nellamboor; and lantations have also been formed in N. Canara and Mysore.

The occasional openings in the forests, at turns in the oad, afforded us views of the mountains below us covered ith the richest vegetation, and of the rice-fields of Ialabar stretching away to the faintly indicated blending f sea and haze on the horizon; which almost equalled n beauty the finest parts of the eastern Andes. From bout 1000 to 5000 feet above the sea the jungle is overed with innumerable leeches, which eagerly fasten n their prey, whether men, horses, or dogs, and make a ourney through this region, in the wet season, exceedingly isagreeable. Within this leech-zone there is a consider-ble clearing called Walla-ghaut, planted with coffee, which s in a ruinous and abandoned state, chiefly owing to the ifficulty of inducing labourers to venture among the leeches. As we continued the ascent, the scenery increased in mag-ificence, the views became more extensive, and there were nountain-tops crowned with glorious forest trees far below s. At 6000 feet mosses appear, then lilies, brambles, and ild strawberries, and occasionally we crossed noisy little treams overshadowed by the trees. We reached the Sispara ungalow, on the summit of the ghaut, 6742 feet above the evel of the sea, late in the afternoon.

The Sispara ghaut takes the traveller from the tropical lains to the temperate climate of the hills, where the face of ature is entirely changed. Here the hills are covered wit

grass, and the ravines only are filled with trees, forming thickets called *sholas*. In the rear of the bungalow there is an almost unrivalled view of the Malabar plains, from the edge of a precipice. The Koondah hills sweep round until they join the Wynaads, half encircling the Nellamboor valley, which was thousands of feet below us, and is covered with forest, intersected in all directions by open glades of a rich light green. The Koondahs rise up from Malabar like perpendicular walls, so steep that even a cat could not scale them in any part, for a distance of forty miles; and the grandeur of the view from this point, with these sublime cliffs, and the vast expanse of forest-covered plain below, is very striking.

At daylight next morning we left the Sispara bungalow, and rode for several miles through a valley interspersed with *sholas* of rhododendron-trees. Eighteen miles from Sispara is the Avalanche bungalow, 6720 feet above the sea, whence there is a good carriage-road to Ootacamund, the chief European station on the Neilgherry hills. At Avalanche the Koondah range is considered to cease, and the Neilgherry hills to commence, but the nature of the country is the same. Between Avalanche and Ootacamund, a distance of 15 miles the country consists of grassy undulating rounded hills divided from each other by wooded *sholas*. Herds of fine buffaloes were grazing by the roadside, and here and there were raw patches of millet (*Setaria Italica*) near the huts of the natives of these hills. As we rode round the artificial lake and, passing several pretty little houses surrounded by shrubberies, stopped at the door of Dawson's hotel at Ootacamund, it was difficult to persuade ourselves that we were not again in England. The garden in front of the house was stocked with mignonette, walflowers, and fuchsias, but the immense bushes of heliotrope covered with flowers, ten feet high and at least twenty in circumference, could not have attained such dimensions in an English climate. Ootaca

ıund is nearly in the centre of the table-land of the
'eilgherries, at the foot of the western face of the peak o
)odabetta, and, except to the N.W., the station is completely
ırrounded by grass-covered hills. Houses are scattered
)out under the shelter of the hills, with gardens and
lantations of *Eucalyptus* and *Acacia heterophylla*, trees intro
ıced from Australia, around them; and the broad excellen
)ads are bordered by *Cassia glauca* bushes with a brigh
'ange flower, honeysuckles, fox-gloves, geraniums, roses
ıd masses of the tall *Lobelia excelsa*. A graceful white iri
also common.

This charming spot, now that the roads are plante
ith tall trees, and the hedges filled with all the fa
iliar flowers introduced from old England, while curlin
ıoke ascends through the foliage, and suggests the ide
chimneys and warm firesides, is as unlike India, and
ce an English watering-place, as can be imagined. Th
wer of the church, seen from many points of view, increas
e resemblance, which is certainly not lessened by the ro
eeks and healthy looks of the children, and the fre
vigorating mountain air. But when a few miles from th
ıtion, and out of sight of all English associations, the
ıs much that reminded me of the *pajonales* in the chincho
gion of Caravaya at a first glance: and I felt sangui
at all the *pajonal* chinchona-trees would thrive in most
e *sholas* on the Neilgherry hills, while suitable sites
)se species which require a warmer climate would
ınd in the forest slopes which overlook the plains.
)ser inspection confirmed me in this opinion.

CHAPTER XXII.

NEILGHERRY HILLS.

Extent — Formation — Soil — Climate — Flora — Hill tribes — Todars — Antiquities — Badagas — Koters — Kurumbers — Irulas — English stations — Kotergherry — Ootacamund — Coonoor — Jakatalla — Government gardens at Ootacamund and Kalhutty — Mr. McIvor — Coffee cultivation — Rules for sale of waste lands — Forest conservancy.

THE Neilgherry[1] hills, between latitude 11° 10′ and 11° 32′ N., and longitude 76° 59′ and 77° 31′ E., form the most elevated mountain mass in India, south of the Himalayas; the highest peak, that of Dodabetta, being 8610 feet above the level of the sea. They are isolated on three sides, and rise up abruptly from the plains of Coimbatore on the south, and from the table-lands of Wynaad and Mysore on the north and east, to a height of 6000 feet above the former, and 2000 to 3000 above the latter; from which they are divided by the broad ravine of the river Moyaar. On the west they are united with the Koondah range, which is a continuation of the western ghauts. The area of the Neilgherries contains 268,494 acres, of which 24,000 are under cultivation.

The formation consists of syenitic granite, with veins of basaltic rock, hornblende, and quartz, while, in some parts, half-decomposed laterite underlies the soil. The plateau is not a flat table-land, but a succession of undulating hills and intervening grassy valleys, with ravines thickly wooded, numerous streams, and occasional rocky ridges running up into fine mountain-peaks. The streams all go

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[1] *Nil*, blue, and *giri*, a mountain; from the blue *Justitias* which cover many of the hill-slopes.

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to swell the great river Cauvery, by its tributaries the Moyaar and Bowany; the Moyaar descending from the hills by a fine waterfall at Neddiwuttum, on the northern slope; and the Bowany flowing down between the Koondahs and Neilgherries to the south. The soil of the plateau is very rich, being formed by the decomposition of basaltic and hornblende rocks, mixed with the clayey products of the granite, and much decomposed vegetable matter. The latter consists of the grass killed down to the roots by the frost, washed in by the succeeding rains, and mixed with the subsoil, increasing its richness and depth season after season. The richest land is on the lower slopes, where there are accumulations of soil washed from the hills above:[2] and there are extensive deposits of peat in the valleys, which afford supplies of fuel. The chief defect in the soil is the absence of lime.

The temperature and amount of humidity vary according to the locality. At Ootacamund, 7300 feet above the sea the means of the thermometer range from 42° to 68°, whil in the two other lower and warmer stations of Coonoor an Kotergherry, about 6000 feet above the sea, the range from 52° to 71°. The annual rainfall at Ootacamund sixty inches, at Coonoor fifty-five inches, and at Kotergher fifty inches. During the south-west monsoon, from May September, the rain comes down in torrents at Sispa and in the western parts of the Neilgherries, but their fo is somewhat exhausted before reaching Ootacamund, in t centre of the plateau. At that station the rainfall, duri the south-west monsoon, is about thirty-four inches; and t range of Dodabetta, which rises up like a wall, immediat to the eastward of Ootacamund, almost entirely screens eastern part of the hills from the rains of the south-west m

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[2] *Report of Captain J. Ouchterlony, Superintendent of the Neilgherry S*

soon, and there the rainfall is only twelve inches from May to September. During the portion of the year from October to April the western parts of the hills are comparatively dry, the prevalent winds are from the north-east, and the rains which they bring with them from the Madras coast do not extend farther west than the neighbourhood of Ootacamund. Kotergherry, and the eastern parts of the hills, receive the full benefit of the rains from the north-east monsoon, but they are not heavy, and the rainfall at Kotergherry, in that season, is thirty-eight inches. Ootacamund also gets some of the rain of the north-east monsoon (thirty-six inches), so that, in that central part of the plateau, there is a belt which receives a moderate supply of rain throughout the year. In January and December there are frosts in the night, and the extreme radiation which goes on in the valleys causes great cold at sunrise; but these frosts are confined to the valleys in the upper plateau, and they never visit the higher slopes, or the well-wooded "*sholas*."

The climates of the Neilgherry hills are the most delightful in the world; and it may be said of this salubrious region, with its equable seasons, what the Persian poet said of Kung, "the warmth is not heat, and the coolness is not cold."[3] On the open plateau, in the wooded *sholas*, and in the thick forests of the lower slopes, there is a great variety of beautiful flowering trees and shrubs; and the vegetation of the hills is both varied and luxuriant. First, in the brilliant splendour of its flowers, must be mentioned the tree rhododendron (*Rhododendron arboreum*), which is very common in all parts of the hills, either forming small thickets or dotted about on the grassy slopes. It grows to a height of twenty feet, with a gnarled stunted trunk, and masses of deep crimson flowers. In the "sholas" are the *Michelia nilagiraca*, a large tree, with yellowish-white fragrant flowers of great size; the *Symplocos*

[3] Ferdosi.

pulchra, with hairy leaves and snow-white flowers; the *Ilex Wightiana*, a large umbrageous tree, with small white flowers and red berries; the pretty pink-flowered *Rhodo-myrtus tomentosa*, the berries of which are called "hill gooseberries;" the *Jasminum revolutum*, a shrub with sweet yellow flowers; the *Sapota elingoides*, a fine forest-tree, with rough cracked bark and an edible fruit used in curries; *Crotalariæ*; *Bignoniæ* peppers, cinnamon, a number of chinchonaceous shrubs, and many others.

In the open grassy slopes and near the edges of the woods ravines are several *Vaccinia*, especially the *Vaccinium Leschenaultii*, a shrub with pretty rose-coloured flowers; the beautiful *Osbeckia Gardneriana*, with a profusion of large purple flowers; the handsome *Viburnum Wightianum*; a number of balsams (*Impatiens* of several species); the *Gaultheria Leschenaultii* in great quantities, a pretty little shrub with white flowers and blue berries; the *Berberis Mahonia*, with its glossy prickly leaves and long slender racemes of yellow flowers; and the bright little pink *Indigofera pulchella*; while the climbing passion-flower (*Passiflora Leschenaultii*) hangs in festoons over the trees, especially in the eastern parts of the hills. Among the more inconspicuous plants are the *Galium requienianum*; the *Rubia cordifolia*;[4] the thorny *Solanum ferox*, with stem and leaves covered with strong straight prickles; the *Girardinia Leschenaultii*,[5] or Neilgherry nettle, a most virulent stinger; the tall *Lobelia excelsa*; a *Justicia* with a blue flower, which entirely covers some of the hills; some pretty *Sonerilas*; several beautiful *Ipomœas* and *lilies*.

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[4] Dr. Wight says that this plant might be collected in vast quantities with little trouble or expense, and yields an excellent red dye.

[5] This nettle is frequent all over the higher ranges of the Neilgherries. The bark yields a fine strong fibre, which the natives obtain by first boiling the whole plant to deprive it of its virulently-stinging properties, and then peeling the stalks. The textile material thus obtained is of great delicacy and strength.—Wight's *Spicilegium Neilgherense*. The fibre of the Neilgherry nettle is worth 200*l*. a ton in England, and its cultivation is likely to be a remunerative speculation.

Celsias; and the *Hypericum Hookerianum*, growing plentifully in the meadows, with large orange flowers; besides ferns, lycopods, and numberless small wild flowers in the grass and underwood.

Enjoying a delightful climate, well supplied with water, and with its gentle undulations of hill and dale in some places clothed with rich pasture, in others presenting woods of fine timber and beautiful flowering shrubs, the Neilgherry hills are eminently fitted for the abode of a thriving and civilized people. Yet for many centuries it would appear that their sole inhabitants were a strange race of cowherds, a people differing in all respects from their neighbours in the plains, and indeed from all the other natives of Hindostan.

These are the Todars, a race numbering less than a thousand souls, who now claim to be the original "Lords of the hills." In times so remote that no record of them remains here are still indications that the Indian peninsula was peopled by races of Scythic origin: and, when the Aryan warriors came forth with their Vedic hymns and grand old civilization from the fastnesses of Sind, they swept irresistibly over Hindostan, and formed as it were an upper stratum of the population. The Scythic element either mixed with, became subservient to the Aryan in the plains, as the Sudra caste, while in the hill and forest fastnesses a few tribes remained isolated and independent. Such, possibly, may have been the origin of the Todars on the Neilgherries. The Brahmins, characteristically dovetailing every tradition and every race into one or other of their historical myths, declare that the Todars came from the north in the army of Rama, when he marched against the wicked Ravana; and that, deserting their chief, they fled to these hills. They themselves have no tradition of their origin, but believe that they were created on the hills.

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people, tall, well-proportioned, and athletic, and utterly unlike all other natives of India. They have Jewish features, with aquiline noses, hazel eyes, thick lips, bushy black beards, and immensely thick clusters of glossy hair cut so as to stand in dense masses round the sides of the head, a very necessary protection from the sun, as they never wear any other head-covering. The old men are very handsome, with long white beards and upright gait, looking like the patriarchs of the Old Testament, with their strongly marked Jewish features: but the expressions of the younger men are less agreeable to look upon. The women are very careful of their hair, which hangs down in long glossy ringlets; and both sexes wear nothing but a long piece of coarse cotton cloth, with two broad red stripes round the edges, worn by the men like a Roman toga, which sets off their well-shaped limbs to advantage, and exposes one leg entirely, up to the hip; and by the women so as to form a short petticoat and mantle. They never wash either their persons or their clothes from the day of their birth to the day of their death. They live in small encampments called *munds*, which are scattered over the hills, and consist of five or six huts, and a larger one used as a dairy. The families are in the habit of migrating from one *mund* to another, at certain seasons of the year; so that we often came upon a *mund* apparently abandoned. A Todar's hut is exactly like the tilt of a waggon, very neatly roofed, with the ends boarded in, and a single low entrance. They are generally surrounded by a stone wall, and the dairy, a larger and more important building, is always a little apart. The only occupation of this singular people is to tend their large herds of fine buffaloes; they live on milk, and on the grain which they collect as a due or *goodoo* from the other hill tribes, and pass the greater part of their time in idleness; lolling about and gossiping in their munds, or strolling over the hills. We passed through one of these munds, about a

quarter of a mile from our hotel, almost daily, but I never remember having seen a Todar engaged in any occupation whatever.

The women become the wives of all the brothers into whose families they marry, the children being apportioned to husbands according to seniority. This pernicious custom is also common among the Coorg, and the Tiars of Malabar. The Todars, formerly, only allowed one female child to live in each family, the rest being strangled; but the authorities have lately interfered to put a stop to this custom. When a Todar bride is given away, she is brought to the dwelling of her husbands, who each put their feet upon her head; she is then sent to fetch water for cooking, and the ceremony is considered to be complete.

The German missionaries, who have had a good deal of intercourse with these people, say that they worship the "sacred buffalo bell," as a representation of *Hiridea*, or the chief God, before which they pour libations of milk; and when there is a dispute about wives or buffaloes it is decided by the priest, who becomes possessed by the *Bell God*, rushes frantically about, and pronounces in favour of the richest. Formerly there were seven holy *munds*, each inhabited by a recluse called *palaul* (milkman), attended upon by a *kavilau* (herdsman); but three of these are now deserted, and the Nurth is rarely frequented. The rest have a herd of holy buffaloes attached to them for the use of the sanctified occupants, and no women may approach them. The only religious festival of any kind celebrated by the Todars, and that scarcely deserves the name, takes place on the occasion of a funeral, when there is much dancing and music. The body is burnt, and buffaloes are slaughtered to go with the spirit and supply it with milk. This is called the green funeral. A year afterwards there is another ceremony called the dry funeral, when forty or fifty buffaloes were hunted down, and

beaten to death with clubs; but the Government has recently prohibited the immolation of more than two beasts for a rich, and one for a poor Todar. The burial-places are like gigantic extinguishers, twelve feet high, and thatched with grass. The bodies are burnt, and the ashes collected and put into chatties, which are deposited in the extinguisher. The Todars have no other ceremonies, care for nothing but their buffaloes, and leave prayers to the *palaul* in his lonely retreat, or to the *palikarpal* or dairyman of each mund, who covers his nose with his thumb when he enters the sacred dairy, and says "May all be well!"[6]

The Todar language is a very rude dialect of the old Canarese, and similar to that of the Badagas, another hill tribe. It is very poor in words conveying abstract ideas, as they have few notions beyond their buffaloes; their verbs have generally but one tense, and they express the future and past by means of adverbs of time.[7]

There are many ancient cairns and *tumuli* on the peaks o the Neilgherries, and it has been objected that they cannot b assigned to the ancestors of the Todars, because agricultura implements have been found in them, and these people neve cultivate the ground. But it must be remembered that th Todars now extort *goodoo* or tribute of grain from the oth hill tribes, and that it is their only food. It must be inferre therefore, that, before they discovered this easy mode of pr curing food, and previous to the arrival of these weaker ag cultural tribes on the hills, the Todars must have been the own cultivators. The hill people attribute all ancient ruin of the origin of which they know nothing, to the Pand the famous heroes of Hindu tradition; and all that can

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[6] *Tribes inhabiting the Neilgherry Hills, from the rough Notes of a German Missionary.* (Madras, 1856.)

by the Todars of the Nilagiri Mounta by the Rev. F. Metz, of the Gern Evangelical Mission. (Madras, 18

aid of these Neilgherry cairns is that they are probably the ork of an unknown extinct race, who practised Druidical ites.[8]

We visited several of these remains of an ancient people. n the summit of the peak of Kalhutty, on the left hand of ie road leading down the Seegoor ghaut to the Mysore lains, whence there is a grand view of mountain scenery, rest-clad slopes, and a wide expanse of country stretching way to the horizon, we found several old cairns. They were great size, built of immense stones, and hollow in the ntre. On another peak, called Ibex Hill, one side of which a scarped cliff many hundreds of feet in height, over- nging the Seegoor ghaut, we also found two huge cairns, rming a circle about eight feet in diameter. There are any others in different parts of the hills, generally on the ghest peaks, and iron spear-heads, bells, sepulchral urns ith figures of coiled snakes, tigers, elephants, dogs, and rds on them, sickles and gold rings have been found buried ider the piles of stones.

The Todars, as has been said, are the "lords of the hills," d not only all the other hill tribes pay them tribute, but e English Government also pays rent to them for the land which the stations are situated.[9] But the agricultural be of Burghers or Badagas, who came to the hills several nturies after the Todars, and are subject to them, are by the most numerous, numbering 15,000 souls, and occu- ing 300 villages. They are divided into eighteen classes castes, the members of one of which, called the Wodearu dagas, wear the Brahminical string, are proud and lazy, d inhabit five villages apart from the rest. The villages

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[8] *Antiquities of the Neilgherry Hills*, Captain H. Congreve, 1847. Also, dwell's *Comparative Dravidian mmar*. The German missionaries eve that these cairns were the work of the Kurumbers, another wild hill tribe.

[9] Todars pay two taxes to Government in return, on female buffaloes and on grazing land, both small in amount.

of the Badagas are scattered all over the plateau of the hills, and their land occupies two-thirds of its area. They are much darker, and not nearly such fine men as the Todars, wear cotton-cloth turbans and clothing much like other natives of India, and are very superstitious and timid; but they are industrious, though not so much so as the labourers who come up from the plains, and kind and affectionate to their women and children. The Badagas, though they possess herds of buffaloes, are chiefly employed in cultivation. Their crops consist of *raggee* (*Eleusine corocana*), the most prolific of cultivated grasses,[10] which is made into dark brown cakes and porridge; *samee* or Italian millet, barley, an amaranth called *keeray*, some pulses, mustard, onions, and potatoes. We often passed through the Badaga villages. The houses are built in a single row, with one thatched roof extending over so as to form a verandah, supported on poles. In fron there is a hard mud floor, where the piles of grain are heape up; and there is generally a *Swami*-house or temple, with verandah in front supported by numerous poles, the wall and poles being painted in red and white stripes, the Hind holy colour. Round the villages there are cultivated patche of *raggee* and *samee*, which they were reaping in Decembe In the centre of the fields there is a small threshing-floo where we often saw the Badagas sifting the grain from tl chaff by shaking it through sieves, and letting the wind bl the chaff away. A Todar was generally squatting near, li an old vulture, waiting for his *goodoo*. The Badagas belo to the Siva sect, their principal deity being Rungaswan whose temple is on the summit of the easternmost peak the Neilgherries; but they also worship 338 other idols *Swamis*, such as trees, streams, stone pillars, and even knives.

[10] *Raggee*, however, is the least nourishing of all the cereals, although it ... the chief part of the diet of the poorer classes in Mysore and on Neilgherries. In good seasons it yi 120-fold, but it is very poor fare.

is the military station of Jakatala, the finest barracks I ever saw in any part of the world. It is well sheltered by high hills from the cold north winds to which Ootacamund is exposed, as well as from the south-west monsoon, and is in every respect admirably adapted as a sanatarium for soldiers and their families. It has been maintained that the children of Europeans cannot be reared even on the hills of India, though upon what grounds this extraordinary assertion is based I have not yet learnt. The strongest arguments against this idea are the fresh rosy cheeks and rude health of the boys and girls in the Lawrence asylum, and of the boys and young men at Mr. Pope's[3] and Mr. Nash's schools in Ootacamund, who present a striking contrast to the children on the plains. The bracing climate of the upper plateau of these hills appears to me to be perfectly well adapted for European colonists: it has all the advantages with none of the disadvantages of England, and there are no influences which can be detrimental to English constitutions. At the time of our visit a battalion of the 60th Rifles, and a number of convalescent soldiers from other regiments, were stationed at Jakatalla. The quarters for the men are built round a large quadrangle, with an upper story, and airy corridors for exercise in wet weather. Beyond are the married quarters for ninety couples, each with two comfortable rooms and a little garden; and there are also a hospital, library, school-rooms, substantially-built skittle-alley with brick arches, fives-court, and swimming-bath. The officers are quartered in bungalows on the surrounding hill-slopes, or at Coonoor. It would be well if the whole of the European troops in the Madras Presidency were permanently quartered on the Neilgherry and other hills as soon as the railroads are completed. Many of the married men might be permitted to cultivate

[3] The great Tamil scholar.

ıd settle on land of their own, with their families, subject to ıe condition of being liable to be called on to serve if re- ıired, and a sort of military colony might thus be formed. here is excellent pasture for flocks of sheep, wheat may ə grown in any quantity, and there is not the slightest ınger to Europeans in undertaking field labour.

The English settler on the Neilgherries will find English uits, flowers, vegetables, and grasses, the introduction of which mainly due to the exertions of Mr. William G. McIvor, the uperintendent of the Government gardens at Ootacamund, ıd now also Superintendent of Chinchona plantations in outhern India. This gentleman has been in charge of the ardens at Ootacamund since 1848, and unites zeal, intel- gence, and skill to the talent and experience of an excellent ractical gardener. Under his auspices the steep slopes of ne of the spurs, which run off from the peak of Dodabetta nd overlook the cantonment of Ootacamund, have been onverted into a tastefully laid-out garden, in a succession o erraces. Hampered at first by the interference of a useles ommittee, and with no assistance beyond that of an Eas ndian foreman and labourers from the Mysore plains, h ıas succeeded in changing the wild mountain-sides into ery beautiful public garden. Every point of view is take dvantage of with admirable taste, and numerous trees an lowering shrubs have been introduced from England, Au ralia, and other countries, while the native flora of the hi s fully represented. There are English roses and ge: ıiums, ponds bordered by white arums, shady walks ov ırched by trellis-work, tasteful vases filled with sho lowers, thickets of rhododendrons, hedges of heliotrope a uchsia, fine clumps of tall spreading trees, and, from the up erraces, between the leafy branches, there are glorious vi of the Ootacamund valley, and of the finely broken rang distant Koondah hills.

Mr. McIvor also has a small branch-garden at Kalhutty, about half-way down the Seegoor ghaut, leading to the Mysore plains, for raising fruits which require a warmer climate. This garden is self-supporting. A magnificent waterfall descends into a rocky basin close beside it, and the garden contains oranges of many kinds, shaddocks, lemons, limes, citrons, nutmegs, loquats, and plantains. On this spot the delicious chirimoyas, the seeds of which we brought from Peru, will hereafter ripen, and enable the people of India to taste the "masterpiece of nature."

European enterprise on the Neilgherries has hitherto been chiefly directed towards the cultivation of coffee, and there are several fine estates near Coonoor. On the 15th of November we set out from Ootacamund to visit them, and rode down the valley of Kaitee, where the house stands which once belonged to Lord Elphinstone, certainly not in a well-selected spot. It was originally chosen for a Government farm, which was given up, and the house was then occupied for a short time by the Governor of Pondicherry. Lord Elphinstone, when Governor of Madras, took a fancy to the place, erected a very substantial house, furnished it handsomely, and frequently resided there. In 1845 the property was bought by Mr. Casamajor of the Civil Service, who established a school there for Badaga children, on the principle of paying them for coming, at the rate of 1 anna a day. On his death he left it to the Basle Evangelical Missionaries, to whom it is now occupied. They have schools, and labour amongst the Badagas, but as yet with scarcely any success. The stream which drains the Kaitee valley forms a very beautiful waterfall down the face of a cliff into the Karteri valley, where there is a small coffee estate worked by a Frenchman; and, after crossing a range of hills, in parts thickly wooded, and in parts covered with a shrubby *Justitia* with a blue flower, we reached the coffee plantation of

Hoolicul,[4] owned by Mr. Stainbank. The highest part of his state is 5700 feet above the sea,[5] and here he has twenty-ve acres planted in rather poor soil. Below his house there re about forty-five more acres planted, down the steep slopes f the hill, some of the bushes in very good bearing. They re thick, as he is against pruning the branches, saying that hen covered by leafy branches the fruit ripens by degrees, nd consequently requires less labour in picking. The estate as passed through several hands, and the oldest trees ere planted seventeen years ago. Mr. Stainbank expects ventually to get fifty tons of coffee off this estate, in the ear. An acre will occasionally yield twenty-five hundred eight.

The view from the house is very fine. The plantatio lopes away by a very steep descent, and in the distance ar he Lambton's Peak range of mountains, and the wide plain f Coimbatore.

Leaving Hoolicul, we again descended into the ravine Karteri, where the river passes close under the steep face he hills on which the station of Coonoor stands, and on th lopes of the opposite mountains there are several coff estates. Mr. Dawson, a son of the landlord of the hotel Dotacamund, has 100 acres planted; but the most extensi estate, on the steep slopes overlooking the ghaut leadi lown into the Coimbatore plains, belongs to Mr. Stanes. as 200 acres planted with 250,000 trees, up the precipit ides of the mountain, facing east, and protected from t excessive rains of the S.W. monsoon. The elevation ab he sea is upwards of 4800 feet. On the summits of t nountains above this estate Mr. Stanes has induced t

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[4] *Hooli*, a tiger in the Badaga language; and *cul*, a rock or stone in Tamil and Canarese. *Pili* is a tiger in Tamil.

[5] a Committee of the House of Comm gave 2500 to 4000 feet as the favourable elevation for the growt coffee.

Todars to form two cattle crawls, whence manure is wash down to his plantation. The trees are planted in rows, 6 8 feet apart, and regularly topped and pruned, so as admit the sun to ripen the fruit on every branch. They from 4 to 6 feet high, and planted in holes 20 inches d by 18; the young plants being brought from a nurs where seedlings are raised. The trees are generally in bearing in the third year. After the berries are picked, brought in baskets to the *godown* or warehouse, the pul fleshy part has to be removed. The berries are placed heaps in a loft, above the *pulper*, looking bright and red ripe cherries. They are then sent down a shoot, into wh a stream of water is conducted, and are thus washed into pulper. On Mr. Stanes's estate this machine is worked b water-wheel, but generally it is turned by hand and a wheel. The pulper is a roller covered with a sheet of cop made rough like a nutmeg-grater. The berries fall on i it goes round, but there is only room for the seed to pass that the pulp is squeezed off, and carried away by a stre thrown off by the water-wheel, while the naked coffee dr on the other side. The seeds are still covered with glutin matter, to remove which they are well washed in a cist the inferior ones floating, while the good ones sink. coffee-seeds are then laid out on the *barbecus*, square p forms of brick plastered with *chunam*, with sides a foot hi where they dry in the sun for about three days, and afterwards stored in the godowns.

It is estimated that an acre of jungle on the Neilgher may be cleared for 200 Rs., including all expenses. coffee-seedlings, from the nursery, may be planted out seven months, and they will yield a first crop in three ye Coffee-seeds are 5 Rs. a bushel, and that quantity will 10,000 plants, covering 10 acres. One acre ought to y one ton, when well cultivated, selling at Calicut, unclea

Todars to form two cattle crawls, whence manure is washed down to his plantation. The trees are planted in rows, 6 to 8 feet apart, and regularly topped and pruned, so as to admit the sun to ripen the fruit on every branch. They are from 4 to 6 feet high, and planted in holes 20 inches deep by 18; the young plants being brought from a nursery, where seedlings are raised. The trees are generally in full bearing in the third year. After the berries are picked, and brought in baskets to the *godown* or warehouse, the pulp or fleshy part has to be removed. The berries are placed in heaps in a loft, above the *pulper*, looking bright and red like ripe cherries. They are then sent down a shoot, into which a stream of water is conducted, and are thus washed into the pulper. On Mr. Stanes's estate this machine is worked by a water-wheel, but generally it is turned by hand and a fly-wheel. The pulper is a roller covered with a sheet of copper, made rough like a nutmeg-grater. The berries fall on it as it goes round, but there is only room for the seed to pass, so that the pulp is squeezed off, and carried away by a stream thrown off by the water-wheel, while the naked coffee drops on the other side. The seeds are still covered with glutinous matter, to remove which they are well washed in a cistern, the inferior ones floating, while the good ones sink. The coffee-seeds are then laid out on the *barbecus*, square platforms of brick plastered with *chunam*, with sides a foot high where they dry in the sun for about three days, and are afterwards stored in the godowns.

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for 4 annas the pound. In three years the estate ought to pay 10 per cent. on the capital expended, if well conducted; the next year the gross profit should increase to 60 per cent., and afterwards to 100 per cent. A good dwelling-house will cost 4000 Rs.; the pulping-house, machinery, and godowns, 4000 Rs. more. Carpenters get 20 Rs. a month, bricklayers 15 Rs., with 2 annas a day batta for coming out of the town, and common labourers 4½ Rs.

The Neilgherry planters have great advantages in the way of means of conveyance from their estates to Calicut and Beypoor, their ports of shipment. The coffee is carried down the Coonoor ghaut on pack-bullocks to Matepoliem, and thence in carts along a good road, by Palghatchery, to the sea-coast. Generally the coffee from the Neilgherry estates is bough by Mr. Perry and Mr. Andrews at Calicut, in rather a dirty state. They have garbling-machines for clearing away al remaining dry pulp, and removing the outer coat from th seeds; and they make their profit by shipping the coffee an selling it in a clean state fit for European use. Neilgherr coffee has an excellent name in the London market.

Europeans, on the Neilgherries, hold land by a *puttum* grant from Government, leasing it in perpetuity, so long the assessment is paid, which is fixed at 1 R. per acre coffee-land, levied after the third year. By the resolutio of the Madras Government, dated August 5th, 1859, the ter on which waste lands can be purchased were regulate These orders apply to all the regions in Southern Ind which are suited for coffee or chinchona cultivation. It w resolved to sell outright the fee-simple of all land used building, and of waste land in the hills, without reservati of quit-rent, and with an absolute and indefeasible tit sold to the highest bidder at an upset price, at twenty tin the amount of yearly quit-rent or land-tax. A title-d will be given under the seal of the Government, declar

the absolute title of the holder, free from all demands on account of land-revenue, with full powers to dispose of the land at pleasure, but not exempting it from payments for municipal purposes. Other parties, however, claiming a previous right in the land, will be free to sue the holder in the Civil Courts, up to a certain time, so that it will be necessary to make careful investigations on this point before purchasing. When the land-tax is not redeemed, Government will issue permanent title-deeds, reserving a quit-rent and the holder will be free to redeem the tax, on the same terms, at any future time.

With regard to labour on the Neilgherries, there used to be abundant supplies of coolies from Mysore and Coimbatore but they have recently fallen off, owing to competition on the railway works. Mr. Stanes was paying his labourers ½ Rs. a month, and women 3½ Rs. He told me that he was particular always to pay every labourer himself, and to be very kind to them, by which means he never found any difficulty in procuring labour. Some of the planters get the services of Badagas, and even of some Kurumbers in the picking-time, but the hill tribes are not generally willing to work on the coffee plantations. There are fifteen coffee estates on the Neilgherry hills.

But the oldest coffee-district in Southern India is Wynaad, a forest-covered plateau about 3000 feet above the sea, which adjoins the Neilgherries on the north. In this district there are upwards of thirty coffee-plantations, some of them, such as that of Messrs. Campbell and Ouchterlony, near the ascent to the Neilgherry hills, being very extensive.[6] There is a great rainfall in Wynaad during the S.W. monsoon, and the crops are very abundant; but at the same time the coffee

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[6] There are 11,386 acres of land under coffee cultivation in Wynaad, of which 8 owned by Europeans, and 4028 by natives: of these 7224 are liable to assessment, that is, the coffee-trees are in bearing.

ot so good as that grown in drier situations, such as the Neilgherries near Coonoor, though the yield is greater. Most of the available land is already taken up. The labour s derived from Mysore, whence the coolies come, often from listances of sixty or seventy miles, returning to their families when their wages are paid. In 1860 the tax on coffee-estates n Wynaad was fixed at 2 Rs. an acre on land actually planted, to be imposed in the third year, at which time the rees are in bearing.[7]

The export trade in coffee, from all the hill-districts of Southern India, was, in 1859-60, as follows:—

	Quantity.	Value.
From the ports of Malabar	7,35,19,26lbs.	7,35,177 Rs
,, ,, Canara	5,13,36,35	8,66,644
,, ,, Tinnevelly	23,36,93	23,387
,, port of Madras	8,15,89,74	2,49,846
	20,87,82,28	18,75,054

In connexion with the clearing of forests for coffee-cultiva ion, it is imperative that due attention should be paid to th preservation of valuable timber, and the conservancy of th belts of wood near the sources and along the upper courses streams, so as to ensure the usual supplies of water, and retain a due amount of moisture in the atmosphere. For th superintendence of these important measures, together wi other duties, Dr. Cleghorn has been placed at the head of Forest Conservancy Department in the Madras Presidenc He strongly urges that the high wooded mountain-tops ove ranging the low country should not be allowed to be clear for coffee-cultivation, lest the supplies of water should njured.[8] "The courses of rivulets," he says, "should overshadowed with trees, and the hills should therefo

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[7] Besides a *jemmi* fee on Govern- land of eight annas an acre

[8] Cleghorn's *Forests and Garden Southern India*, p. 16.

be left clothed for a distance of half their height from the top, leaving half the slopes and all the valleys for cultivation. Immense tracts of virgin forest in the valleys of the Koondah hills are eminently suited for coffee-cultivation. The clearing should only be allowed from 2500 to 4500 feet, this being the extreme range within which coffee planted on a large scale is found to thrive."

There are still thousands of acres of uncleared forests, at suitable elevations, well adapted for the growth of coffee, in the cultivation of which the English capitalist would make large and rapid profits; yet it is not many years since the first coffee-plants were introduced into these hills. Coffee now forms an important item in the exports from the Madras Presidency. There is every reason to hope that the bark from quinine-yielding chinchona-trees may also become one of the valuable products of the hills; and in the following chapter I propose to give an account of the selection of the sites for the first experimental plantations.

CHAPTER XXVI.

MYSORE AND COORG.

Seegoor ghaut — Sandal-wood — Mysore — Seringapatam — Hoonsoor — The tannery — Frascrpett — Mercara — The fort — The Rajahs of Coorg — The Coorgs — Origin of the river Cauvery — Coorg — Climate — Coffee cultivation — Sites for chinchona-plantations — Caryota Urens — Virarajendrapett — Cardamom cultivation — Kumari — Poon, blackwood, and teak — Pepper cultivation in Malabar — Cannanore — Nuggur and Baba Bodeen hills — The Beebee of Cannanore — Compta — Sedashighur — Arrive at Bombay.

THE descent from the plateau of the Neilgherries to the plains of Mysore on the north, is by the Seegoor ghaut, the only one which is practicable for carriages. It is much tamer, and not to be compared with those of Sispara or Coonoor; and at the foot there is a wide belt of thin, stunted, pestiferous jungle, twenty-five miles in breadth, through which the river Moyaar flows to join the Bowany. There are a great many young teak-trees, and sandal-wood is also found, in the forests on the inner or eastern slopes of the ghauts; but all the timber looked poor and stunted.[1] The sandal-wood tree (*Santalum album*) is about twenty feet high, with numerous spreading branches, and small purplish flowers. Dr. Cleghorn reports that with vigilant supervision, and slight assistance to nature in clearing the heads of young plants, which are often matted down by creepers, an addition might accrue to the revenue of several districts in the Madras Presidency by the

[1] Dr. Cleghorn states that the Seegoor forest has been much exhausted by unscrupulous contractors. "It is important," he adds, "that it should be allowed to recover, as it is the main source of supply to Ootacamund for housebuilding purposes." Captain Morgan has been placed in charge of it, and it is hoped that the sale of sandal and jungle-wood will cover the expenses, while the young teak is coming on for future supply. P. 36.

sale of sandal-wood. The export trade in sandal-wood and oil is even now very considerable. The road from the foot of the Seegoor ghaut to Mysore, a distance of sixty-four miles, is excellent, and there is a very good bridge over the river Moyaar. We passed the night at the half-way bungalow of Goondulpett, whence there is a grand view, with scattered date-palms in the foreground, a vast expanse of undulating plain beyond, bounded by the belt of forest, with the blue line of the Neilgherries in the distance. There is nothing of interest between Goondulpett and Mysore.

Mysore is on a table-land 2450 feet above the sea. On the western side of the town flows the Purneah canal, which comes from a distance of seventy miles to supply Mysore with water, and was made by the Brahmin minister Purneah, who came into power during the present Rajah's minority, after the death of Tippoo. In approaching the town, the isolated rocky hill of Chamandi is seen on the right. Mysore is fortified, and, after passing under the ramparts, we entered a square, one side of which is occupied by the Rajah's palace. Here, and in the adjoining streets, there was an unusual amount of life and bustle owing to the presence of a native court; and we met crowds of nautch-girls, men in various costumes, elephants, camels, and bullock-carts. Some of the houses have upper stories, but the majority are dark places, with red-tiled roofs extending far over, and forming verandahs.

Mysore is so called from its having been the abode of the buffalo-headed demon *Mahesh-asur*, who was slain by Parvati, the wife of Siva, in her most hideous and repulsive form, as Cali, the impersonation of vengeance. The country, from 1336 to 1565, formed a part of the Brahminical kingdom o Bijayanuggur; and in 1576 one Raj Wadeyar established hi independence as ruler of Mysore, from whom the presen Rajah is descended. After the death of Tippoo Sultan, an

the capture of Seringapatam by the English in 1799, the present Rajah, then only five years old, was placed on the throne, and the country was ruled by his very clever minister Purneah, until he came of age. He afterwards proved so utterly incompetent to govern, that the country fell into a state of anarchy, and the English therefore undertook the administration in 1832. The Mysore Commission was then formed, with Sir Mark Cubbon at its head, and Mysore was divided into four divisions—Bangalore, Astagram, Nuggur, and Chitteldroog.

The table-land of Mysore covers an area of 30,886 square miles, and contains a population of 3,300,000 souls. Sir Mark Cubbon's administration was vigorous and progressive. In 1832 the revenue was 440,000*l.*, in 1860-61 it was 950,000*l.*, and in the latter year there was an excess of income over expenditure, amounting to 120,000*l.* The Chief Commissioner has made upwards of 1600 miles of excellent carriage-road, bridged throughout, and has introduced many important measures, while the officers who have worked under him have generally been distinguished for ability and zeal. The good old general was sixty years in India, and governed Mysore from 1832 to 1861. He was adored by all ranks of the people, and his resignation caused universal regret, when, early in 1861, he sailed for England. But he was not destined to see his native land again, he died at Suez and thus passed away a brave soldier and an enlightened statesman, one who had done as good and valuable service to his country as any English public servant during the present century.

During our stay at Mysore we drove over to Seringapatam a distance of twelve miles. The immediate neighbourhood of the capital is chiefly planted with dry grains, such as raggee and pulses. The common people live chiefly on raggee

which they store in underground pits. They also use the seeds of gram (*Cicer arietinum*) in curries and cakes, and the oxalic acid which exudes from every part of the plant serves instead of vinegar for their curries. The roads round Mysore are lined with hedges of American aloe. After the first few miles, we began to pass through groves of cocoanut and betel-palms,[2] much rice cultivation, and fields of sugar-cane. Close to Seringapatam a sugar manufactory has been established by Mr. Grove, who buys up the *jaggery* from the ryots and refines it. We crossed the Cauvery by a fine bridge, and saw the great canal constructed by Tippoo for irrigating the rice-fields. There are large ruinous houses and temples, embowered in palm-trees, with flights of steps down to the river, outside the old town itself, which is surrounded by a wall and ditch.

We first drove to the tomb under which Hyder Ali and Tippoo are buried. It is in the middle of a garden called the *Lal-bagh*, with a pretty avenue of cocoanut and betel-palms leading up to it. The tomb is a square building, surmounted by a dome, with minarets at the angles, richly decorated with arabesque-work in *chunam*. It is surrounded by an open corridor, supported by pillars of black hornblende, and in the centre of each side there is a doorway. That facing the avenue is filled in with an open-work screen of the same stone, and the others have double doors richly inlaid with ivory, the gift of Lord Dalhousie. The tombs are placed under the dome, three in number, namely, of Hyder, Tippoo and Tippoo's mother, each covered over with a pall of crimson silk. The building is surrounded by cloisters, a part bein

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[2] The areca-palm requires a low moist situation, with rather a sandy soil, either under the *bund* of a tank, or in a position otherwise favourable for irrigation. The seeds are put into holes six feet apart, and the tree comes into bearing in about eight years. It yields fruit for fifty years, and, when in full bearing, produces 1½ lbs. of nuts.

used as a choultry for Moslem travellers, another as a mosque, and another as a school for small boys who learn to read the Koran. Government grants an allowance for keeping the place in repair, and paying Moulvies to serve in the mosque. The effect of the snow-white tomb, richly adorned with arabesque-work, the lance-like minarets, the cloudless sky, and the feathery palm-trees rearing their graceful heads round the building, was exceedingly like a scene in the Arabian Nights. The tomb of Colonel Baillie, who was taken prisoner by Hyder Ali in 1780, is close by, but in a very neglected state.

We then went to the *Derya Dowlet-bagh* close to the town, which was the favourite summer-palace of Tippoo. It is a very richly ornamented arabesque building, every part being covered with gilding and bright colours, and pictures on the walls representing the repulse of Lally, and the defeat of Colonel Baillie. From this place we went to the town of Seringapatam itself, which is built on an island in the Cauvery, and surrounded by a strong wall and two very deep ditches. Close to the gate is the *jumma musjid*, or principal mosque, with two tall minarets; and, in one corner, the spot is pointed out where Tippoo was accustomed to pray, entering the mosque by a small side-door. The double ditch is a very formidable defence to the town, but it does not extend along the side facing the river, and it was here that the assault was delivered by the English general. A feint was made in the direction of the *Lal-bagh*, where the English suffered severely, while the real storming party was formed on the opposite side of the Cauvery, at a spot which is now marked by two upright posts. A bastion facing the river had previously been breached, the four guns on it dismounted, and scarcely any other guns could be brought to bear on the soldiers of the assaulting column at this

rticular point, who dashed across the Cauvery and up the ɜach. Tippoo was jammed by the flying crowd in a small orway, which we saw, where he was killed, and from that y the pestiferous Seringapatam ceased to be the capital Mysore. The palace, now in ruins, is very like that of e Nawab of the Carnatic at Trichinopoly, a plain rambling ilding with rows of large windows, and there are extensive rdens round it, full of tamarind-trees, cocoanuts, plantains, d vines.

The old town of Seringapatam is exceedingly interesting, ıt it now wears an appearance of silent decay and deso- tion. It is notoriously unhealthy, and the inevitable ɜnalty of a night passed in the town is a severe attack of ver.

From Mysore we took our way, by Hoonsoor, to the hill strict of Coorg. The road to Hoonsoor passes over twenty- ght miles of a country very little cultivated, with extensive acts of waste land, and a few fields of dry grain near the llages. Hoonsoor has for many years been a Government ɜazing-farm and manufactory. In 1860 the bullocks were l sold off, but there are still thirty-eight fine elephants, and pwards of a hundred camels. We saw the elephants having ıeir breakfasts in a solemn motionless row, large heaps o ce wrapped in bundles of reed being put into their mouth y the mahouts. Besides an establishment of blacksmith ırpenters, brass-workers, and of women employed in makin lankets, there is an extensive Government tannery at Hoo ɔor. There are many trees in India well adapted f ınning purposes, but the American sumach (*Cæsalpin ɔriaria*) introduced by Dr. Wallich in 1842, and called l ıe natives *divi-divi*, appears to be considered the best Hoonsoor. The *kino*-tree (*Pterocarpus marsupium*) is anoth nd there are two kinds of *catechu* used for tanning, one fr

the betel-nut-palm, and the other from an acacia. To obta
the *catechu* from the betel-palm the nuts are boiled, and t
remaining water is inspissated, and yields the best kir
which is used for the golden coffee-brown colour in dyei
calico, as well as for tanning. From the acacia the *catechu*
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considered so good as *kino* or *divi-divi* for tanning purpos
on account of its extreme astringency. The tannery
Hoonsoor is a very extensive establishment, where shc
sandals, crossbelts, and scabbards are made for the army.

This place suffers frequently and most severely fr
cholera; and, during these terrible visitations a *Swami*
God, in the shape of a small stone image of Ganesa sea
under a black-wood tree, is specially invoked.

Hoonsoor is 25 miles from Fraserpett, at the foot of
Coorg mountains, and we passed through extensive grove
palm-trees with chatties fastened round the spadices to ca
the toddy. Fraserpett is within the Coorg district, and i
in the pleasant little bungalows which have been built h
that the English take refuge during the heavy down-pou
the south-west monsoon. Through the kindness of Cap
Martin, a former Superintendent of Coorg, and now enga
in the cultivation of coffee, we found horses waiting for u
Fraserpett, and continued our journey to Mercara, the cap
of the district.

After the first two miles the road enters a dense ban
jungle, extending along the base of the mountains. It
the month of January and the forest was completely d
up and burnt by the sun and want of rain, looking bl
and sombre. A splendid white *Ipomœa*, with a rich
centre, was creeping in festoons to the very top of
feathery bamboos which bent gracefully over the road.
a place called Soonticoopah, ten miles from Fraserpett,

the betel-nut-palm, and the other from an acacia. To obt
the *catechu* from the betel-palm the nuts are boiled, and
remaining water is inspissated, and yields the best ki
which is used for the golden coffee-brown colour in dye
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ascent of the mountains begins. The road leads up

a succession of wooded heights, which gradually in-
e in elevation, with intermediate valleys cultivated with
and generally fringed with plantain-groves, through
ı the huts of the Coorgs are visible. At the heads of
valleys the streams are divided into two channels, and
own each side, the space between being sown with rice
rraced fields, gradually descending with the slope of the
y. These bright patches of cultivation are very pretty,
their light vivid green contrasting with the sombre hues
ıe forest. Near Mercara the jungle is a good deal
ed, and the slopes are covered with coffee-plants. The
is excellent.

›wards evening we came in sight of Mercara, by far the
iest place I have seen in India. On the opposite side of
ep narrow valley was the fort and palace, built on an
ience overlooking a vast extent of mountainous, forest-
red country. The palace is surrounded by a fortified
of dark-coloured stone, with semicircular bastions at
vals. On the wall facing us were two square buildings,
a row of long windows, and an overhanging roof, the
lence of Captain Eliott, the Superintendent of Coorg;
behind rose up the long edifice forming the old palace,
the white steeple of a modern church. A range of
lcd hills, with heavy clouds hanging over them, formed
background. To the right, at a lower elevation were the
ve town, and two mosque-like buildings, snowy white,
ı domes, and minarets at the angles, rising up amongst a
ve of trees. These are the tombs of the former Rajahs.
narrow gorge below the fort is planted with coffee and
ıtains, which almost hide the huts that nestle amongst
m. In the bottom of the ravine is the principal pagoda
Mercara, built like a mosque, with the tops of the
ıarets richly gilded. The entrance to the fort is by a
ep ascent, leading under a deep gateway in the outer line

of fortification, into a courtyard. A second archway le into a second small court, where there is an elaborat carved pagoda to Ganesa. A third archway opens upon principal courtyard of the fort, one side of which is occup by the Rajah's palace, a long barrack-looking building, w an upper story and projecting tiled roof. The officers native regiment are quartered in the palace. To the le the English church, and to the right there is a dark dung under the rampart, where the late Rajah kept his prison He used to allow one at a time to run out, and try to esc by the archway, while he picked them off with a rifle fro window of the palace as they ran. There are two full-si models of favourite elephants, built of brick and *chunam* the courtyard. The huts of the native regiment are cluste in a little valley close under the south wall of the fort.

The palace is entered by an archway, over which the a balconied window supported by two white horses. inner court is surrounded by a corridor of stone pillars, a roof entirely of copper; and in the centre of the there is a tank paved with stone flags, now dry, with steps down to it, on two sides, and a carved stone tortois the centre.

On the other side of the small valley filled with sold huts, there is a parade-ground, and a small amphitheatre out of the solid rock, where elephants and tigers fough the diversion of the Rajah. Beyond the parade-ground ridge on which Mercara is built abruptly terminates, an land sinks down into a wooded valley. Here the late R had built a little brick and *chunam* summer-house, wh the land descends precipitously to the road leading dow Mangalore ghaut. From this point there is one of the glorious views to be found in India, and we could sit o grassy edge of the cliffs for hours, without ceasing to it. Right and left there is a wide expanse of forest-co

ıges of mountains extending into the blue distance, and in
ınt rises up the mountain of Tadiandamol, the loftiest
ak in Coorg. We watched the crimson sunset over the
ls, and after dark a spontaneous ignition of the dry grass
ınd like a serpent along the loftier ridges of the opposite
ountains, producing an indescribably beautiful effect in the
ar starry night.

Coorg has been a portion of the British dominions since
34, when the last Rajah was deposed. The old Rajahs were
t Coorgs, but Hindu Lingayets, a peculiar sect whose
embers wear a small god round their necks, in a little
ver coffer.[3] The family had certainly reigned in Coorg
ıce 1633; and Dodda Virappa, who died in 1734, fixed the
at of government at Mercara, and was the greatest prince
his family. He repulsed a simultaneous invasion of the
ysore Rajah and the Nairs of Malabar, and afterwards
igned in peace for eighteen years. Hyder Ali invaded and
erran the country several times, but in 1788 the young
ajah Viraraja rallied the people round him, disputed every
ch of ground against Tippoo's invading army, and made an
liance with the English in Malabar. On the fall of Tippoo
treaty was signed between the East India Company and
raraja of Coorg, who died in 1807, leaving the country t
s favourite daughter Devammaji. His brother Lingaraja
owever, usurped the throne. He was a monster of cruelty
d, dying in 1820, was succeeded by his still more brut
n Viraraja, who massacred all his father's friends, togethe

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[3] The Lingayets are members of a *Vira Saiva* sect, or worshippers of Siva as the *Linga*, a representation which they carry round their necks. The sect is numerous in the central and southern parts of the peninsula. It is of modern origin, having been founded by a Brahmin of Kalyan in the middle of the 12th century. Its members and the authority of the Vedas, recognize various divinities, and virtually abolish the distinction of castes and the inferiority of women. They are divided into *Aradhyas*, by birth Brahmins, and often well versed in Sanscrit literature; *Jangamas*, who have a literature of their own, written in Karnata and Telugu; and Bhaktas

with the poor young princess Devammaji. Her sister, who had married a Coorg, escaped into British territory. It would be too revolting to recount all the atrocities of the last Rajah of Coorg; but at length the patience of Lord William Bentinck was exhausted, and in April 1834 General Fraser entered Mercara, and deposed him. Coorg has since been governed by an English Superintendent, under the orders of the Commissioners of Mysore.

The Kodagas or Coorgs are a tall, muscular, broad-chested, well-favoured race of mountaineers, numbering about 25,000, with a population rapidly increasing since the deposition of the Rajah.[4] They are of Dravidian origin, and speak a dialect of Canarese; but a colony of Brahmins early settled in the country, and endeavoured to mould the traditions of the Coorgs into harmony with their own legends. These are embodied in the Cauvery Purana, where there is a romantic account of the origin of that important river, which rises in the mountains of Coorg.

In the Mahabharata it is related that the *amrit* or drink of immortality, which had been lost in the waters of the Deluge, was recovered by the Suras and Asuras, gods and demons, by churning the ocean. The Asuras are then said to have stolen it, and it was finally restored to the gods by the maiden Lopamudre, who charmed the Asuras by her beauty. The fair damsel then resolved to become a river, and thus pour herself out in blessings over the earth. But the sage Aghastya, famous in the history of Madura, was enamoured of her, and she at length so far yielded as to consent to be his wife, on condition that she should be at liberty to forsake him the first time he left her alone. One day he went to a short distance to bathe, when Lopamudre immediately gratified her early longings, by jumping into Aghastya's holy tank, and

[4] The whole population of Coorg is about 119,160.

flowing forth as the river Cauvery. The sage, on his return, ran after her, but the only consolation that was left to him was to explain to his beloved the course she ought to take in flowing towards the eastern sea.

The Cauvery Brahmins, as persons of that caste are called in Coorg, wear the sacred thread, and perform *poojah* to Amma, the goddess of the river. They number about forty families, but are fast dying out. They are often very rich, and are employed in the pagoda, or as clerks in the Superintendent's office. The Coorgs themselves, the inhabitants of this mountainous district, are divided into thirteen castes.[5] They generally retain the old devil-worship of the Scythic or Dravidian race from which they are descended, and are addicted to the use of charms and sorceries. They marry at a ripe age, but the wives of brothers are considered as common property. All the men wear a silver-mounted dagger, secured round the waist by a silver chain; and the women, who are often very pretty, wear a white cotton cloth round the head, with the ends hanging half-way down the back. The men are an independent, hard-working race, tall, with comparatively fair skins. They are very keen sportsmen, and most of them possess a gun, the boys practising with pellet-bows.

Coorg consists of a succession of lofty wooded ridges and long deep valleys, forty miles broad by sixty long, between lat. 12° and 13° N. It is bounded on the north by the river Hemavati, on the south by the Tambacheri pass, on the west by Malabar and South Canara, and on the east by Mysore. South of Mercara the country appears covered with forest

[5] Namely, the *Amma Kodagas* or Cauvery Brahmins; the *Kodagas* or chief tribe; the *Himbokulu* or herdsmen; the *Heggade* or cultivators; the *Ari* or carpenters; the *Badige* or smiths; the *Kuruba* or honey cultivators; the *Budiya* or drawers of toddy from the *Caryota urens* palm; the *Meda* or basket-makers; the *Kaleya* or farm-labourers; the *Holey* or slaves; and the *Yerawa* or slaves from Malabar, cheaper than cattle.

wave upon wave of wooded mountain ranges rising one behind the other, the highest peak of all having its summit partially bare of trees, and covered with rich herbage. The elevations above the sea are as follows:—

Tadiandamol (the highest peak)	5781 feet
Pushpagiri (another peak)	5682
Mercara	4506
Virarajendrapett	3399
Fraserpett	3200

The river Cauvery drains about four-fifths of the surface of Coorg, while about a dozen streams, issuing from the same hill region, traverse Malabar and South Canara. From the end of December to the end of March rain is very scarce, but the valleys are seldom without fogs more or less dense in the evenings and mornings, and heavy dews are frequent. During these months a dry east wind prevails, which has long ceased to carry rain with it from the Bay of Bengal. Towards the end of March clouds begin to collect, and the air grows moister. In April and May there are thunderstorms and frequent showers, with a warm and moist climate. In the end of May the clouds in the western sky grow in strength; and in June rain prevails, descending at times softly, but generally with great violence, accompanied by heavy gusts of westerly wind. In July and August the rain pours down in floods day and night, to such a degree that a flat country would be deluged, but Coorg after being thoroughly bathed, sends off the water to the east and west by her numerous valleys. The yearly fall of rain often exceeds 160 inches. In September the sun breaks through, in October a north-east wind clears the sky, in November showers fall over Coorg, being the tail of the north east monsoon, and December is often foggy.[6] The following table will give an idea of the annual temperature of Mercara,

[6] *Coorg*, by Rev. H. Moegling. (Mangalore, 1855.)

[7] Observations by Dr. R. Baiki *Madras Journal*, 1837, vi. p. 342.

the extremes ranging from 52° to 82°, and the average being 60°:—

MERCARA, THE CAPITAL OF COORG, 1836-37.

MONTH.	Mean Temperature.		Rainfall in Inches.	Prevailing Wind.
	6 A.M.	10 A.M.		
January	56	69	None.	N.E.
February	60	74	None.	E.N.E.
March	64	76	1·3	Variable.
April	65	78	0·2	Variable.
May	63	72	7·6	N.W.
June	62	68	20·8	W.N.W.
July	62	64	23·7	W.N.W.
August	60	63	24·7	W.N.W.
September	62	67	7	W.N.W.
October	63	68	0·5	W.N.W.
November	60	70	1·5	E.N.E.
December	58	70	0·07	N.E.

An immense quantity of rice is cultivated in the Coorg valleys, and largely exported, but scarcely any dry grain is raised. In 1853 the rice harvest was said to have been worth seven lacs of rupees. The Coorgs pay so much on the seed sown, as a land-tax, besides a small house-tax, and the cardamom sales yield about 35,000 Rs.[8]

Coffee cultivation was only commenced in Coorg about six years ago, but its extension both amongst natives and Euro

[8] 1860—61.

Revenue of Coorg.		*Expenditure.*	
Land revenue	£14,727	General expenditure	£10,21
Excise and stamps	3,611	Public works	1,15
Income tax	98		
Miscellaneous	8,300		
	£26,736		£11,3

ans has since been very remarkable. There are now more
an a dozen plantations owned by Europeans, chiefly near
e road leading down the ghaut from Mercara to the port of
angalore, and several thousand acres are already under cul-
ation. Mr. Mann, the largest proprietor, has upwards of
0 acres planted with coffee-trees. The natives too have
own great enterprise in undertaking a cultivation previously
known to them, and there is now scarcely a hut to be seen
thout its little coffee-garden. All the plantations on the
stern side of Mercara, excepting one, belong to natives; and
se to the town I observed a small clearing where a Coorg
s hard at work building himself a hut, cutting away the
gle, leading a small stream into new channels for purposes
irrigation, and planting the slopes of two hills with coffee.
An export duty of four annas the maund is levied on coffee
Coorg, which, in 1861, brought in a revenue of 23,000 Rs.
that year 1,29,869 maunds were exported, 1,17,223 by
ive growers, and 12,645 by Europeans. This dispropor-
n will not exist this year, as the plants on several new
ates will now be in bearing for the first time. The main
ds in Coorg are excellent, and one at least of the planters,
not more, has displayed great energy in connecting his
ates by good roads with the main Government highways.
st of the available land, within reasonable distance of a
hway, is already taken up for coffee cultivation. Labour,
s also the case in Wynaad and the Neilgherries, is chiefly
cured from Mysore, the coolies coming up after their own
k is done.

t will be seen by the account I have been able to give
he elevation, temperature, and of the periods of drought
moisture in this hill district, that it is not nearly so well
pted for the cultivation of chinchona-plants as Neddi-
tum, and many other localities on the Neilgherry hills
may be compared, more appropriately, with the forest

near Sispara on the Koondahs, as it is exposed to the full force of the south-west monsoon, and suffers from a long drought during the winter.

The country to the north and east of Mercara is a plateau, about 4500 feet above the sea, intersected by ravines full of trees and underwood, amongst which I observed wild orange and lime-trees, *Michelias*, and tree-ferns, with an undergrowth of ferns, *Lobelia*, *Ipomœa*, and *Solanum*. The scenery is charming, with grassy slopes, wooded glades, and here and there a secluded hut in a grove of plantains, on the edge of a small patch of rice cultivation. I also examined some of the forests down the Mangalore ghaut. The road is excellent, winding with a gentle gradient through the beautiful forest scenery past numerous coffee-plantations to their port of shipment at Mangalore. At the fourth milestone from Mercara there is a forest extending for nearly a mile, on the left of the road, at an elevation of 3800 feet above the sea. I descends from the road to the bottom of the ravine, and on the opposite side there are forest-covered heights of greater elevation. The forest contains many tall trees, not growing very close, with tree-ferns, *Cinnamomum*, *Hymenodictyon*, *Melastomaceæ*, a *Papilionacea* with a bright yellow flower, and ferns, of which I collected five kinds. The general character of the flora appeared suitable for the growth of chinchona plants; and, though this was the driest time of the year, found at least one small stream trickling down through the underwood. The valley runs north-west and south-east.

In this locality plants of *C. succirubra* would no doubt flourish, and the experiment ought certainly to be tried though, from the low elevation, the bark would probably be thin, and would yield perhaps a small per-centage of alkaloids. These points, however, can only be ascertained by experiences gained from experimental culture. I would

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is a devil living on it, to which the Coorgs do *poojah*, an the Commissioner of Mysore has, therefore, been hither unwilling to allow it to be occupied.

There are many other localities equally suited for th cultivation of *C. succirubra* and *C. micrantha* in Coorg; th Government will shortly establish a chinchona nursery there and, with so many energetic and intelligent planters in th district, it will be strange if the growth of this importa product is not extended and rendered profitable by priva enterprise. A few rows of chinchona-plants ought to l established in the loftiest part of each coffee-clearing; an every settler should plant them, and encourage the cultiv tion among the natives, from motives of humanity, well as with a view to successful commercial speculation.

We finally left Mercara before dawn, and rode for thr miles down the steep ghaut leading to the lower and mo extensive valleys of south-eastern Coorg, which we reach as the sun rose. It was a very pleasant ride through t beautiful hill country, with uplands covered with fine fore and long strips of fertile valley. In the jungles we sa immense clumps of bamboo, which overshadowed the roa a leafless and thorny *Erythrina* with crimson flowers; and *Solanum* with a small white flower by the road-side. He and there we came to open grassy glades, whence little fo paths led through the neighbouring jungle to some seclud hut. The cultivated valleys are covered with rice, a fringed with plantain groves and *Caryota urens*.

The *Caryota urens* is a lofty palm-tree, with large leav and the Coorgs draw an immense quantity of toddy fr it during the hot season. The pith of the trunk of old tr is a kind of sago, and is made into bread and gruel by t natives of many parts of India. Humboldt says that t

forest in question has been applied for and refused to sever coffee-planters. The land belongs to Government, but the is a devil living on it, to which the Coorgs do *poojah*, a the Commissioner of Mysore has, therefore, been hither unwilling to allow it to be occupied.

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form of the leaves is very singular, the singularity consisting in their being bipinnatisect, with the ultimate division having the shape of the fin and tail of a fish.[9]

We passed several hundred pack-bullocks conveying Bombay salt from the Malabar ports to the interior, and, having forded the Cauvery at a point where the bed is full of large boulders of rock, reached the village of Virarajendrapett. It consists of two clean streets, at right angles, with a missionary church and school. The mountains are here dotted with plantain-groves, and nearly every house has a small coffee-garden attached. The surrounding country is exceedingly pretty, the view being bounded by forest-covered mountains. The bungalow at Virarajendrapett is on the site of an old palace of the Rajahs, and the compound is surrounded by a high wall, with an ornamental gateway, flanked by stone sentry-boxes.

From this point the descent into Malabar commences, through dense forest, with bright moonlight glancing through the branches of gigantic trees, and after a journey of fifteen miles we reached the bungalow of Ooticully in the middle of the jungle. It is in these forests, on the western slopes of the Coorg mountains, that cardamom cultivation is carried on to a great extent. In February parties of Coorgs start for these western mountains, and, selecting a slope facing west or north, mark one of the largest trees on the steepest declivity. A space about 300 feet long and 40 feet broad is then cleared of brushwood, at the foot of the tree; a platform is rigged about twelve feet up the tree, on which a pair of woodmen stand and hew away right and left until it falls head foremost down the side of the mountain, carrying with it a number of smaller trees in a great crash.

Within three months after the felling, the cardamom

[9] Seemann's *Popular History of the Palms*, p. 134.

plants in the soil begin to show their heads all over th
cleared ground during the first rains of the monsoon, an
before the end of the rainy season they grow two or thre
feet. The ground is then carefully cleared of weeds, and le
to itself for a year. In October, twenty months after th
felling of the great tree, the cardamom-plants are the heigh
of a man, and the ground is again carefully and thoroughl
cleared. In the following April the low fruit-bearin
branches shoot forth, and are soon covered with clusters
flowers, and afterwards with capsules. Five months afte
wards, in October, the first crop is gathered, and a fu
harvest is collected in the following year. The harves
continue for six or seven years, when they begin to fail, a
another large tree must be cut down in some other localit
so as to let the light in upon a new crop.

The harvest takes place in October, when the grass is ve
high and sharp, sorely cutting the hands, feet, and fac
of the people. It is also covered with innumerable lar
greedy leeches. The cultivators pick the cardamom capsul
from the branches, and convey them to a temporary h
where the women fill the bags with cardamoms, and ca
them home, sometimes to distances of ten or twelve mil
Some families will gather 20 to 30 maunds annually, wo
from 600 to 1000 Rs.[1]

This method of cardamom cultivation must be conside
injurious to the conservancy of fine timber in the forests, b
on the other hand, the crops themselves are very valua
and bring in a considerable revenue. But there is anot
kind of cultivation carried on in these vast forests on
western slopes of the ghauts, which is far more prejudi
to the production of valuable timber-trees. This is cal
kumari, and *punam* in Malabar. It has been altoget

[1] Moegling's *Coorg*, pp. 74-77; also Buchanan's *Travels*, ii. p. 511, Drury's *Useful Plants of India*.

rohibited in Coorg and Mysore, while in Canara it is not
ow allowed within nine miles of the sea, or three of any
avigable river, or in any of the Government forests without
revious permission. But in Malabar, where all the forests
re private property, the Government is unable to interfere
n the matter, and *kumari* is quite unrestricted.

Kumari is cultivation carried on in forest-clearings. A
pace is cleared on a hill-slope at the end of the year; the
ood is left to dry until March or April, and then burnt.
he seed, generally *raggee* (*Eleusine coracana*), is sown in the
shes on the fall of the first rain, the ground not being
ouched with any implement, but merely weeded and fenced
he produce is reaped at the end of the year, and is said t
e worth double that which could be procured under ordinar
odes of cultivation. A small crop is taken in the secon
nd perhaps in the third year, and the spot is then deserte
nd allowed to grow up with jungle. The same spot
ultivated again after 10 or 12 years in Malabar, but i
North Canara the wild hill tribes generally clear patch
n the virgin forest. Dr. Cleghorn reports that *kuma*
enders the land unfit for coffee-cultivation, destroys valuab
imber, and makes the locality unhealthy, dense underwo
eing substituted in the abandoned clearings for tall tre
nder which the air circulated freely.[2] The Kurumbers a
rulas, wild tribes of the Neilgherries, also raise small cro
y burning patches of jungle and scattering seeds over t
shes. This system, which sounds so wasteful and is
njurious to the yield of timber in the forests, is exceeding
rofitable to the cultivator, who has no expenses beyond t
ayment of land-tax, which in these wild unfrequent
pots is often evaded. A common profit is 18 to 28
n acre.

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[2] Cleghorn's *Forests and Gardens of* | official correspondence respec

After leaving Ooticully we still had to pass through fift miles of jungle, before reaching the open cultivated cou in northern Malabar. In driving down the ghaut the vi through occasional openings, of the wide expanses of fo were very grand. Tall trunks of trees towered up to a g height in search of light and air, palms and bamboos wa gracefully over the road, and the range of Coorg mount filled up the background. Most of the valuable timber been long since felled in these forests, excepting in the inaccessible parts. The poon-trees (*Calophyllum angus lium*),[3] which are chiefly found in Coorg, and yield valuable spars for masts, have become exceedingly sc The young trees are now vigilantly preserved. Black-w (*Dalbergia latifolia*) is also getting scarce, though I s good deal of it in some of the Coorg jungles; and teak- of any size have almost entirely disappeared, excep in the forests of North Canara.

At a distance of twenty miles from the sea the cultiv country commences in this part of Malabar, and the roa each side is lined with pepper-fields, with occasional gr of plantains and clumps of cocoa and betel-nut palms. land undulates in a succession of hills and dales, with cultivation in some of the hollows. Here the pepp regularly grown in large fields, and not in gardens Calicut. In the first place trees are planted in rows, us such as have rough or prickly bark—the jack, the m or the cashew-nut. In the country we were passing thr the tree used was an *Erythrina*, with the bark of trunk branches thickly covered with thorns. Until the trees grown to the proper size the land is often used for ra plantains. When the trees have attained a height of

[3] *Cleghorn*, p. 11. Poon spars are | tree with brownish flowers, e

feet, the pepper is planted at their bases, and soon thickly
ers the stem and festoons over the branches. The
per-cuttings or suckers are put down by the commence-
nt of the rains in June, and in five years the vine begins
bear. Each vine bears 500 to 700 bunches, which yield
ut 8 or 10 seers when dried. During its growth it is
essary to remove all suckers, and the vine is pruned,
ned, and kept clear of weeds. The vine bears for thirty
rs, but every ten years the old stem is cut down and
ers are trained. It is an exceedingly pretty cultivation,
l, if it was not for the crests of straggling branches which
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The houses on the road were built of laterite, large and
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berries have been gathered they are dried in the sun on
ts, and turn from red to black. The white pepper is from
same plant, the fruit being freed from the outer skin
macerating the ripe berries in water. Before reaching
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In enumerating the localities where it is likely that chin
)na-plants will thrive, the mountainous country in Mysore
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ls, must not be forgotten. Nuggur consists of rounded hills
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gh as 6000; and the adjoining Baba-Bodeen hills attain
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the town of Nuggur, on the western side of the hills, th
ns last for nine months, during six of which they are s
ayy that the inhabitants cannot leave their houses. Th

20 feet, the pepper is planted at their bases, and soon thickly covers the stem and festoons over the branches. The pepper-cuttings or suckers are put down by the commencement of the rains in June, and in five years the vine begins to bear. Each vine bears 500 to 700 bunches, which yield about 8 or 10 seers when dried. During its growth it is necessary to remove all suckers, and the vine is pruned, thinned, and kept clear of weeds. The vine bears for thirty years, but every ten years the old stem is cut down and layers are trained. It is an exceedingly pretty cultivation, and, if it was not for the crests of straggling branches which crown the vine-covered trunks, it would not be unlike the hop-fields of Kent.

The houses on the road were built of laterite, large and comfortable like those at Calicut. We saw the people sitting before their doors, busy with their heaps of pepper. When the berries have been gathered they are dried in the sun on mats, and turn from red to black. The white pepper is from the same plant, the fruit being freed from the outer skin by macerating the ripe berries in water. Before reaching Cannanore we passed over three or four miles of elevated rocky land, without cultivation, and arrived in the cantonment late at night.

In enumerating the localities where it is likely that chinchona-plants will thrive, the mountainous country in Mysore, north of Coorg, including Nuggur and the Baba-Bodeen hills, must not be forgotten. Nuggur consists of rounded hills from 4000 to 5000 feet above the sea, with peaks rising as high as 6000; and the adjoining Baba-Bodeen hills attain a height of 5700 feet. The climate is exceedingly moist, and at the town of Nuggur, on the western side of the hills, the rains last for nine months, during six of which they are so heavy that the inhabitants cannot leave their houses. The eastern side is drier and more level. North of Nuggur the

chain of western ghauts sinks down far below the chinchon zone, and north of 14° they scarcely rise above the plain o Dharwar.[4]

There are several profitable coffee plantations in Nuggu and I understand that it is in contemplation to establish teak plantation in that district. Though, as a locality fc chinchona cultivation, it is not to be compared with th Neilgherries or Pulneys, or even with Coorg, still it probable that some of the hardier species might thriv there, and thus the area of the chinchona-plants would b eventually extended from Nuggur, in 14° N., to the hills nea Courtallum, in the extreme end of the peninsula.

We embarked at Cannanore on board a little steamer f Bombay. The view from the sea is pretty. On the left an old fort built long ago by the Dutch; in the centr looking from the anchorage, is a sandy beach, where elephan were being loaded with the luggage of a detachment troops just arrived from Calicut; and a little to the right the native town surrounded by extensive groves of cocoanu trees, with the blue line of the Coorg and Wynaad mountai visible in the distance. There are three very large buildin on the sea-shore, one of which is the palace of the Beebe a long house, with the ground-floor let out as a pepp warehouse.

The Portuguese built a fort at Cannanore in 1505. Th were driven out by the Dutch, who sold the place to Ioplah, from whom the present Beebee of Cannanore descended, the succession going in the female line. S s much in debt, but owns the Laccadive islands, as well Cannanore, and the land round the town. We were told th he Beebee considered that she had been shamefully treat y the English Government, and that she spoke her mi

[4] Hooker's *Flora Indica*, i. p. 180.

ery freely on the subject. It appears that, in about 1545, ıe Laccadive islands were conferred in jagheer on the head f the Moplah caste at Cannanore, the ancestor of the Beebee, y the Rajah of Cherikul, on the payment of a certain tribute, hich was duly rendered to the Cherikul family until its estruction by Hyder Ali in the last century. After the orming of Cannanore by the English in 1791, the islands ame into possession of the East India Company, and in 799 they were restored to the Beebee's family, subject to ıe payment of an annual *peshcush* of 10,000 Rs.

In April, 1847, a hurricane of unequalled violence swept ver the islands, which are only nine feet above the sea in ıe highest part. The wind tore up the trees by the roots, ıe waves flooded the land, and almost everything on the vo most valuable islands was destroyed. The Beebee bor- wed a steamer from the Government to send supplies for ıe relief of the islanders, and she also obtained a remission one-third of the *peshcush* for ten years, on certain con- itions connected with reforms in her administration. Her ifficulties have chiefly arisen from being unable to pay the ım demanded for arrears of *peshcush*, and for the use of ıe steamer, and in 1854 the English Government assumed ıe administration of the islands until the debt was paid. was desired that the Beebee should give them up alto- ether for a pecuniary equivalent, but to this she has solutely refused to consent. The islands have since been stored to her.[5]

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[5] The inhabitants of the Laccadive ands are Sooni Mussulmans. They ve some songs commemorating the troduction of Islam 500 years ago, t do not know when the Beebee of nnanore got possession. Menakoy, e largest island, is a mass of coral miles in diameter. The land is s than a mile wide, the rest being a f encircling a large lagoon. Within a hundred yards of the reef there is no bottom. The lagoon, which abounds in turtle and fish, has three entrances from the sea, one of which has a depth of two fathoms. The soil of the island is a coarse powdered coral, with a little vegetable matter. It is quite flat, no part being destitute of vegetation; the south thickly covered with cocoanut-trees and under-

On the day after sailing from Cannanore we put into M galore, where the town, like that of Calicut, is comple hidden from the sea, the lighthouse and a few bungalows b visible on a hill in the rear. This was the dry season, the coast of Canara was not nearly so pretty as that of M bar, looking parched and dried up. North of Mangalo the port of Compta, with a lighthouse on a steep conical but no town visible. Compta is now the port of shipmer the cotton of Dharwar, and there were several *pattama* the anchorage, with their decks piled up with bales of co They take it up to Bombay, where it is pressed and shi for England; and we heard that the crews of the patta work their way into the bales, and pull out large handfu cotton, filling the space up with filth. In this way there petty trade in stolen cotton along the coast, and the p work it up into gloves, stockings, &c., for sale.

Though, at the time of my visit, Compta was use the cotton-port for Dharwar, yet the port of Sedashi further north, has a great advantage over it, and i only place along the coast where there is safe anch during the S.W. monsoon. A point of land, called C head, forms and protects the bay of Carwar and Beitcool and, with the assistance of a breakwater, there woul safe anchorage throughout the year. A line of islands

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wood, and the north more sparingly. Rats abound, there are some cats, a few cows and goats, large grey cranes, ducks occasionally, and the mosquitos are fearful.

The population is 2500; of these 116 are *Malikans*, the aristocracy of the islands, who own vessels trading to Bengal. The *Koornakar*, or agent of the Beebee, is generally a *Malikan*; he collects rents, and superintends her traffic. The *Malikans* have the exclusive privilege of wearing shoes, live in large houses built round courtyards, and possess Eng-

telescopes. Below them ar *Malummies*, or pilots, a rank ol by merit. Then 1107 *Klasies*, f the bulk of the population, w small landed proprietors, go to regular wages, but are very in dent. Then 583 *Maylacherr* tree-climbers for hire. The he are elected by the people. islanders have six or seven ves for the Bengal trade, and th four for coasting. They go with to Goa and Mangalore for s rice, with coir to Bengal, with

ɪs, called the Oyster rocks, a little to the northward, also rs a place of shelter. There is an anchorage under their during the S.W. monsoon, where vessels might ride in fect safety, and, when a lighthouse is established on the hest Oyster rock, vessels will be able to approach this ıgerous coast, and run into the anchorage, during the sum- r months. Sedashighur is nearer Dharwar than any other t; a river, the Kala-nuddee, navigable for boats for twenty es, falls into the sea close to the anchorage, and a good d is all that is required to make this place an important t for the shipment of cotton. Energetic measures have eady been adopted for this purpose, and it will not be long fore Dharwar, the only cotton district in India where the nerican species has as yet been profitably cultivated, will supplied with a port where the cotton may be pressed and ipped direct for England.[6]

After passing Sedashighur we put into Goa harbour, and ɪnt thence to Vingorla, the port of the Belgaum district, d a great place for the manufacture of earthenware chat- ɪs, which are taken up the coast in pattamars. The follow- g day we were at Rutnagherry, and passing Sevendroog, e famous stronghold of the pirate Angria, we concluded our asting voyage by anchoring in Bombay harbour.

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[6] The gross exports of cotton from the ports in the various districts of the adras Presidency in 1859-60 were as follows :—

Vizagapatam	40,758 lbs.	Valued at	£783
Godavery	3,000	,,	36
Krishna	198,670	,,	1,591
Nellore	21,075	,,	230
Fort St. George ..	7,960,368	,,	128,648
Tinnevelly	18,562,546	,,	274,380
Malabar	2,509,132	,,	49,900
N. and S. Canara ..	33,264,498	,,	504,905
Total ..	62,560,047	,,	960,473

In 1860-61 the total export of cotton from Bombay amounted t 55,393,894 lbs.; of which 278,868,126 lbs. went to Great Britain. In the same year the ports of Malabar and Canara sent 55,182,181 lbs. ombay.

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APPENDIX D.

REPORT ON THE CULTIVATION OF CHINCHONAS IN SOUTHERN INDIA. BY WILLIAM G. McIVOR, ESQ., SUPERINTENDENT OF CHINCHONA-CULTIVATION IN THE NEILGHERRY HILLS.

Rearing Seeds.—THE first sowing of imported seeds took place in the beginning of February 1860. No certain data being given for the treatment of Chinchona-seeds, our first operations were necessarily experimental, and a good number of seeds were lost by being sown in too retentive a soil, and supplied with what, to Chinchona-seeds, proved to be an excess of moisture; the greatest success we obtained in our first attempts was with the use of a soil composed almost entirely of burned earth, and of this sowing nearly sixty per cent. germinated, the temperature of the earth being about 70°. The number of days required before germination took place in the several sowings varied from sixty-two to sixty-eight. The seedlings made but little progress for the first six weeks, but after that time they sprung into rapid growth, averaging from 1½ to 2 inches per mensem.

Seeds of the valuable Chinchona Condaminea, received on the 16th February 1862, were sown on the same day in a very light open soil composed of a beautifully open sort of sand, with a very small admixture of leaf-mould. Our experience with the first seeds having established beyond all doubt that the Chinchonas are very impatient of any excess of moisture, particular care was taken in the preparation of the soil used in this sowing. The earth was in the first instance exposed to the sun for two or three days and thoroughly dried, it was then heated to about 212° in order to destroy all grubs or larva of insects; after being allowed to cool, it was brought into the potting-shed and watered sufficiently to make it moist, but only to that degree of moisture that the particles of soil would not adhere together on being pressed firmly with the hand, that is, the earth on being laid down was sufficiently dry to break and fall into its usual form. With the soil in this state the pots were filled, the surface lightly pressed down, and the seeds sown thereon, being lightly covered with a sprinkling of sand. The pots were then placed on a slight bottom heat of about 72°. They were never watered in the strict sense of the word; when the surface got dry they were slightly sprinkled with a fine syringe just sufficient to damp the surface, but never to penetrate the soil. Under this treatment

he seeds began to germinate very vigorously on the sixteenth day after owing, and now, 17th March 1862, or twenty-nine days after sowing, pwards of sixty per cent. of the whole of the perfect seeds sown have erminated, and we may fairly hope to rear over ninety per cent. of this owing. I may, however, observe that these seeds possessed the great dvantage of being forwarded to India in a letter, and thus they were never ubjected to the damaging effects produced on seeds sent out in air-tight arcels. The reason of this is the want of a circulation of air through the ackets, and a consequent deposit of moisture on the interior of the outer overing by every increase and decrease of temperature on the voyage. As oon as the seeds germinate they are carefully pricked out into fresh pots the soil being prepared as before described for the seeds). This must of ourse be done with very great care, the radicle being carefully covered ith soil, while the seed and cotyledons are kept above the surface. In this ay about twenty-five seedlings are transplanted into a four-inch pot, and eated in every respect the same as the seeds; that is, they are never atered, the soil being merely sprinkled as before stated to keep it in that iedium state of moisture in which it was first put into the pots. This revents the damping off of the seedlings, to which they are very liable hen treated otherwise; it also greatly facilitates their growth and the rmation of roots, the soil being so perfectly open that it is readily affected y the atmosphere, and thus kept in the most favourable condition for pro- oting vegetation. When treated in this way our seedlings have made an verage growth in ten months of over eighteen inches, the growth being uch more rapid towards the end of the ten months than in the earlier ages.

Propagation.—As soon as the seedlings and imported plants attained fficient size, they were propagated by being layered; in this way it was und that they rooted readily in about six weeks or two months, and rew out shoots from every bud; and not only this, but many latent buds ere developed, and a fine growth of young wood produced for succeeding yers and cuttings. The principle of layering, being so well known to nglish gardeners, requires no detail; but in the Chinchona-plants it was und that the layers were very liable to *bleed*, and this not only weakened e plants but retarded the formation of roots; this we found to be reme- ed in a great degree by inserting in the cut a triangular piece of perfectly y broken porous brick. An abundance of young wood being produced, e proceeded to propagate by cuttings, the earth being prepared with eat care, the same as for the seeds, with the exception of not being ated. The ends of the cuttings are placed upon pieces of perfectly dry rous brick, around the sides of the pots. They are then placed on a ttom heat of 75° or 80°; and, with this treatment, young and tender od roots in about three weeks or one month, older wood in about six eks to two months. With cuttings of the young wood our loss has t exceeded two per cent., and with older wood about ten per cent.

Our object being to produce the largest number of plants in the shortest

possible space of time, it was found that cuttings and layers required more wood than could be conveniently spared, and it was resolved to try the propagation by buds; in this respect the success has been most satisfactory. The secret of success entirely lies in the amount of moisture given; if in excess, they rot immediately, but, if sufficient care is exercised in reference to moisture, the losses will not exceed three or four per cent. Six C. Calisaya buds put in on the 30th January all rooted in forty-one days. It may be observed that it is not necessary that a leaf should be attached to the bud: this is no doubt an advantage, although we have struck many buds of the red bark without leaves, and also a few of the Calisayas.

It ought to be explained that the reason why the earth is brought to medium state of moisture before being put into the pots is because it never afterwards watered to such an extent as to render it really wet, being in fact just kept in that state of moisture in which it was originally placed in the pots, and this uniform and medium state of moisture is more easily retained by the pots being plunged in beds of earth. The reason why we found this system necessary was, that, when the soil was watered in the usual way after the seedlings or cuttings were placed in it, it was found, from expansion and adhesion by the action of the water, that its particles were forced far too close together to be beneficial to the growth of the plant and in many instances this proved to be injurious, vastly retarding the growth.

In the nurseries in the open air the same principle of cultivation and propagation as that described above has been adopted, and, with reference to the condition of the plants and layers, with nearly equal success, the period of rooting of the layers being from two months to ten weeks, while cuttings take from two to three months, the average loss being about fifteen per cent.: this occurs from the impossibility, in the open air, of keeping a uniform state of the atmosphere around the cuttings. With layers this is not so important, as they root quite as surely (though slowly) as in the propagating-houses, and flourish equally well.

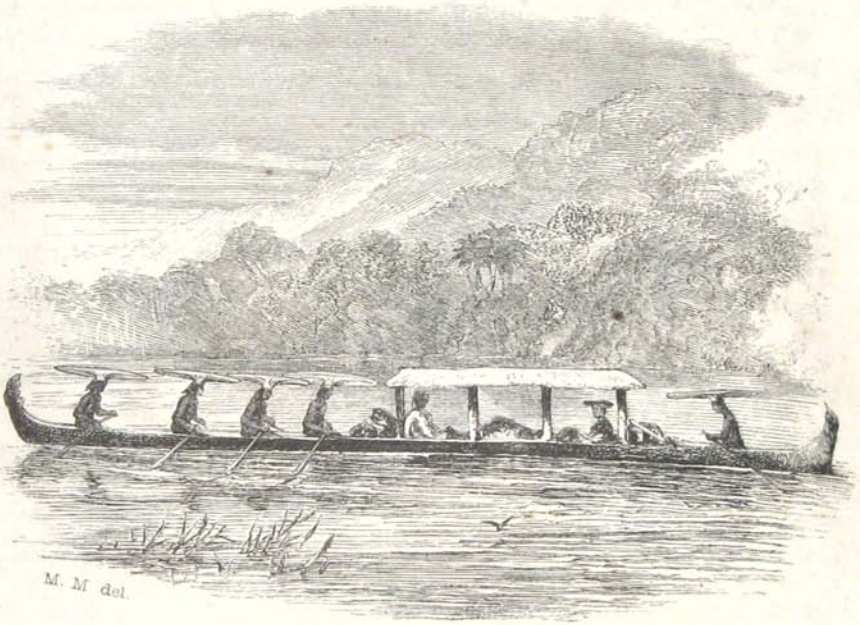
Formation of Plantations.—The mode of cultivation of these plants likely to prove the most advantageous being uncertain, it was resolved in May and June of 1861 to place out a number of plants under different conditions of shade, exposure, &c., and the result has been that the plants placed without the protection of living shade have made the most satisfactory progress, and borne the dry season without the least injury. The plants placed under living shade were found to be damaged in some degree during the rains by the incessant drip, but on the weather clearing up they threw out new leaves and quickly recovered. Nine months after planting, or at the end of our dry season, these plants were found to be suffering considerably from the drought; and on taking a few of them up, it was found that the holes in which these Chinchonas were planted had become entirely filled by the fibres of the roots of the living trees in their neighbourhood, which had drawn up the whole of the moisture and nourishment [illegible] Chinchona-plants were placed. In putting

plants out, which were placed in the open, we of course saw from the first that with the young plants we had to combat the bad effects of excessive evaporation during our dry season, under a bright and scorching sun; we also saw the injury likely to be done to the plants by radiation during bright and cloudless nights. To obviate these disadvantages the plants were sheltered on the approach of the dry season by a rough enclosure of bamboo-branches, with the leaves adhering to them, so as to give them sufficient shade both from the effects of evaporation and radiation. The enclosure is left open on the north side, and enclosed on the south, east, and west; the sun's declination being south during the dry weather. The ground will not be impoverished by the roots of other trees, and the whole of its nourishment is preserved for the Chinchona-plants. At the same time they will, by this treatment, be far more efficiently protected from evaporation and radiation than they would be by the use of living shade, whether caused by forest-trees or by the admixture of faster-growing plants. In addition to this shade of the branches of cut bamboos, the soil around the roots of some of the young Chinchona-plants was covered one or two inches in thickness with half-decayed leaves, and the plants thus treated show a very great luxuriance, which is not exceeded by any of the plants in our propagating-houses. To ascertain the cause of this luxuriance a few of the plants were recently examined, and although at the end of the dry season the soil about the roots was found to be perfectly moist; thousands of young rootlets of great strength were found to have been thrown into the covering of decayed leaves, so that it had become one matted mass of beautiful white roots, many of them nearly the thickness of a crow-quill. On the strength of these observations we have resolved to place out this season seventy-five acres of Chinchona-plants in cleared land, and exactly under the conditions and treatment last described; we also propose planting seventy-five acres under various degrees of living shade, in which every attempt will be made to mitigate as much as possible the injurious effects of this system already described. The cultivation of these plants being experimental, it is necessary that we should give every method of cultivation which appears reasonable a fair trial, and that only developed facts should influence us in giving preference to one method of cultivation over that of another. The distances at which we have prepared to place the plants are for the larger growing species from nine to ten feet apart, for the sorts of medium size eight feet, and for the shrubby sorts seven feet: these distances are of course too close to admit of the plants attaining a full size, but we believe that it will be advantageous to plant them close in the first instance, and thin them out afterwards. In order to illustrate the extreme growth of our plants, it is worthy of note that one or two of them, although not yet twelve months old, have attained a height of about five feet by three and a half feet in diameter through the branches; we may therefore conclude that the plants will in about two years fairly cover the ground if placed at the distances given above. When they begin to crowd and impede the growth of each other

will of course be thinned out and pruned ; and it is anticipated
)d supply of bark may be obtained by these means in from eigl
/e years, or perhaps earlier.

)*tacamund, 19th March*, 1862.

3. On the 5th of April the seeds of *C. Condaminea* were comin
ifully, and 4193 seedlings had already been transplanted. 100
of *C. crispa* had also come up. The seeds of *C. Condaminea*
ıg up at the rate of 500 a-day. At this date there were 25
:hona-plants on the Neilgherry hills, and all the species, excep
'olia, were increasing rapidly. It will be some time before Mr. M
be able to propagate from the latter species, owing to the very
ıy state in which the plants arrived from Java. In April 50
)und were prepared for planting at the Dodabetta site, and 70 ac
iwuttum.



CANOE ON THE BEYPOOR RIVER.

See page 351.