CANARA DISTRICT MANUAL.

CHAPTER I.

GENERAL DESCRIPTION OF THE DISTRICT.

Situation—Boundaries—Area—Latitude and longitude—Name of the district—Sub-divisions—Coast survey—General appearance—Mountains—Rivers—Roads—Forests—Flora—Filices—Fauna—Wild animals—Domestic animals—Reptiles—Insects—Birds—Fishes—Geology and mineralogy.

Situation.

THE district of South Canara is situated on the western coast of India, half way between Bombay and Cape Comorin, and is the most northerly of the districts belonging to the Madras Presidency which occupy the western portion of the peninsula of India. It is a broken, low plateau or table-land, which spreads from the foot of the Western Ghauts of Mysore and Coorg to the sea and forms a long and narrow strip of country, cutting off the semi-independent state of Mysore from all communication with the coast. A few of the northernmost islands of the Laccadive group, known as the Amindívis, are also attached to the district.

Boundaries.

The district is bounded on the north by North Canara (Bombay Presidency), on the south by Malabar, on the east by Mysore and Coorg, and on the west by the Indian Ocean.

It is 150 miles in length, about 25 miles broad in its narrowest, and 50 miles in its widest part.

Latitude and longitude.

It lies between 12° 4′ 15″ and 13° 58′ 30″ north latitude and 74° 43′ 26″ and 75° 44′ 31″ east longitude. The latitude of Mangalore, the chief town of South Canara, is one of the two most important points in India. It is at the extreme end of the arc of parallel which crosses the peninsula of India in latitude 13° from Madras to Mangalore, passing through Bangalore midway.

This arc[1] is of special interest, because it is situated much nearer to the Equator than any similar arc that has been as yet measured on any part of the globe. Its length is 360 miles: old maps used to make the distance 400 miles, an important difference of 40 miles.

[1] Markham's *Great Trigonometrical Survey of India.*

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Name of the district.

The name of the district, Canara, *Kannada* or *Karnáta* is derived according to Caldwell [2] from two old Dravidian words *kár*, black, and *nádu*, country, referring to the black cotton soil of the southern plateau of the Deccan where the early Canarese kingdoms were. Gradually the name Karnáta spread to all the countries under the domination of the rulers of Karnáta, and was corrupted into Kannada, whence the English name Canara, which is now confined to the western coast.

A more appropriate name might have been Tuluva, as the larger portion of the district is made up of the old country of Tuluva, which has a language of its own called Tulu. The northern portion, including the taluk of Coondapoor and part of Udipi, belonged to 'Haiga,' where, probably owing to its closer connection with the ruling Canarese-speaking people above the ghauts, Canarese is spoken by all Hindu castes, while Malayálam is the language of the portion of the district south of the Paiswani or Chandragiri river in the Kásaragód taluk, which only came under Canarese rule in comparatively recent times.

The name Haiga appears to be derived from the Canarese *Havu* and *Hai* (a corrupted form of the same word) meaning snake, so that Haiga or Haviga really means the land of snakes. This derivation is supported by the fact that the Canara coast was known in olden times as *Ahi-Kshétra*, a literal Sanskrit rendering of the Canarese Haiga or snake land.

The name Tuluva, in the opinion of some, is derived from a Tulu word meaning mild, humble, meek, and is supposed to denote the quiet and peaceful character of the inhabitants; but this is probably a mistake. The word 'Tulu,' meaning mild, is not in common use, and though the Tulu people are mild and peaceable, as a rule, they are not markedly more so than their neighbours, and there have been times when they have given trouble enough. According to the 'Kéralólpatti,' the name comes from that of one of the Perumáls of Kérala who fixed his residence in the northern portion of his dominions just before its separation from Kérala and who was called 'Tulubhan Perumál.'

Sub-divisions.

For administrative purposes, South Canara is divided into five taluks, viz., Coondapoor, Udipi, Mangalore (inclusive of the Amindívi Islands), Kásaragód and Uppinangadi. The taluks are further sub-divided into *Máganés* or collections of villages, and these again into *grámas* or villages, of which there are 1,277 in the district, including two towns.

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[2] Caldwell's *Dravidian Grammar*, Introduction, p. 34.

Taluk.	Area in square miles.	Population.	Designation and head-quarter station of Revenue Divisional Officers.
1. Mangalore	620	278,908	Assistant Collector (Mangalore).
2. Udipi	787	253,717	Head Assistant Collector (Coondapoor).
3. Coondapoor	512	120,268	
4. Kásaragód	1,032	280,659	General Duty Deputy Collector (Puttúr).
5. Uppinangadi	951	118,807	
Total ..	3,902	1,052,359	

To this must be added the four islands of the Amindívi group of the Laccadives with a population of 3,722 under a resident Sub-Magistrate.

North and South Canara formed one district under the Madras Government prior to the year 1860, when they were separated into the above-named two divisions. This separation was followed in 1862 by the transfer of North Canara, with the exception of the Coondapoor taluk, to the Presidency of Bombay on account of its close trade connection with the latter.

Coast Survey.

The coast line of South Canara commences a few miles south of Bhatkal in North Canara. The coast is indented by numerous creeks and bays formed by the estuaries of rivers, which, taking their rise among the hill ranges of the Western Ghauts, run from east to west and flow into the Arabian Sea. The coast line is low and sandy with broken and rugged rocks cropping up in places, but the country near the seaboard is well planted with cocoanut trees.

The coast has been surveyed by the Marine Department and the following results have been arrrived at :[3]

"Shirúr, in latitude 13° 56′ N., longitude 74° 35′ E., is now an "insignificant place, but its ruins point it out as having been once "a large town. It is the northernmost port under the Madras "Government. It is 3 or 4 miles south-east of Bhatcal in North "Canara and a little way to the east of Hadi Point. Hadi "Point is 5½ miles north-west by north of Beidoor Head. The "space between them is studded with dangerous rocks. One white "rock, just above water, bears south-west by south 2½ miles from "Hadi Point, and 2 miles south of the single rock are two white "rocks close together above water. Between these and Beidoor

[3] *Madras Manual of Administration*, vol. ii. app. xiii.

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"Head and south of that headland there are numerous others, "which, extending out to the depth of 7 fathoms water, make "this coast unsafe to approach under 10 fathoms. Beidoor river "and town are on the east side of Beidoor Head, which is a piece "of table-land jutting into the sea, and running back for some "distance inland. The river is only fit for small boats, and the "scattered rocks off it make it unsafe to approach. From the "Coondapoor Sandy Point, which is 3 miles north-west by north "of that river mouth, and was formerly called Barsalore Point, the "sandy coast runs north by west $\frac{1}{4}$ west 12 miles to Beidoor "Head; at 5 miles south of which there are some dangerous "rocks awash, in 6 and 7 fathoms at low water, situated 3 miles "from the shore. To the west and north-west of Beidoor are "other rocks in even deeper water, which render this part of the "coast dangerous, and it is prudent to give them a wide berth. "The land near this part of the coast shows in detached pieces of "table-land, most easily recognized as such in the morning, when "the mist hangs in the valleys. Scattered here and there are small "round hills of about equal height. The mountains of Bednore or "Nugger come close to the sea about here, being only 6 miles off, "and have some peaks more than 3,000 feet high; Yeljita Goodda, "the south one, 2,950 feet above the sea, is a sharp peak, at 7 "miles to east of Beidoor Head, and very conspicuous to a vessel "coming from the north. Barsalore Peak is a round mountain, "3,600 feet above, and 9 miles from the sea; but having the high "chain of the Bednore mountains for its base, does not show much "above them, except at a distance from land. Kollur Goodda, or "Codasahyádry Parwat, 4,400 feet above the level of the sea, is a "fine sugar-loaf peak, 17 miles north-east $\frac{1}{2}$ north of Coondapoor. "It was styled by early navigators false Barsalore Peak, from the "fact of its being frequently mistaken for the peak of that name, "which is 8 miles further to the west-north-west and only visible at "a great distance from land; for other peaks, intervening between "it and the sea, hide Barsalore Peak, whereas Kollur Goodda "is distinct, being perfectly isolated, but it disappears behind the "others when bearing to the south of east. From Mangalore to "Coondapoor the whole coast is sandy, with cocoanut trees, with "the exception of Soortacull little rocky point, and the Caup bat-"tery rocks; at the back of the trees the hills rise gradually "towards the base of the mountains.

"Coondapoor river, in latitude 13° 38′ N., longitude 74° 39′ E., "lies to the south-south-east of Barsalore Point, and is 18 miles "north of Deria Bahaudur Ghur. It is now a place of consid-"erable trade. A reef of rocks, on which the sea breaks, lies "at 2 miles to the west of the river entrance. The rocks off it

"afford a little shelter to small coasters from north-westers, but "these vessels generally run into the river at high water. At the "distance of 2 miles north-north-west of the entrance is a small "rocky point; and 1 mile further north-west is a sandy cape "(formerly called Barsalore Point), off both of which patches of "rocks extend into 5 fathoms water. This river is only navigable "by boats and small vessels; and the shore here should not be "approached under 9 fathoms in a large ship. Barcore, called "also Hangarkatta, is a small river port, about midway between "Coondapoor and Deria Bahaudur Ghur.

"The Saint Mary Isles extend from latitude 13° 27′ to 13° 20′ "N., the outermost of the range being 2½ miles distant from the "shore, with a channel with 2 and 3 fathoms irregular soundings "between them and the main, but safe only for boats. Some of "them may be seen 3 or 3½ leagues from the deck; the others are "low, nearly even with the water's edge. They are in one with "Barsalore Peak bearing north by east ½ east and some of "them are long, flat islets, particularly the southernmost. Deria "Bahaudur Ghur, in latitude 13° 20′ N., longitude 74° 41′ E., "about 18 miles to the south by east of Coondapoor, and bearing "north by east 8½ miles from Moolky Rocks, is the highest and "middle one of the three islands generally called Saint Mary "Isles, and its highest part is 70 feet above the sea. These islands "are basaltic, and in some parts have long grass and creepers. "The north, a separate island, which is nearly 3 miles north-north-"west of Deria Bahaudur Ghur, has cocoanut trees on it, and "water is obtainable by digging. There are rocks midway be-"tween these islands and scattered about to the north of them. "Rocks awash extend 1 mile to west of the cocoanut island, and "another patch at the distance of 2 miles north-west of it; whilst "to the north there are other rocks until abreast of Barcore river. "A ship should not approach this part under 8 fathoms by day in "working up the coast, or 12 fathoms by night; in running down "coast, it is prudent not to come under 15 fathoms. To small "coasting vessels excellent shelter is afforded from north-west "winds between Deria Bahaudur Ghur and the sandy shore "abreast; the passage in is close round the south end of these "three islands, and the anchorage is in 3 fathoms at lower water, "sand and mud bottom, with the highest part of Deria bearing "north-west. The sandy shore abreast of these isles is the point "of Malpe river, inside of which stands the little port of Udia-"war, not far from the town of Udipi, one of the German mis-"sionary stations, numerous along this coast.

"The Moolky or Primeira Rocks, in latitude 13° 12′ N., longi-"tude 74° 40′ E. (nearly 3 leagues to the south of Deria Bahaudur

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"Ghur), bear from Mangalore light-house north-north-west ½ "west 22 miles; they are situated 4 miles from the mainland, "are of black basalt, elevated in parts 40 feet above the sea, and "may be seen 9 or 10 miles from a ship's deck. On their east "side the bottom is sand and broken shells, which is not good "holding ground, otherwise a vessel in extremity might anchor to "leeward of them in a west gale. The channel between them and "the main is perfectly safe, but contracted to a breadth of 2 miles "on the north by the Caup Rocks, which are above and below "water, 3 miles to the north-east of the Primeira, and there is a "detached rock out in 4 fathoms 3 miles due east of them, off the "small hill of Utchila Goodda, which hill is on the shore 20 "miles north by west ½ west from Mangalore light-house. Caup "battery, 2 miles north by west of Utchila, is an old rock fortifi- "cation on the sandy shore, and from this the outermost Caup "Rocks bear west by north 1½ miles. There is an old temple, called "Coonajur Goodda, within a fort on an isolated hill, 280 feet high, "a good landmark, 4 miles north-east of Caup battery. At the "distance of 4 miles north by east from the Moolky Rocks, is a patch "of dangerous rocks awash; they lie out in 5 fathoms, with Coon- "jaur Goodda bearing east, and they are 1½ miles to the south-west "of a solitary black rock standing out of the water, midway between "Caup Rocks and the south islet of the Deria Bahaudur Ghur group.

"Mangalore, or Codiyaul Bunder, in latitude 12° 52′ N., "longitude 74° 49½′ E., is the chief town in the province of "Canara, and a place of large trade. The light-house is on high "ground, 1½ miles east-north-east of the river entrance, and 240 "feet above the sea. The town is very large, and on the north "and east side of the river, which is navigable for boats for many "miles up to Bantval, a large town. The bar has only 6 or "7 feet on it at low spring tides, so that only small vessels can "enter; Arab vessels of 150 tons manage to get in at high "springs, but the larger Buggalahs, which bring horses from the "Persian Gulf, are compelled to lie out in the roadstead. The "houses and trees on the elevated plateau by Mangalore light- "house unmistakably point it out. Barn Hill, 16 miles to south- "east of it, is also a good mark. The Ass's Ears, or Conijadacull, "17 miles north-east of Mangalore, is a rugged, double peaked "hill, of lime-stone, 1,100 feet above the sea, rising almost verti- "cally from the low country, but is in many views only just "visible from seaward above the tops of intervening flat hills. "Mount Hyder, or Kudre Mukh (the horse's face), 30 miles "north-east by east of Mangalore, is a magnificent peak, 6,000 "feet above the sea, abruptly terminating on the south, when "viewed from the west. It is the south-west extreme of the

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"Nugger, or Bednore district, of the province of Mysore, and "beyond it the ghauts recede much to the east; the hills at "the back of Mangalore are undulating, and separated from each "other by valleys through which rivers run from the mountains. "A fixed dioptric fourth order light on a white tower is exhibited "on the hill at the back of the town, at an elevation of 240 feet, "and may be seen in clear weather 14 miles, but in the hazy "weather of March and April only 10 or 11 miles. On the light-"house hill there are houses and trees, which form conspicuous "marks in the day-time. It is high water on full and change "between 10 and 11 hours; ordinary springs rise 6 feet, neaps 3 "and 4 feet. Night tides are higher than day tides in the fine "season. The most convenient anchorage for communicating "with the river is with the light-house east-north-east to north-"east in $4\frac{1}{2}$ fathoms low water, muddy bottom. In case of a "north-wester (which breezes prevail here in the afternoon between "February and May), boats can conveniently come at high water "out of the Gurupura mouth, 2 miles north of the Mangalore "entrance. Approaching Mangalore from the north, caution is "necessary to avoid the Saint Mary Isles and Moolky Rocks, the "latter being in the line of 9 fathoms. It must also be remem-"bered that this is a projecting part of the coast. The bank on "which a ship may get soundings extends nearly 40 miles of "Mangalore; there being a depth of 10 fathoms at 10 miles "off shore, 20 fathoms at 10 miles, and 30 fathoms at 18 miles "all muddy bottom, between Mangalore and Mount Delly. "Above the latitude of Mangalore these depths are found much "further off shore. Abreast of Barcore and Coondapoor, 30 "fathoms, is found more than 30 miles from land, and soundings "of between 20 and 30 fathoms occupy a flat, 17 miles broad east "and west, between the latitudes of Saint Mary Isles and Pigeon "Island. At depths greater than 30 fathoms on this part of the "coast the bottom is generally sand or rock. Soortacull is a small "point with a temple on it, about 150 feet above the sea, bearing "north by west 9 miles from Mangalore river mouth. The inter-"mediate shore is straight, sandy, and well planted with cocoanut "trees. Moolky river entrance is 4 miles to north of Soortacull, "on the same bearing, and is nearly 10 miles to south-east of the "Primeira or Moolky Rocks. From Mangalore, the direction of "the coast is south-south-east, 18 leagues to Mount Delly; the "land near the sea is generally low and woody, particularly to "the south of Barn Hill, or Posody Goompey, which is a sloping "mount, nearly level on the summit, 1,000 feet high, situated a "little inland, in latitude 12° $40\frac{1}{2}'$ N., longitude 75° 0' E., and $5\frac{1}{4}$ "leagues distant on a south-east bearing from Mangalore. About

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"7 leagues to the south of this hill, at nearly an equal distance "from Mount Delly, 3 miles inland, stands another mount, in "latitude 12° 23′ N., 500 feet high, called Mount Formosa. "There are other hills farther from the sea, and 2,800 feet above the "level of the sea. In passing along this part of the coast there is "no danger, the depths decreasing regularly towards the shore to "7 or 8 fathoms, about 3 miles off. A ship in working may "stand into 7 or 8 fathoms, soft ground, when the weather is fine. "Between Mangalore and Békal, there are three considerable "streams—Manjéswar, Coombla, and Kásaragód—all reckoned "among the minor ports of Madras. The bars of these rivers "change every year, and a native pilot is necessary.

"Békal fort, in latitude 12° 23′ N., longitude 75° 1′ E., cover- "ing the whole extent of a small promontory 130 feet high, bears "from Delly little cape north-north-west 25 miles. There is a "travellers' bungalow among trees to the north of the fort. "Rather more than 1½ miles to north-west of this fort is a reef of "rocks, on which the sea breaks, having 4 fathoms close to it. "This reef is about ½ mile to the south-west of another little rocky "cape. The coast from Békal to Mangalore is all sand, fringed "with cocoanut trees, with the exception of the little rocky points "mentioned above. The land at the back rises gradually from "the sea, until at 5 miles distance there is a table-land nearly "400 feet high, intersected by rivers every 6th or 7th mile. To "east of Békal and Hosdroog, a spur of the ghauts, of considerable "elevation, reaches towards the coast. To the north of this the "highland recedes and is not often visible."

General appearance.

To convey a vivid impression of the general appearance of the country, it seems hardly possible to do better than transcribe the opening paragraphs of an article contributed some years ago to *Fraser's Magazine* by Mr. Walhouse, formerly District Judge of South Canara:

"It is difficult to imagine a wider contrast than exists between "the eastern and western coasts of the Indian peninsula. The "general aspect of the former is a long barren sandy shore, "stretching monotonously away till fading in the heat haze, and "only redeemed from utter dreariness by the heavy surf that "advances in three swelling lines, one after the other, each rising "higher, and hollowing its foamy crest more darkly as it nears "the beach, on which it bursts with a roar deeper and more sus- "tained than any heard by Homer. But there is no shade—no "refuge; the tropical sun beats burningly upon the treeless inter- "minable sand bank, and for mile after mile no rock or cliff "interrupts the sameness of barren beach and breaking water. "Very different is the western coast. From Cape Comorin

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"upwards it presents a continually varying panorama of grand or "picturesque scenery. Sometimes high ranges, rising far inland "and lifting their peaks and blue wavy outline above belts of cloud, "or sometimes approaching nearer, and disclosing their forests "and precipices, and throwing out spurs that dip their rocky feet "in the waves. Where the mountains retreat inland, a flat and "fertile region is left between them and the sea,—once doubtless "beneath the water; for as the ancients knew that Egypt was "the gift of Nile, so the natives regard this tract as won from the "sea, and say that the demigod Parashu Ráma asked the ocean "deity Varuna to give him land from his domain as far as he "could fling his *parashu* or battle axe. 'Be it so' was the answer; "on which the hero, standing by Nássick, hurled his axe 300 "miles from north to south, when the sea retreated from the "track over which it had fled, and the region termed Kérala was "left bare, now forming the sea-board territory of Travancore, "Malabar and Canara.

"To the ship sailing fast, the shore presents an ever varying "outline, generally a dark serried belt of cocoa-trees, whose roots "are washed by the waves, divided at frequent intervals by the "gleaming mouths of broad rivers. Rocky headlands, seldom "uncrowned with old fort or white pagoda, jut out, forming a "succession of winding bays where the long narrow fishing boats "are busy and the awkward looking *pattimars* or native vessels, "with their tilted sterns and sloping masts, are lying at anchor. "Now and then large towns can be discerned embowered amongst "cocoa groves and bananas; and farther inland knolls and tree-"clad eminences are dotted about, and beyond them long rolling "upland plains, bright green during the rains, whitening when "the grass is ripe, extend far away. For four months in the year "the south-west monsoon deluges all this region, and earth and "air are steeped in moisture. Hence, while trees are comparatively "rare and grateful objects on the other coast, here foliage abounds "and chequers the surface with green even during the hot dry "months, when vegetation is inconceivably burnt up. The soil of "all this country is principally laterite, a stiff deep red clay often "seamed with white and yellow layers; when exposed to the atmos-"phere, the surface, from the iron it contains, solidifies into black "rough rock; it can be dug out and cut into blocks, which soon "harden, and are the universally used and very durable building "material. Great masses of gneiss and granite are frequently "embedded in it, and, becoming denuded by time and weather, "crop up from the surface and strew the tops and sides of the hills "with fantastic boulders. A special feature in the aspect of the "country is a flatness uniform, yet infinitely diversified. Once it

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"was the floor of an ocean, but now worn and furrowed by "millenniums of monsoons into net-works of river basins, valleys "and hollows, varied with hills, ridges and elevated plains, all "flattened at the same general level, and bounded by abrupt wall-"like cliffs. While traversing any wide plain, one may suddenly "encounter a deep ravine, opening as it were beneath one's feet, "that, beginning with a mere gash in the surface, widens, as it "goes winding on, till it joins some broader valley. Under its "black craggy rims the upper slopes are studded with cashew-nut "trees, loaded in the hot season with large red and yellow apples "from the ends of which the edible nut curiously projects. "Beneath, amidst fallen blocks and an undergrowth bristling "with enormous thorns, the graceful climbing fern *Lygodium* "*scandens*, edged, like point lace with delicate seeding, twines "upward hop-fashion, and the splendid clusters of the *Gloriosa* "*superba* grow abundantly. Lower down, the sides of the ravine "are bordered with close set plantations of cocoa and areca nut trees, "interspersed with palmyras and Talipats lifting up the enormous "green fans of their leaves, and, stateliest of all the tribe, the "smooth-trunked sago palm raises high its head, whence droop "the long streamers of its quivering leaves and the immense "clusters of its grape-like seeds. Between the forest of tall slen-"der stems grow bananas, and pepper vines climb up anything "that gives support. Copious springs invariably issue from the "head of the ravine, and, as it widens out, rice plots begin to "occupy the level centre—first one, then two or three side by side, "then more as the area broadens, till a sheet of vivid green 100 "or 200 yards across stretches river-like between the palm-groves "and under cliffs of the ravine. Under the grateful shade of "those groves stand the homesteads of the owners of the rice tract "and gardens; low built and thickly thatched, with eaves slop-"ing down over the seat that runs along the outer wall, where "the family gathers after work. In front a smooth clean-swept "beaten floor, where grain is husked and winnowed, in the middle "of which stands a pedestal-like altar bearing a tulsi or sacred "sage plant. Dark glossy-haired girls and women classically "draped in blue brightly bordered garments are busy with house-"hold tasks; brown pretty black-eyed children run naked about, "and in the rice-grounds hard by, the good man, with his sons "and servants, is guiding the primitive plough, drawn by a pair "of sullen looking buffaloes, through the deep mud. With such "fertile hollows the surface of Canara is seamed; the description "of one suffices for the general features of all, but there is an "endless variety of picturesque likeness, just as no Devonshire "combe repeats another."

Mountains.

Speaking broadly the eastern boundary of the district is either the watershed or the scarp edge of the Western Ghauts, of which the peaks vary from 3,000 to 6,000 feet in height, while the general height of the range may be taken at 2,000 feet towards the north and 3,000 farther south. In the northern parts the range on its western side assumes, as a rule, the form of precipitous cliffs as far as the Bangadi valley to the east of the Kudre Mukh, the highest peak of the range and the sanitarium of the district, but to the south of this where the range is farther from the sea, it has more of the character of parallel ridges intersected by the deep valleys from which the most important of the Canara rivers take their rise. At the extreme south the range again approaches the sea, but in a broken irregular manner. From the ghauts spurs run downwards in all directions, one of the longest being the Chibbidri ridge which runs from Balálráya Drug to Dharmastala, a distance of about fifteen miles, intersected, however, at Chibbidri by one of the main affluents of the largest river in South Canara. A low running spur from the Kudre Mukh is somewhat peculiarly terminated by a towering conical rock on which stood the fort of Jamálabád, and another large double peaked rock near Mudbidri known to mariners as the Ass's Ears, rises to the height of about 1,100 feet, although it lies some ten miles to the west of the line of ghauts. All over the district there are detached low hills which become less frequent as the coast is approached.

The most interesting of the mountains of South Canara is of course the Kudre Mukh group of three peaks on the highest scarp of a ridge of the Western Ghauts facing Beltangadi. The most prominent of the peaks is that known as the 'Mukh Head,' which is 6,173 feet above sea-level with a magnificent precipice of over 1,000 feet, but the two other peaks are slightly higher, that known as 'Midge Point,' being 6,177 feet high, while 'Funk Hill' is as much as 6,207. The civilians' bungalow is at the edge of a beautiful shola running down from the ridge, about twenty minutes' walk from the top, and overlooks the Mysore village of Samse with Kalasa Peak beyond. From the perennial stream in the shola, water is led off to the bungalow and dropping about 15 feet over a low cliff into a pool forms what is known as the 'Douche,' appreciated by all who come home hot and weary after a long morning's stalk.

The most important of the other peaks of the ghauts are Kodashadri, 17 miles from Coondapoor and about 4,400 feet high, Balálráya Drug (4,934) over the Bangadi valley, Káte Gúdda (4,534) to the south of the Chármadi ghaut road, Sisalkal (3,921) over the old Sisala ghaut, and Subramanya (5,667) overlooking

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the Bisli ghaut and the well-known temple of Subramanya. Amongst isolated hills Ammadikkal rises from the low country a little distance off the ghauts in the Uppinangadi taluk to a height of 4,261 feet, and the rock of Jamálabád mentioned above is as high as 1,788 feet.

Rivers.

The rivers of South Canara necessarily run from east to west and as not one of them takes its rise as much as 20 miles beyond the peaks of the Western Ghauts, which are nowhere more than about 50 miles from the sea, the course of the longest is considerably under 100 miles. With the heavy rainfall of the south-west monsoon and the broken nature of the country, the rivers and streams are innumerable and the volume of water is very great at times, but the current is then rapid and the circumstances generally are unfavourable to their use as a means of communication. In the dry weather, owing to the rocky character of their beds, the rivers are not usually navigable for many miles above the reach of tidal influence. Within these limits, however, they are very extensively used for bringing produce to the coast ports and towns, and great facilities for traffic up-and-down portions of the coast are also afforded by the backwaters or salt-water lagoons, which are formed by sand spits thrown up by the meeting of the river and littoral currents, and often run for several miles along the coast before the waters of the river find their way into the sea, two rivers frequently making their exit by one opening. A scheme to establish a system of canal communication from north to south by connecting these backwaters is now under investigation. When it is accomplished facilities will be afforded for traffic along the coast throughout the whole year instead of being practically put a stop to as at present during four or five months of the south-west monsoon.

The six principal rivers of South Canara are the Nétravati, the Gurpúr river, the Gangoli river or Gurget, the Chandragiri or Paiswani, the Sítanadi and Suvarnanadi.

When the force of the south-west monsoon is at its height, some of the larger rivers become swollen by the heavy rains and overflow their banks, inundating the surrounding country. These floods do not last long, and within a short time the rivers retire to their usual channels. Occasionally crops sustain some damage, but the floods are seldom destructive to life and property and the deposit of fertilizing silt made by them is highly beneficial.

The Nétravati takes its rise in the ghauts to the east of the Kudre Mukh and flows down the Bangadi valley past Beltangadi, after which, joined by other streams from the ghauts, it meets at Uppinangadi another and larger river called the Kumardhari, which comes from Kumara Parwat near Subramanya. The combined stream, retaining the name Nétravati, passes over a very

rocky bed with many rapids to Bantval, and westwards through richly wooded banks to Mangalore. From Bantval the river is navigable to boats of a capacity of about three tons, and as it approaches Mangalore, the channel assumes wider proportions and is studded by a number of small islands called 'Kadres,' rising a few feet above the surface of the water. These islets are exceedingly fertile and rice and sugar-cane cultivation is extensively carried on in them.

At Mangalore, the Nétravati effects a junction with the Gurpúr river and both discharge the large volume of their combined waters into a backwater, forming a common estuary to the two rivers, and having a long spit of sand intervening between it and the sea. At present the openings from the backwater to the sea are two in number, one at the northern and the other at the southern extremity of the backwater, the latter having opened a few years ago at much the same place as old maps show the opening at the beginning of the century. The tendency seems to be for the southern mouth to move northwards, and the northern to move southwards till they meet, after which the single opening moves northwards till the stream of the larger river at the south again bursts a separate opening for itself.

The Gurget is the name of the most important of several streams of no great size, that meet and form a broad estuary to the north of the town of Coondapoor, and fall into the sea at Gangoli. This estuary is really a most picturesque and extensive salt-water lake with only one outlet into the sea. Of the streams forming it, the Kollúr, Haladi or Gurget and Chakranadi rivers are alone of any importance.

As the Western Ghauts are, in the Coondapoor taluk, nowhere more than 25 miles from the sea, the course of these rivers is very short, but, owing to the heavy rains, the quantity of water brought down is, by no means, inconsiderable. The Haladi river takes its rise in the ghauts near Amashabail, about 6 miles to the north of the Udipi taluk. It is influenced by the tide nearly as far as Haladi about 17 miles from the mouth, and is navigable to that place, even at the driest season, by boats containing one *coryi* or about $1\frac{1}{2}$ tons of rice. The Kollúr river has its source in the ghauts forming the north-western boundary of the Coondapoor taluk, a few miles beyond Dali. It skirts the coast for about 10 miles north of Coondapoor and is navigable to a distance of 12 miles from its mouth. The Chakranadi river joins the Kollúr 3 miles from Coondapoor and is navigable for boats of small burthen as far as Wandse, about 12 miles from the entrance to the backwater.

A little to the south of Kásaragód village, a large backwater is formed by the Chandragiri river, which constitutes the boundary

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between the Tulu and Malayali races, that part of the Kásaragód taluk, which lies to the south of this river, being peopled by the same castes as are found in the neighbouring district of Malabar. The Chandragiri river is navigable for about 10 miles from its mouth. It has two branches, one rising in the Uppinangadi hills, and the other in the ghauts on the Coorg frontier.

The Sítanadi takes its rise in the ghauts beyond Sóméshwar to the north-east of the Udipi taluk, while the Suvarnanadi flows from the hills situated at the south-eastern boundary of the same taluk. Both fall into the sea at Bárkúr or Hangarkatta, nearly 8 miles to the north of the town of Udipi, a large backwater being formed by their junction. The Sítanadi is navigable as far as Kokarni, 11 miles inland, and the Suvarnanadi, up to Baje about 12 miles from the coast, from both of which places the merchandise from the interior and from above the ghauts is taken down by boats to be exported from the port of Hangarkatta.

Roads.

Communication between the district and the country above the ghauts is maintained by means of seven well-traced roads through passes in the Western Ghauts, besides a number of paths and cattle tracks, which latter are fast falling into disuse. The main roads from five out of the seven passes converge on Mangalore. Beginning from the south the road from Madras through Bangalore and Merkara comes down the Sumpaje pass and enters South Canara about 66 miles from Mangalore. After passing through Puttúr, the head-quarters of the Uppinangadi taluk, it is joined at Máni by the road from Manjarabád, which comes down the Siradi Ghaut road and at Uppinangadi by a road from the newly constructed Bisli Ghaut road which enters the district near the tri-junction of Mysore, Canara and Coorg. Farther north there is a road from the Kadúr district of Mysore by the Charmádi or Kodekal pass, which joins the before-mentioned roads about 15 miles from Mangalore. The next pass is at Agumbe to the north of the Udipi taluk, and near Sóméshwar at the foot of the pass, roads branch off towards the ports of Coondapoor, Bárkúr and Udipi, but the main road comes on to Mangalore. The Hossangadi or Hyderghur Ghaut from Bednore or Nugger has direct communication only with the river leading to the port of Coondapoor, to which port also comes the road from the Kollur pass, the most northerly of the made ghaut roads of the district. In addition to these through lines of communication the district is well supplied with cross lines and feeders, with regard to which farther information will be found in the taluk notices. The number of broad estuaries and backwaters and the long stretches of sand near the coast makes it impossible ever to have a thoroughly satisfactory coast road, but a good deal has lately been done to improve it,

and as it passes through the most thickly populated portions of the district, there is a heavy local traffic of all kinds on sections of it, and the road throughout is much used by travellers to and from Mangalore. Wheeled conveyances, &c., are taken across the rivers by means of platforms on boats.

Forests.

South Canara is essentially a forest district. The slopes of the Western Ghauts from north to south are clothed with dense forests of magnificent timber, and the forest growth, stimulated by the heavy rainfall, approaches within a few miles of the coast to the north of the Coondapoor taluk, and again in the southern máganés of the Kásaragód taluk. Generally the heavy forest begins from 20 to 30 miles from the coast, but to the south of the Mangalore taluk and the north of the Kásaragód taluk it recedes farther inland, the plains being more extensive and the population denser than elsewhere in the valleys of the various streams which flow into the Nétravati river which enters the sea at Mangalore. Even on the plains, however, a large portion of the Uppinangadi taluk is covered with heavy forest, and jungle varying from moderate forest to mere scrub is to be found everywhere throughout an exceptionally large area of waste land, cultivation in South Canara being confined mainly to the plains close to the coast, and the bottoms of the innumerable valleys which wind amongst laterite hills and plateaus from the ghauts to the sea. The only bare spots are some of the hard laterite plateaus which seem now-a-days to produce nothing but thatching grass, and a certain proportion of the waste which has been recklessly denuded for the supply of fuel and manure. Notable instances of the latter are the hill slopes adjoining the areca-nut plantations in the Vittal Mágane of the Kásaragód taluk. Complete denudation of the slopes of valleys in other parts is comparatively rare, but over large tracts mere bushes or low coppice now grow where fine timber once abounded as can be seen from the patches of carefully conserved 'kumaki' lands. This clearance is not modern. It was noticed in 1801 by Buchanan, who wrote regarding the country in the neighbourhood of Beltangadi "on "the hills many trees have now grown up, but it would appear "that formerly they had all been cleared, and to keep the "bushes down and destroy vermin the grass is still annually "burned."

Nothing is now on record which can enable us to decide whether any definite rules of forest administration were in force under the early native governments, but there are numerous indications that the value of forest for the preservation of springs and the supply of leaves for manure, was well understood by private owners, and in later days Tippu introduced rules of

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draconic severity for the conservancy of sandalwood for his revenue, and teak for his navy. During the century or so of foreign invasion, and intestine strife, and wiping out of petty local courts, which preceded the arrival of the British, large tracts of country in the neighbourhood of the ghauts became practically depopulated and tended to revert to forest. When affairs became more settled under British administration, and extension of cultivation was again desired, the advancing forest was not unnaturally regarded in the light of an enemy to be got rid of, and clearances were encouraged and stimulated in every possible way. The views regarding the claims to private property in forest land, definitely recognised in the adjoining district of Malabar, were also held to be generally applicable to South Canara. Large areas of forest were always spoken of as forming parts of estates, and in certain cases these views were irrevocably given effect to, up to 1844, by the formal grant of 'mulpattas' for deserted estates, in which full proprietary rights were assigned within specific boundaries which included large areas of waste and forest land. These boundaries were usually the '*nettikatt*' or crest of the hills overlooking cultivated valleys. In 1822, though it was still held that large areas of forest were private property, an attempt was made to define them and lists were called for of all the Government forests in the district. Orders were, at the same time, issued that when a Government forest adjoined cultivated land a margin of 100 yards was to be left as '*kumaki*' (aid) to the cultivation. This was the same term as was in use to designate the aid afforded to all valley cultivation by the forest growth on the hill slopes up to the '*nettikatt*,' but as time wore on and the rights of Government were more and more asserted from 1839 onwards, the origin and limited nature of the '100 yards *kumaki*' got lost sight of, and '*kumaki*' has come to mean a semi-proprietary right to forest within 100 yards of all cultivation, while the old '*nettikatt*' right has become nothing more than a common usufruct of the open hill side for grazing, and the collection of leaves for manure, and sticks for fuel and fencing. While thus gradually extinguishing proprietary rights the Government omitted to enforce strict Government conservancy, and as a consequence landholders proceeded to make hay while the sun shone, and encouraged coast merchants and others to make such a clearance of the forests that at the present time it is impossible to derive any revenue worth speaking of from the timber within a marketable distance of the coast, which now receives supplies from the private forests of Malabar at cheaper rates than timber can be procured from the

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local forests, which in Canara have not the advantage of the numerous navigable rivers which are to be found in Malabar. In addition to the denudation of the good timber by merchants, the forests about the same time suffered by a large extension of the destructive temporary cultivation known as '*kumari*,' under which a large tract of fine forest was felled, and the wood burned, in order that a catch crop or two might be grown in the rich soil manured by the ashes, after which the cultivators moved on and repeated their depredations in a new tract. It was not till 1860 that this matter was seriously taken in hand, but in that year sweeping orders were issued directing its discontinuance except in the five southern máganés of the Kásaragód taluk which had been taken over from Malabar, in which private property in forest land had been more distinctly allowed than in Canara. Subsequently this strict rule was relaxed a little to meet the case of certain forest tribes within the Coondapoor and Uppinangadi taluks, who had no other means of livelihood, and, now under strict forest conservancy, it seems probable that it may be desirable to allow it here and there elsewhere so as to keep settlers in the reserved forests, it being impossible to work an entirely deserted forest.

In 1874 before the passing of the Forest Act the Government directed the removal of all existing restrictions from the exercise of proprietary rights in jungles which were private property, and the demarcation of valuable forests admittedly the property of Government. This involved an elaborate inquiry, and before it was completed a decision of the Bombay High Court in a suit from North Canara very materially modified, in favour of Government, the views held by the Madras Government of 1874 regarding private rights over forests. This, and the passing of the Forest Act of 1882 with its prescribed procedure for the formal disposal of claims, rendered the inquiry begun in 1874 of little value except as a preliminary investigation. It was made clear, however, that only a very small area of the forest land in Canara had any legal claim to be considered private forest, while the great bulk was Government property subject only to rights of way and water, and rights to pasture and forest produce over the portions adjoining cultivated lands. As a preliminary step towards the constitution of reserved forests, notifications were issued declaring by name a large number of forests to be reserved lands, with the exception of the slopes immediately adjoining cultivation. The approximate area thus reserved was about 1,000 square miles. From these reserved lands the District Forest Officer has been for some years engaged in selecting suitable blocks to be constituted reserved forests, excluding all lands over which there are claims

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which cannot, or ought not to be disputed. The final settlement of many of these blocks has been delayed pending the decision of some appeals by the courts, and orders by the Board and Government, on some minor questions of policy.

Besides these 1,000 square miles of forest which are eventually to be constituted 'reserved forests,' there are many hundreds of square miles of forest which will be left unreserved, and as above stated the greater part of the waste land of Canara is covered with forest or jungle growth of some kind. Over all these unreserved lands the villagers exercise considerable privileges in the way of grazing cattle and cutting timber, other than certain specified trees, for fuel or for building or agricultural or domestic purposes. The cutting of forest produce for agricultural purposes is a very extensive privilege, as immense quantities of leaves, twigs, and even branches are used for the 500 odd square miles of land under rice cultivation, a method of manuring which, it need hardly be said, would be impossible, except in a country like Canara, where natural forest reproduction is stimulated by a rainfall of 130 inches in a tropical climate. In the '100 yards *kumaki*' lands above alluded to, which usually owe their existence in their present state to the strict conservancy exercised by the holders of the adjoining cultivated lands, the holders are also allowed to fell timber of all classes for their own use, and permits for felling the trees on them cannot be given by Government to others, except with the permission of the holders of the *kumakis*. Free-felling for sale is not allowed to any one, but in practice, as regards firewood, this rule is enforced only in connection with the supply of the larger towns and bazaars, such as Mangalore, Bantvál, Udipi, Kárakal, Coondapoor, Puttúr and Kásaragód. A large proportion of the firewood used in the town of Mangalore is brought by sea from the southern portion of the Kásaragód taluk, where, as above stated, '*kumari*' cultivation is still allowed and the larger timber not reduced to ashes for manure is available for export as firewood.

The forests in Canara are both evergreen and deciduous, and many of the trees, notably the Poonspar (Calophyllum elatum) and the Kiralboghi (Hopea parviflora) attain an immense size, especially on the ghaut slopes. Teak is most abundant in the Uppinangadi and Kásaragód taluks, but it is to be found here and there throughout the district. Blackwood is most common in Coondapoor and Uppinangadi. Some details regarding these and all the other timber trees will be found under the head 'Flora,' and it is unnecessary to do more here than give a list of those which have been selected as the most deserving of protection even on unreserved lands. On the coppiced or shrub jungle throughout

the district, the commonest trees and bushes are perhaps Emblica officinalis, Strychnos nux vomica, Cinnamomum zeylanicum, Eugenia jambolam, Anacardium occidentale (cashew-nut), Ixora coccinea, and in the Coondapoor taluk Acacia catechu and Acacia sundra. The 'reserved' trees are the following:

No.	Botanical name.	English.	Canarese.
1	Tectona grandis	Teak	Saguvani.
2	Dalbergia latifolia	Blackwood ...	Biti.
3	Santalum album	Sandalwood ...	Gandha.
4	Artocarpus integrifolia	Jack	Halasu.
5	Artocarpus hirsuta	Wild jack ...	Hebbalasu.
6	Diospiros ebenum and melanoxylon.	Ebony	Karimara.
7	Acacia catechu and sundra ...	Catechu ...	Káchu.
8	Calophyllum elatum	Poonspar ...	Srihonne.
9	Cinnamomum zeylanicum	Cinnamon ...	Dalchini.

Those which are considered less valuable, but still deserving of special protection, have been designated 'classified trees' and cannot be felled without permits even on unreserved lands. They are the following:

No.	Botanical name.	English.	Canarese.
1	Hopea parviflora	.....	Kiralboghi.
2	Terminalia tomentosa	.....	Banapu or Matti.
3	Terminalia paniculata	.....	Maravu or Honnagalu.
4	Terminalia chebula	Myrabolan ...	Anile.
5	Pterocarpus marsupium	Kino	Bengha.
6	Xylia dolabriformis	Ironwood ...	Tiruva or jembe.
7	Lagerstrœmia microcarpa	Benteak ...	Bolandur or bilinandi.
8	Calophyllum wightianum	.....	Kalpun.
9	Artocarpus lakoocha	.....	Wátehuli.
10	Albizzia odoratissima	.....	Kalbághi.

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No.	Botanical name.	English.	Canarese.
11	Albizzia lebbek	.....	Pulibghi.
12	Hopea odorata	.....	Bilitir pu.
13	Vitex altissima	.....	Myrol.
14	Adenanthera pavonina	.....	Manjetti.
15	Borassus flabelliformis	Palmyra ...	Tálimara.

Owing to the large area of unreserved land suitable for grazing purposes, and the manner in which cultivated land and forest are intermingled in Canara, no attempt has yet been made to raise forest revenue by the imposition of grazing fees. For the reason already mentioned departmental felling of timber is not at present carried out on a large scale, operations being confined to the Uppinangadi taluk for the supply of the Mangalore market. Local wants in excess of privileges are met by the issue of permits for reserved and classified trees throughout the district. Firewood is charged for only when taken to the larger towns. At one time a considerable revenue was realized by allowing stills to be set up in the ghaut forests for the distillation of sandalwood oil from sandalwood brought from Mysore, but an attempt to regulate the felling of the required firewood was met by a kind of strike, and a ruling that '*kumaki*' firewood could be legally used for the purpose has temporarily put a stop to revenue from that source. The most extensive forest revenue operations are really in connection with minor produce. In reserved forests a great variety of such produce is collected by agents of the department and brought into depôts when they are paid for at fixed rates, and in the case of scattered forests and '*kumaki*' lands any one who chooses can bring the produce to a depôt and receive payment therefor.[4] The most widespread produce collected in this way is perhaps 'shigekai' (Acacia concinna), which every alternate year gives a crop of nearly 100 tons. Above this in value and next to it in quantity comes 'rámapatre' or wild mace (Myristica malabarica), of which some 25 tons, worth about as many thousand rupees, may be considered a good crop. Next in importance come 'cinnamon buds,' the flower of the 'dálchini' or Cinnamomum zeylanicum. The seeds of the Strychnos nux vomica or 'kásarakana mara' are procurable in considerable quan-

[4] An attempt is now being made to work the minor produce on the contract system.

tities, but do not pay the cost of collection except in localities near a market, and hardly 10 tons are collected annually. Myrabolans are found mainly in the Coondapoor taluk, but they are poor in quality and not very abundant. Pepper is not so abundant as it was before Tippu deliberately suppressed the trade to prevent intercourse with Europeans, but a few tons are gathered annually. The collection of these products affords employment at certain seasons to large numbers of poor people, equivalent if the work were distributed throughout the year to an establishment of about 500 men, women and children on an average wage of 2 annas a day.

Forests.

The botanical and medicinal particulars given in the following list of the flora of the district have been taken mainly from Drury's "Useful Plants of India," from the "Pharmacopœia of India," and from a Canarese publication by Messrs. Pflebst and Stolz of the Basel Mission at Mangalore. Only such plants are mentioned as have an economic or medicinal value, or are so widely spread as to form an important feature of the flora of South Canara. The families are arranged according to the natural system of Endlicher:—

Flora.

GRAMINACEÆ—

1. *Oryza sativa*, Can. *akki*, Eng. *rice*.

This is the staple product of the district and has been separately noticed under another head.

2. *Eleusine corocana*, Can. *rági*.

This crop is grown only to a limited extent, mainly in kumaris, but also as a monsoon crop on uplands which have not been levelled for rice cultivation, and as an irrigated cold weather crop in the neighbourhood of the ghauts.

3. *Zea mays*, Can. *dodda jóla*, Eng. *maize*.

Grown very sparingly as a garden crop.

4. *Saccharum officinarum*, Can. *kabbu*, Eng. *sugar-cane*.

The cultivation of sugar-cane has been described under the head of products.

5. *Bambusa arundinacea*, Can. *bidru gala*, Eng. *common bamboo*.

Of the common bamboos there are several varieties, all of which are common in the forests throughout the district. The large and middle-sized bamboos are used largely for building, as masts and spars for native vessels, for scaffolding, tent poles, ladders, floating timber, &c., and a smaller-sized bamboo, known as 'kiri bidru,' is used mainly for battens, roofing, flooring, and split to make walls for houses, matting, baskets, &c. A still smaller variety known as 'wante' or 'wáte' is used chiefly for baskets and matting.

Flora.

6. *Bambusa stricta*, Can. *gandu bidru*, Eng. *male bamboo.*

This is a solid bamboo which is used mainly for roofs, floors, battens and spear handles.

7. *Cynodon dactylon*, Can. *kariké hullu*, Eng. *hariali grass.*

This grass is not very abundant in the district, but it is found in low-lying localities.

8. *Andropogon muricatum*, Can. *kasuru hullu*, Eng. *cuscus grass.*

9. *Poa cynosuroides*, Can. *darba hullu.*

This is probably the most common grass in Canara, but there are numerous species which do not seem ever to have been examined and classified.

LILIACEÆ—

1. *Asparagus racemosus*, Can. *shatamúli balli.*

A very pretty climbing shrub with feathery leaves, common all over the district. The root is used medicinally by the natives, but is regarded as unworthy of notice by the compiler of the "Pharmacopœia of India."

2. *Scilla indica*, Can. *kádu-belluli-gida.*

This grows in sandy places near the shore. The bulb is described in the "Pharmacopœia of India" as a fair substitute for the officinal squill.

3. *Gloriosa superba*, Can. *shiva-shakti-balli.*

A very handsome climbing plant, common throughout the district. The root is used medicinally by the natives and is commonly believed to be very poisonous. Its properties, however, are not yet very well ascertained.

DIOSCOREACEÆ—

1. *Dioscorea tomentosa*, Can. *mullu genasu.*
2. *Dioscorea alata*, Can. *túna genasu.*
3. *Dioscorea aculeata*, Can. *sígenasu.*
4. *Dioscorea pulchella*, Can. *kunta genasu.*
5. *Dioscorea atropurpurea*, Can. *hebbu genasu.*

All the above yams are grown commonly in gardens throughout the district.

AGAVEACEÆ—

Agave americana, Can. *áne katáli.*

The American aloe is not so common in Canara as on the east coast, but it is grown to a certain extent for hedges and for its fibre.

BROMELIACEÆ—

Ananas sativus, Can. *anásu, pharangi-halasu*, Eng. *pine-apple.*

The pine-apple was introduced into the west coast of India, by the Portuguese, and is largely and successfully grown in Canara, sometimes with little or no care, or merely for hedges; but when

cultivated with care, very fine specimens of the fruit are obtained. The fibre is not much used.

ZINGIBERACEÆ—

1. *Zingiber officinale*, Can. *sunti*, Eng. *ginger*.

Ginger is commonly grown in what is called 'hakkal' cultivation which is described elsewhere. It used to be cultivated on a somewhat extensive scale at Kokkada in the Beltangadi division of the Uppinangadi taluk, but the cultivation has fallen off of late years. Small patches of it are still grown all over the district, but chiefly in the Mangalore and Uppinangadi taluks.

2. *Zingiber zerumbet*, Can. *kádu sunti*, Eng. *wild ginger*.

This plant is very common in the forests at the foot of the ghauts. The rhizome possesses in a minor degree the carminative properties of common ginger.

3. *Curcuma longa*, Can. *arasina-gida*, Eng. *turmeric*.

Turmeric is grown chiefly in the Karakal division of the Udipi taluk, and exported from the port of Hangarkatta, but like ginger it is cultivated in small patches, chiefly in 'hakkal' cultivation, all over the district. Its ordinary uses are well known. It is much used in native medicine, but in the Pharmacopœia it is stated to be officinal only as a chemical test.

4. *Curcuma aromatica*, Can. *kádu arasina-gida*, Eng. *wild turmeric*.

This plant is very common in the ghaut forests. It is used by the natives as a perfume and medicinally.

5. *Curcuma angustifolia*, Can. *kúve*, Eng. *East Indian arrow-root*.

The 'kúve' plant is very common in moist places in the forests throughout the whole district. A very fair arrow-root can be prepared from the tubers with care, but that which is usually made in South Canara and which sometimes can be bought in the bazaars is hastily made and very dirty.

6. *Ellettaria cardamomum*, Can. *yélakki*, Eng. *cardamom*.

Cardamoms are found here and there all over the ghaut forests, and the natural growth is sometimes improved and developed by a partial clearing of the forest. The most important cardamom forest is at Neriya near Beltangadi. Several forests near the Bisli and Merkara ghauts have recently been leased out by the Forest Department for cardamom cultivation, and the landholders in the southern máganés of the Kásaragód taluk also give attention to the cultivation of this product. In the northern taluks little has been done, but cardamoms are found at Tingala-makki near Sóméshwar in the Udipi taluk.

7. *Costus speciosus*, Can. *pushkaramúla*.

A very handsome species found in moist places all over the Canara forests.

CHAP. I. GENERAL DESCRIPTION.

Flora.

MUSACEÆ—

1. *Musa paradasiaca*, Can. *bále*, Eng. *plantain.*

The plantain is cultivated extensively all over South Canara, and the varieties most appreciated by Europeans are very successfully grown near Mangalore.

2. *Musa superba*, Can. *kádu bále*, Eng. *wild plantain.*

The wild plantain grows freely all over the ghaut forests. It is valued only for its fibre.

ARACEÆ—

1. *Arum colocasia*, Can. *késu.*

Grown in gardens. The leaves and stalks and occasionally the tubers are eaten by the natives.

2. *Arum campanalatum*, Can. *gandíra*, Eng. *telinga potato.*

The roots of this plant are very nutritious and are eaten in the same way as yams.

3. *Acorus calamus*, Can. *baje*, Eng. *sweet flag.*

A common plant in moist places. The rhizome is one of the most popular of native remedies and is stated in the "Pharmacopœia of India" to be well adapted for certain forms of dyspepsia and to have been favourably noticed as an ante-periodic and a stimulant diaphoretic. The powdered rhizome is a valuable insectifuge, especially as regards fleas.

PANDANACEÆ—

Pandanus odoratissimus, Can. *mundige*, Eng. *fragrant screw pine.*

This plant is exceedingly common all along the streams and backwaters of the district. The flowers known as 'kédige' are much worn by the people and imitated in their gold ornaments; an oil is also extracted from them. The leaves are used for making mats and the fibre is also much valued.

PALMACEÆ—

1. *Cocos nucifera*, Can. *tengina-mara*, Eng. *cocoanut palm.*

The cocoanut palm is very extensively cultivated in Canara and the method of cultivation has been specially described under another head. It is grown mainly on the coast and in the valleys of the larger rivers.

2. *Areca catechu*, Can. *adike*, Eng. *areca palm.*

The cultivation of this palm has also been separately described. It is grown mainly in deep shady valleys in the forest tracts of the district. The nut is the well known betel nut.

3. *Borassus flabelliformis*, Can. *tále*, Eng. *palmyra.*

The palmyra is most common in the Mangalore and Kásaragód taluks, growing chiefly on the slopes from the cultivated valleys to the laterite plateaus above, or on sandy plains near the coast. The fruit is not much used and the tree is valued mainly for the juice, which is either drunk as toddy, distilled into arrack

or made into jaggery. The leaves are used for many purposes like those of the cocoanut palm. The wood is valuable for rafters.

4. *Caryota urens*, Can. *bainé*, Eng. *bastard sago.*

This palm is found wild throughout the ghaut forests. It yields toddy very abundantly and the wood is used for aqueducts. A very strong fibre, used for fishing lines and known as Indian gut, is made from the leaves. If found in sufficient quantities it would be valuable for export to Europe for brush making.

5. *Phœnix sylvestris*, Can. *ichil*, Eng. *wild date.*

This tree is found in the district, but the climate is too moist for it to thrive well. Mats are made of the leaves.

6. *Phœnix farinifera*, Can. *sanna ichil*, Eng. *dwarf wild date.*

This species is found chiefly on the open hill sides on the ghauts.

7. *Corypha umbraculifera*, Can. *sritále*, Eng. *talipot or fan palm.*

This species is not very common in the district. Umbrellas used to be made of the leaves, but these are fast giving way to umbrellas of European manufacture. The best 'cadjan' writing leaves are got from this palm.

8. *Calamus rotang*, Can. *betta*, Eng. *rattan cane.*

This is the common rattan cane and is found all over the ghaut forests. A variety covered with black spots, called 'nágabetta' in Canarese, is found near Subramania in the Uppinangadi taluk and is much valued for walking sticks.

PIPERACEÆ—

1. *Piper nigrum*, Can. *olle menasu*, Eng. *black pepper.*

Pepper is indigenous in the Canara forests, but is not now nearly so much cultivated as it was in the last century, the pepper trade with Europeans having been interdicted by Hyder and Tippu. Such cultivation as there is is carried on mainly in bits of evergreen forest, known as '*káns*', attached to *wargs* in the Uppinangadi taluk. Cultivation of the pepper vine in gardens in the low country is carried on only to a small extent. White pepper is the same fruit as the black pepper, the ripe berries being deprived of the outer skin by maceration in water.

2. *Piper longum*, Can. *hippali*, Eng. *long pepper.*

This plant is grown to a small extent in gardens. The fruit is mainly used as a condiment. It is said to possess more powerful carminative properties than black pepper.

3. *Piper betel*, Can. *vilyada balli*, Eng. *betel leaf.*

The cultivation of the betel leaf is general throughout Canara and has been described elsewhere.

CHAP. I. GENERAL DESCRIPTION.

Flora.

CASUARINACEÆ—

Casuarina muricata, Can. *chabukina-mara*, Eng. *casuarina*.

The casuarina has been lately introduced into Canara and several plantations have been formed near Mangalore.

MORACEÆ—

1. *Ficus racemosa*, Can. *atti-mara*, Eng. *country fig tree*.

The fruit is edible. The root, in decoction, and the bark are sometimes used in native medicines.

2. *Ficus religiosa*, Can. *ashwatta-mara*, Eng. *peepal, sacred fig tree*.

These trees are found with basements built round them all over the district, with a 'snake-stone' as a frequent accompaniment.

3. *Ficus bengalensis*, Can. *álada-mara, góli-mara*, Eng. *common banyan tree*.

This tree is very widespread. It is much used for avenues, and large solitary trees are often found in pasture lands, affording shade to a large number of cattle. The juice is used for tooth-ache and the bark as a tonic.

4. *Urostigma pisiferum*, Can. *kiru-góli*.

This is a small kind of banyan tree, not uncommon throughout the district.

5. *Ficus conglomerata*, Can. *gargasada-mara*.

The leaves of this tree are rough like sand-paper and are used for polishing wood. The fruit is used medicinally. The tree is common enough in Canara.

ARTOCARPACEÆ—

1. *Artocarpus integrifolia*, Can. *halasu*, Eng. *jack*.

The common jack tree grows very abundantly in Canara. At the proper season the fruit affords food to large numbers of the poorer classes, and is eaten by all. The seeds are also eaten roasted, and the leaves are given to fatten sheep and goats. The timber is very valuable and the juice is used medicinally.

2. *Artocarpus hirsuta*, Can. *hebbalasu*, Eng. *wild jack*.

The timber of this tree is even more valuable than that of the ordinary jack. The fruit also is edible, but it is not considered worth while to grow the tree for the fruit. A dye is made from the bark, and the leaves are used medicinally.

3. *Artocarpus lakoocha*, Can. *wáte-huli*.

The fruit of this tree is much used in curries in Canara instead of tamarind.

4. *Artocarpus incisa*, Can. *divi halasu*, Eng. *bread-fruit tree*.

This tree is common in the Amindívi Islands attached to the district of South Canara, and is grown occasionally in gardens on the mainland.

URTICACEÆ—

Urtica heterophylla, Can. *turike-gida*, Eng. *Nilgiri nettle*.

It is given as a decoction for fever, and a fibre is made from it.

PUTRANJIVACACEÆ—

Putranjiva roxburghii, Can. *putrajiva*, Eng. *wild olive*.

A middle-sized somewhat rare evergreen tree, of which the nuts are worn as necklaces by children to keep off sickness, hence the vernacular name.

CANNABINACEÆ—

Cannabis sativa, Can. *bangi*, Eng. *hemp*.

Hemp is grown in Canara for the seed only in back-gardens, usually in small quantities for private consumption as ganja or bangi, and occasionally for sale in a small way. The cultivation prevails throughout the district, but more in the Coondapoor taluk than elsewhere.

CHERNOPODACEÆ—

Basella alba and rubra, Can. *basale balli*, Eng. *Malabar nightshade*.

This is grown all over the district and is eaten cooked like spinach.

AMARANTACEÆ—

Amarantus oleraceous, Can. *harive-soppu*.

This is a very favourite vegetable in all parts of the district.

NYCTAGINACEÆ—

1. *Mirabilis jalapa*, Can. *madhyána mallige*, Eng. *four o'clock flower*.

The root of this plant is stated in native medical works to be an efficient purgative equal to common jalap, but in chemical trials its powers were found to be feeble and uncertain. The bruised leaves are applied by natives to boils and abscesses to hasten suppuration.

2. *Bœrhavia diffusa*, Can. *sanádiká-gida*, Eng. *spreading hogweed*.

A common and troublesome weed. The root is used medicinally as a laxative vermifuge, expectorant and emetic.

LAURACEÆ—

Cinnamomum zeylanicum, Can. *dálchini*, Eng. *cinnamon*.

The cinnamon tree, which grows wild all over the district except in the heavy forests of the ghauts, is probably a variety of the true cinnamon (Cinnamomum zeylanicum). The most important product of the tree is the immature flower, which is much used in native medicines and known to commerce as cassia buds. The bark is exported to some extent, and a volatile oil is distilled from the leaves.

SANTALACEÆ—

Santalum album, Can. *gandhada-mara*, Eng. *sandal-wood*.

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The sandal-wood tree grows freely all over the open scrub forest of South Canara, but on the plains the fragrant heart-wood does not develope properly and is practically useless for the distillation of sandal-wood oil.

ARISTOLOCHIACEÆ—

Aristolochia indica, Can. *ishwara-gida*, Eng. *Indian birthwort.*

A common jungle creeper with a nauseous bitter root, much used by the natives as a stimulant and febrifuge.

PLUMBAGINACEÆ—

1. *Plumbago rosea*, Can. *kempu chitramúla*, Eng. *rose-coloured leadwort.*

Grown in gardens. The bruised root is acrid and stimulating. It is used by the natives as a blister, and is mixed with oil as an embrocation.

2. *Plumbago zeylanica*, Can. *bili chitramúla*, Eng. *Ceylon leadwort.*

A wild variety of the foregoing, possessing similar, but less powerful properties.

COMPOSITÆ—

1. *Sphæranthus hirtus*, Can. *karande.*

A common plant on the banks of rice fields, used medicinally by the natives.

2. *Vernonia anthelmintica*, Can. *kádu-jirige*, Eng. *purple fleabane.*

The seeds of this plant are a valuable anthelmintic in ascarides, and are highly valued by the natives.

3. *Pyrethrum indicum*, Can. *sévantige.*

Grown in gardens for its fragrant and ornamental flowers.

LOBELIACEÆ—

Lobelia nicotianæfolia, Can. *kádu-hogesoppu.*

This plant, which grows in the ghaut forests, is called wild tobacco by the natives. The leaves are said to cause giddiness if eaten, and bees get much honey from the flowers.

RUBIACEÆ—

1. *Coffea arabica*, Can. *káphi-gida*, *bunnu-gida*, Eng. *coffee.*

A small amount of coffee is grown for trade purposes just below the ghauts in the Uppinangadi taluk and in the southern máganés of the Kásaragód taluk. Coffee bushes are found here and there in gardens all over the district.

2. *Ixora coccinea*, Can. *képala.*

An evergreen shrub with beautiful red flowers disposed in ample corymbs, to be found flowering all the year round in every forest or open piece of scrub jungle from the ghauts to the coast.

3. *Gardenia lucida*, Can, *dikká-malli.*

A small tree with large white flowers. The resin is fragrant and good for keeping flies and worms off sores.

4. *Ophiorrhiza munghos*, Can. *pátála-garuda-gida.*

The root of this plant is intensely bitter and is regarded by the natives as an antidote for snake-bites.

5. *Mussænda frondosa*, Can. *bellotti.*

A large, handsome and very common shrub, which attracts notice in the forests by a part of the calyx looking like a large white leaf.

6. *Morinda umbellata*, Can. *poppili, maradarisina.*

The root of this tree yields a dye of permanent yellow.

JASMINIACEÆ—

1. *Jasminum sambac*, Can. *mallige.*

This plant is common in the forests, and is also cultivated for the fragrant flowers, which are also used as a lactifuge.

2. *Jasminum angustifolium*, Can. *kádmallige.*

3. *Jasminum hirsutum*, Can. *kastúri-mallige.*

4. *Jasminum grandiflorum*, Can. *jáji-mallige.*

5. *Jasminum pubescens*, Can. *dodda kádu-mallige.*

All the above jasmins are much valued for their flowers.

LOGANIACEÆ—

1. *Strychnos nux vomica*, Can. *kásarkana.*

The nux vomica tree is one of the most common trees throughout the whole of the district. The seed is most valued both in native and European medicine, and the well-known poison strychnine is prepared from the kernel of the fruit. The pulp of the fruit is harmless and eaten by birds, monkeys and cattle. In some parts of the district in the dry weather, where grass is scarce, no milk can be got without a bitter taste owing to the cattle eating the leaves of coppiced nux vomica trees.

2. *Strychnos potatorum*, Can. *chillida-mara.*

An evergreen tree with white flowers found in the ghaut forests. The seeds are harmless and have the singular property of clearing muddy water, if it is poured into a vessel of which the sides have been rubbed with bruised or sliced seeds.

APOCYNACEÆ—

1. *Carissa carandas*, Can. *karavadi.*

A common shrub in scrub jungle useful for fences. The berries are eaten and preserved and pickled.

2. *Plumeria acuminata*, Can. *kádu-sampige.*

Grows wild, and is also grown as an ornamental tree in gardens. The flowers have a strong sweet scent, and branches of young trees are used for hedges.

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3. *Wrightia antidysenterica*, Can. *kodasige.*

A common shrub or small tree in the forests. The bark is a valuable medicine for dysentery and also a tonic and febrifuge. It used to be imported into Europe under the name of conessi bark.

4. *Wrightia tinctoria*, Can. *hallunóvu-mara.*

A tree somewhat similar to the foregoing, but the bark is comparatively or wholly inert. The leaves are said to be good for tooth-ache, hence its Canarese name.

5. *Cerbera odollam*, Can. *chande-mara.*

A common tree in swamps and on banks of backwaters with a poisonous fruit somewhat like a mango.

6. *Tabernæmontana coronaria*, Can. *maddarasa-mara.*

The juice of the flowers mixed with oil is good for sore eyes and the root for tooth-ache.

7. *Alstonia scholaris*, Can. *hále-mara.*

A common and handsome tree with soft wood. The tree is officinal as an astringent tonic, anthelmintic and antiperiodic.

ASCLEPEDIACEÆ—

1. *Calotropis gigantea*, Can. *ekkamále*, Eng. *gigantic swallow-wort.*

This plant is found in dry places in the district. The root bark dried is the mudar of the Pharmacopœia, which is an alterative tonic, diaphoretic, and in large doses an emetic. It also yields a very strong fibre.

2. *Hemidesmus indicus*, Can. *sugandhi balli, námada-beru*, Eng. *country sarsaparilla.*

The root of this plant finds a place in the Indian Pharmacopœia. An infusion of the root is used as a tonic, diuretic and diaphoretic.

LABIATÆ—

1. *Ocimum sanctum*, Can. *tulasi-gida*, Eng. *holy basil.*

This plant is considered sacred to Vishnu, and is found in the courtyard of every Brahman's house in the district. The root and leaves are used medicinally by the natives, but they are not considered effective by European practitioners.

2. *Ocimum basilicum*, Can. *káma-kastúri*, Eng. *sweet basil.*

The plant is aromatic and fragrant. The juice of the leaves is a native remedy for ear-ache, and an infusion of the seeds is a favourite remedy for relieving the after-pains of childbirth.

3. *Ocimum album*, Can. *nai-tulasi.*

4. *Teucas indica*, Can. *tumbe.*

A very common wild flower, or weed.

VERBENACEÆ—

1. *Tectona grandis*, Can. *tégina-mara, saguváni-mara*, Eng. *teak.*

The teak tree is fairly common in the deciduous forests of the Kásaragód and Uppinangadi taluks, and is found here and there elsewhere, especially in the Mangalore taluk. Teak and black-wood are the two most valuable timbers of the district.

2. *Gmelina arborea*, Can. *kashmiri-mara.*

This tree is generally distributed throughout the district. The wood is light, but strong and useful. The tree grows to a considerable size.

3. *Vitex negundo*, Can. *bilénekki-gida.*

A common small tree or shrub. The root is used medicinally.

4. *Vitex altissima*, Can. *balage.*

A common tree on the upper slopes of the ghauts. The wood is hard and valuable.

5. *Clerodendrum infortunatum and serratum*, Can. *gantubárange-gida.*

Both these shrubs are found in the forests, and the former is very common. The root is a well-known native medicine in febrile and catarrhal affections.

6. *Lantana aculeata*, Can. *nátahu.*

A recent introduction, as an ornamental flower, but promises to become a widespread weed. It is very common in Mangalore and the neighbourhood, at Niléshwar, and here and there throughout the district.

CONVOLVULACEÆ—

1. *Ipomœa batatas*, Can. *genasu*, Eng. *sweet potato.*

This common tuber is cultivated throughout the district.

2. *Batatas paniculata*, Can. *nela-kumbala genasu, gudda genasu.*

The root is used as a cathartic.

3. *Ipomœa turpethum*, Can. *tigade balli*, Eng. *Indian jalap.*

The root is known to be one of the best purgatives.

4. *Evolvulus alsinoides*, Can. *vishnukránti-gida.*

This plant is very common in rice fields. The leaves, stalks and roots are said to be valuable remedies for fever and dysentery.

5. *Argyrea speciosa*, Can. *samudra-hále*, Eng. *elephant creeper.*

A common climber in the district. The leaves are used for emollient poultices.

6. *Ipomœa maritima*, Can. *adumbu-balli*, Eng. *goat's foot creeper.*

Very common in the sand near the sea-shore.

SOLANACEÆ—

1. *Solanum esculentum* or *melongena*, Can. *badane*, Eng. *brinjal* or *egg-plant.*

The brinjal is cultivated as a vegetable all over the district.

2. *Solanum jacquini*, Can. *kantakári.*

The fruit is considered an expectorant by the natives and given by them for coughs, consumption and asthma.

Flora.

3. *Solanum indicum*, Can. *kirigulla-gida*, Eng. *Indian night-shade.*

The root is much used in native medicines.

4. *Datura alba*, Can. *ummatta*, Eng. *white-flowered thorn-apple.*

This is a common plant in Canara as in the rest of India. It finds a place in the Indian Pharmacopœia as an anodyne and antispasmodic, and in over doses a violent poison. Its medicinal, and perhaps even more markedly its poisonous, properties are well known to the natives.

5. *Datura fastuosa*, Can. *kari-ummatta*, Eng. *purple thorn-apple.*

This is closely allied to the preceding, and its properties are similar.

6. *Capsicum frutescens*, Can. *menasu*, Eng. *chilly.*

In the neighbourhood of Mangalore and near Bajpe and Tálepádi on the inland road to Mulki large quantities of chillies are grown during the monsoon by Native Christians in a kind of 'hakkal' cultivation on uplands which have never been levelled for rice cultivation. Throughout the district they are grown to some extent either in hakkal or as a second or third crop in little patches of rice fields.

7. *Nicotiana tabacum*, Can. *hoge soppu*, Eng. *tobacco.*

Tobacco is grown to a very considerable extent in the southern máganés of the Kásaragód taluk, mainly near the coast. The species is called 'natti' in Canarese, and is used for snuff throughout the whole district. A certain amount is also exported to Bombay.

ACANTHACEÆ—

1. *Gendarussa vulgaris*, Can. *karinekki.*

2. *Gendarussa adhadota*, Can. *ádusóge*, Eng. *Malabar nut.*

The bark and leaves of the above shrubs are used medicinally by the natives.

3. *Barleria prionites*, Can. *mullu-górante.*

There are four varieties of this shrub—white, red, yellow and blue. The juice of the leaves is used by the natives for children with fever or catarrhal affections.

4. *Barleria longifolia*, Can. *kolavalike-gida.*

The plant is found in moist places. The root is used as a tonic and diuretic.

5. *Strobilanthus callosus*, Can. *gurige.*

This and other varieties of strobilanthus form the most common undergrowth throughout the forests of South Canara.

BIGNONIACEÆ—

1. *Calosanthes indica*, Can. *ánemungu.*

A small tree of no value as timber. The bark and fruit are used medicinally and for tanning.

2. *Sesamum indicum*, Can. *ellu*, Eng. *gingelly*.

Gingelly is grown to some extent in the district, but not very largely. It is usually cultivated in *kumari* or *hakkal*, sometimes mixed with paddy, and occasionally as a third crop in *bail* fields.

SAPOTACEÆ—

1. *Bassia latifolia*, Can. *ippe*, Eng. *Mhowa tree*.

This tree grows in the Canara forests, but is not very common and the practice usual in other parts of India of making a spirit from the flowers does not prevail in Canara.

2. *Mimusops elengi*, Can. *ranje*.

A large and handsome tree with good wood. Oil is obtained from the seeds, and the root and fruit are used in medicine.

3. *Mimusops obtusifolia*, Can. *hádari*.

The leaves are used medicinally and the fruit eaten.

EBENACEÆ—

1. *Disopyros melanoxylon*, Can. *kari-mara*, Eng. *ebony*.

This species of diospyros yields a fine kind of ebony when the trees are large and old. It is found here and there in the Canara forests, but is not common.

UMBELLIFERÆ—

Hydrocotyle asiatica, Can. *ondelaga*, Eng. *Asiatic pennywort*.

Is included in the Pharmacopœia of India as an alterative tonic, and locally applied as a stimulant. It is believed by the natives to be an excellent remedy for leprosy, and there is no doubt that good results have, in some cases, followed its use.

MENISPERMACEÆ—

1. *Cocculus cordifolius*, Can. *amrita-balli*.

The plant, which is found in the forests, is included in the Pharmacopœia of India as a tonic, antiperiodic and diuretic. It is extensively used by native practitioners.

2. *Cocculus indicus*, Can. *kage-mári*.

The berries of this plant contain a poison and are used for poisoning streams to secure the fish; also for killing crows. An ointment prepared from the powdered berries is included in the Pharmacopœia of India as an insecticide.

3. *Clypea burmanni*, Can. *pádávalli-balli*.

The root is used medicinally by the natives.

MYRISTICACEÆ—

Myristica horsfieldii or malabarica, Can. *kádujajimara*, Eng. *wild nutmeg*.

This tree grows to a large size in evergreen forests. It is most common in the Uppinangadi and Coondapoor forests. The nutmeg and mace known in Canara as 'rámgót' and 'rámpatra' are collected by the Forest Department and sold for remunerative prices.

CHAP. I. GENERAL DESCRIPTION. — Flora.

ANONACEÆ—

1. *Anona squamosa*, Can. *sítaphala*, Eng. *custard-apple*.

2. *Rollinia sieberi*, Can. *rámaphala*, Eng. *bullock's heart* or *sweet sop*.

Both the above are grown to a small extent for the fruit.

MAGNOLIACEÆ—

Michelia champaca, Can. *sampige*.

This tree is grown for the sweet-scented flowers, which are used at religious and other ceremonials.

CRUCIFERÆ—

1. *Raphanus sativus*, Can. *mulangi*, Eng. *radish*.

Grown for use as a vegetable.

2. *Sinapis juncea*, Can. *sásive*, Eng. *Indian mustard*.

Grown for the seeds which are stated in the Pharmacopœia of India to be an efficient substitute for the black or white mustard, especially for mustard poultices. They are also used for dietetical purposes, and the oil expressed from them is used as a rubefacient.

CAPPARIDACEÆ—

1. *Cleome icosandra*, Can. *kádu-sasive*.

Known as wild mustard and used in the same way.

2. *Cratæva nirvala*, Can. *narumbéle*.

Used by the natives as a stomachic and tonic.

NYMPHACACEÆ—

1. *Nymphæa rubra*, Can. *kenneidile*, *kendávare*, Eng. *red water-lily*.

2. *Nymphæa pubescens*, Can. *neidile*, *távare*, Eng. *white water-lily*.

3. *Nelumbium speciosum*, Can. *távare*, *kamala*, Eng. *lotus*.

The three preceding water lilies are common in ponds and still water all over the district.

PAPAYACEÆ—

Carica papaya, Can. *poppayamara*, Eng. *papaw tree*.

This tree, originally introduced from America, is now commonly grown in Canara as in other parts of India. The fruit is eaten by the natives in curries and pickled. A milky juice from the fruit, especially when unripe, has the property of hastening animal decay, and if freshly killed meat be wrapped in the leaves and then roasted, it is found quite tender. It is said that the same effect is produced by hanging the meat under the tree for two or three hours.

CUCURBITACEÆ—

1. *Cucumis sativus*, Can. *mullusautekai*, Eng. *common cucumber*.

2. *Cucumis utilissimus*, Can. *kargumbala*, Eng. *field cucumber*, *pumpkin*.

3. *Cucurbita maxima*, Can. *kumbala*, Eng. *squash gourd.*

4. *Lagenaria vulgaris*, Can. *alúbu*, Eng. *white pumpkin, bottle gourd.*

5. *Beninkasa cerifera*, Can. *bilé-kumbala*, Eng. *white gourd.*

6. *Luffa acutangula*, Can. *hiré-kai.*

7. *Trichosanthus anguina*, Can. *patla-kai*, Eng. *snake vegetable.*

8. *Momordica charantia*, Can. *hágala-kai.*

All the above cucurbitaceæ are commonly cultivated as vegetables throughout the district.

9. *Cucumis citrullus or citrullus vulgaris*, Can. *bachchangai*, Eng. *water melon.*

10. *Cucumis melo*, Can. *ibbudlu*, Eng. *melon.*

The water melon is cultivated all over the district, but more in the Coondapoor taluk than elsewhere. The sweet melon is hardly known.

11. *Cucumis pubescens*, Can. *hirimekke.*

This is a wild cucumber which is eaten by the natives.

12. *Cucumis trigonus*, Can. *hávumekke.*

The plant common in Canara is probably the Cucumis trigonus and not the Citrullus colocynthus. The properties are said to be the same as those of the Officinal colocynth.

MALVACEÆ—

1. *Hibiscus esculentus*, Can. *bende-kai*, Eng. *lady's fingers.*

One of the most common vegetables in Canara as in other parts of South India.

2. *Hibiscus sabdariffa*, Can. *pundisoppu*, Eng. *roselle, red sorrel.*

3. *Hibiscus cannabinus*, Can. *phindisoppu*, Eng. *duccani hemp.*

The leaves of the above are eaten as vegetables, also the fleshy calyx and capsules of the Hibiscus sabdariffa. A good fibre is got from both.

4. *Hibiscus rosa sinensis*, Can. *dásanige*, Eng. *shoe-flower.*

This well-known flower is grown freely in gardens.

5. *Hibiscus abelmoschus*, Can. *kád kastúri*, Eng. *musk.*

This plant with its sulphur-colored flowers, dark crimson at the base, is very common in the forests. The fibre is very strong.

6. *Thespacia populnæ*, Can. *adavi bende*, Eng. *portia tree.*

A handsome tree with yellow flowers with a red dye. It yields a good timber.

7. *Gossypium indicum*, Can. *hatti*, Eng. *cotton.*

Cotton is grown only in the Kumaris of the southern máganés of the Kásaragód taluk.

STERCULIACEÆ—

1. *Bombax malabaricum*, Can. *búrugada*, Eng. *red cotton tree.*

Flora.

A very large and common tree with red flowers. The wood is of no value, but the cotton from the pods is used for stuffing pillows, cushions, &c.

2. *Helicteres isora*, Can. *kóle-nár bhutakaralu-mara.*

A small tree or shrub very common in the forests. A coarse fibre prepared from the bark is much used instead of rope by those who live near the forests.

3. *Sterculia alata*, Can. *doddole.*

A very large and common tree with soft and useless wood.

DIPTEROCARPACEÆ—

1. *Vateria indica*, Can. *dhúpadamara.*

A large and handsome tree well suited for avenues, for which they have been planted all over Canara. The finest old 'dhúpa' avenue in the district is between Mudbidri and Karakal and thence up to the Rámsamudra lake. A piney gum is got from the tree known as 'white dammer' and an excellent varnish can be made from it, but the timber is of little value. A solid oil obtained from the seeds is known as vegetable tallow and is used as a local application in chronic rheumatism, &c.

2. *Dipterocarpus indicus*, Can. *maradayenne-mara.*

A tree found in the south-eastern part of the Uppinangadi taluk, from which a wood oil is obtained, which is much valued for varnishing furniture and the wood work of houses.

CLUSIACEÆ—

1. *Calophyllum inophyllum*, Can. *honne*, Eng. *alexandrian laurel.*

This is very common, especially near the coast, as it grows well in sandy soils. The wood is good and a lamp-oil is made from the seeds.

2. *Calophyllum elatum*, Can. *sri-honne.*

A very tall and straight evergreen tree, common in the ghaut forests, much used for masts and spars under the name of poon-spar. Dug-out boats of this tree are also considered the most lasting and are often procured of great size.

3. *Garcinia pictoria*, Can. *járigehuli*, Eng. *Mysore gamboge tree.*

A fairly common evergreen tree which yields a good gamboge.

4. *Garcinia purpurea*, Can. *murgina huli-mara.*

This tree is common in evergreen forests. A solid oil known as 'kokam butter' is obtained from the seeds and used in medicine and cooking.

5. *Mesua ferrea*, Can. *nága sampige.*

A handsome tree with fragrant flowers. An oil obtained from the seed is used in medicine and for lighting.

AURANTIACEÆ—

1. *Citrus decumana*, Can. *chakóra*, Eng. *shaddock.*

2. *Citrus medica*, Can. *mahaphala-gida*, Eng. *citron.*

3. *Citrus bergamia*, Can. *nimbe-mara*, Eng. *lime*.

All the above are grown to some extent for the fruit.

4. *Ægle marmelos*, Can. *bélapatre-mara*, Eng. *bael tree*.

5. *Feronia elephantum*, Can. *bélada-mara*, Eng. *wood-apple tree*.

The above two trees are somewhat similar, and the fruit of both is used medicinally in cases of diarrhœa and dysentery. The bael fruit finds a place in the Pharmacopœia of India, but the medicinal properties of the wood-apple are much inferior and the frequent substitution of the latter for the former in hospital supplies has led to the bael fruit being treated with neglect. A gum resembling Gum arabic is got from the wood-apple tree. Neither are very common in the district, as a drier climate suits them better.

6. *Bergera kœnigii*, Can. *karibévu*, Eng. *curry-leaf tree*.

The leaves are much used to flavour curries and add to their digestibility. The bark, root and leaves are much used in native medicine as a tonic and stomachic and have been favourably reported on by European practitioners. An oil is made from the seeds.

SAPINDACEÆ—

Sapindus emarginatus, Can. *aradála*, Eng. *soap-nut tree*.

The fruit is used as soap.

RHAMNACEÆ—

1. *Zizyphus œnoplia*, Can. *surimullu*.
2. *Zizyphus xylopyrus*, Can. *kotta-mara*.
3. *Zizyphus jujuba*, Can. *bogari-mara*, Eng. *jujube*.

The fruit of the Zizyphus jujuba is very good to eat.

EUPHORBIACEÆ—

1. *Emblica officinalis*, Can. *nellimara*, Eng. *emblic myrabolan*.

This tree is very common in scrub jungle all over the district. The fruit is sometimes pickled, and it is used as an astringent in bowel-complaints.

2. *Ricinus communis*, Can. *haralu*, Eng. *castor-oil plant*.

The castor-oil plant is grown in *kumari* lands and as a garden crop. There are two varieties. The medicinal oil is obtained from the small-seeded variety. The other oil is used for lamps, &c.

3. *Jatropha curcas*, Can. *kádharalu*, Eng. *physic nut or wild castor-oil plant*.

An oil is expressed from the seeds which differs from castor-oil in its slight solubility in alcohol. It is a very much more powerful purgative than castor-oil, but very uncertain in its action. It is used for hedges, as cattle do not eat it.

4. *Jatropha manihot*, Can. *kanagala-mara*, Eng. *tapioca* or *bitter cassava plant*.

Flora.

This plant is grown to a small extent in Canara, but no tapioca is made from it.

5. *Macaranga indica*, Can. *uppalige-mara.*

A large and tolerably common tree of little value.

6. *Euphorbia tirucalli*, Can. *kalli*, Eng. *Indian tree spurge.*

7. *Euphorbia nivalia*, Can. *ele-kalli.*

8. *Euphorbia antiquarum*, Can. *chatura-kalli*, Eng. *triangular spurge.*

The first of the above three is a somewhat common hedge and the others are varieties of it. They all abound in an acrid milky juice.

9. *Acalypha indica*, Can. *kuppi-gida.*

The expressed juice of the leaves is a valuable emetic for children, and the root is used as a purgative.

10. *Tragia involucrata*, Can. *dúlagondi.*

A twining plant covered with stinging hairs. The root is used medicinally.

ANACARDIACEÆ—

1. *Mangifera indica*, Can. *mávina-mara*, Eng. *mango.*

Mango trees are very common in Canara, and of late years considerable additions have been made to the number of good graft trees near Mangalore.

2. *Spondias mangifera*, Can. *ambata-mara*, Eng. *hog-plum* or *wild mango.*

A very large tree. The fruit is eaten by deer and also pickled.

3. *Anacardium occidentale*, Can. *géru-mara*, Eng. *cashew-nut tree.*

This tree, originally introduced by the Portuguese from South America, is now widely spread over the district. It will grow on any soil and requires no care. The nut is largely exported as well as used locally, and a spirit is made from the fruit. The pericarp of the nut contains a black acrid oil, and an edible oil is expressed from the nut.

4. *Semecarpus anacardium*, Can. *géru-kái-mara*, Eng. *marking-nut tree.*

The black juice of the fruit is used for marking linen and medicinally.

COMBRETACEÆ—

1. *Terminalia tomentosa*, Can. *banapu*, *matti.*

A fine large very common tree, of which the timber is a great favourite with the people of Canara for building and other purposes.

2. *Terminalia paniculata*, Can. *maruva.*

Also a large and common tree. The wood is good, but not equal to that of the Terminalia tomentosa.

3. *Terminalia chebula*, Can. *anile*, Eng. *myrabolan.*

Yields the true myrabolan. It is fairly common in the Coondapoor taluk, in which many of the forests are at a good elevation. It is not nearly so common further south.

4. *Terminalia bellerica*, Can. *shánti*, Eng. *belleric myrabolan.*

A large and handsome tree; but the wood is of no value, and the myrabolans scarcely cover the cost of collection.

ALANGIACEÆ—

Alangium decapetalum, Can. *ankólé-mara*, Eng. *sage-leaved alaregium.*

The wood of this tree is good. The fruit, an astringent acid, is eaten by the natives and the root is used medicinally.

LYTHRACEÆ—

1. *Lagerstræmia microcarpa*, Can. *bili-nandi, bolandúr*, Eng. *benteak.*

A common and handsome tree found all over the district. The wood is very good for house-building, but, if exposed, it decays soon and is liable to be attacked by white ants.

2. *Lagerstræmia reginæ*, Can. *dásál.*

A handsome tree with rose-coloured blossoms. The wood is not so good as that of the preceding.

MYRTACEÆ—

1. *Psidium pyriferum*, Can. *jámphalada-mara*, Eng. *white guava.*

2. *Psidium puriferum*, Can. *góva-mara*, Eng. *red guava.*

The above are grown to some extent in gardens for the fruit, but neither are common.

3. *Eugenia jambolana*, Can. *néralu.*

4. *Eugenia jambosa*, Can. *jambunéralu.*

5. *Eugenia malaccensis*, Can. *kempu-jambu-néralu.*

The fruit of the above is eaten.

6. *Careya arborea*, Can. *daddálada-mara.*

GRANATACEÆ—

Punica granatum, Can. *dálimbe*, Eng. *pomegranate.*

The pomegranate is grown to a small extent in gardens.

ROSACEÆ—

Rosa centifolia, Can. *gulábi*, Eng. *rose.*

PAPILIONACEÆ—

1. *Dolichos biflorus*, Can. *huruli*, Eng. *horse gram.*

Horse gram is grown to some extent all over the district, but more in the Udipi and Mangalore taluks than elsewhere, as a

CHAP. I. GENERAL DESCRIPTION.

Flora.

second crop in Majal fields and also in 'hakkal' cultivation on uplands.

2. *Phaseolus mungo*, Can. *hesaru*, Eng. *green gram.*

3. *Phaseolus roxburghii*, Can. *uddu*, Eng. *black gram.*

4. *Dolichos lablab*, Can. *avare.*

These are grown to a small extent chiefly as a second crop in sandy soils near the coast.

5. *Cajanus indicus*, Can. *togari*, Eng. *pigeon-pea.*

Grown in 'kumari' and 'hakkal' cultivation and in gardens.

6. *Vigna catjang*, Can. *alasande*, Eng. *cow gram.*

Grown chiefly as a vegetable in gardens.

7. *Cassia occidentalis*, Can. *dodda togache.*

Found throughout the district. The leaves are believed by the natives to be good for skin diseases.

8. *Abrus precatorius*, Can. *gulaganji-balli*, Eng. *wild liquorice.*

An efficient substitute for the ordinary liquorice.

9. *Mucuna pruriens*, Can. *nasugunni balli*, Eng. *cowhage.*

Recognised as an anthelmintic in the Pharmacopœia of India.

10. *Clitorea ternatea*, Can. *shankapushpa.*

A common and pretty climber. The seeds are used as a purgative.

11. *Phaseolus rostratus*, Can. *káduhesaru.*

The roots of this wild plant are eaten by the natives, and it is also used medicinally.

12. *Atylosia candollei*, Can. *kád-togari.*

A very common shrub in almost all the forests of the district.

13. *Crotolaria juncea*, Can. *sanabu*, Eng. *sunn hemp.*

Cultivated to some extent for the fibre which is used for fishing nets and lines. The climate and soil of Canara seem to be favourable for the growth of this fibre-producing plant.

14. *Dalbergia latifolia*, Can. *biti*, Eng. *blackwood.*

One of the most valuable timbers in India. Found all over the district, but especially in the Coondapoor and Uppinangadi taluks.

15. *Adenanthera pavonina*, Can. *manjatti.*

A large handsome and fairly common tree which yields a good wood.

16. *Butea frondosa*, Can. *muttaga*, Eng. *bastard teak.*

A handsome tree with red flowers. The seeds are highly thought of as a febrifuge by native practitioners. The wood is poor.

17. *Tamarindus indica*, Can. *hunise*, Eng. *tamarind.*

The tamarind tree is not common in the Canara forests, and is not grown by the people as extensively as in the East Coast.

18. *Erythrina indica*, Can. *hangarakana.*

A common tree with red flowers and soft wood. These trees are extensively used as posts for picottahs in South Canara.

Flora.

19. *Cassia fistula*, Can. *kondé*.

A handsome tree with hanging branches of yellow flowers. The wood is good and the pulp round the seeds is used as a laxative.

MORINGACEÆ—

Moringa pterygosperma, Can. *nugge*, Eng. *drumstick tree*.

This tree produces the 'drumsticks' used in curries. The root which possesses the pungent taste and smell of the English horse radish is used medicinally.

MIMOSACEÆ—

1. *Acacia catechu and sundra*, Can. *káchu*.

These trees are found in abundance in the Coondapoor taluk, and the Forest Department derives about Rs. 1,500 a year from the manufacture of catechu or the thickened juice of the boiled wood.

2. *Acacia concinna*, Can. *shige*.

The pods resemble soap-nut and are used in the same way. There is a good crop every second year, and the Forest Department gets a considerable revenue from it.

3. *Acacia speciosa*, Can. *bage*.

This tree yields a considerable quantity of gum and the wood is good.

4. *Entada monostachya*, Can. *hallekáiballi*.

A large creeper with immense sword-like pods.

5. *Mimosa pudica*, *Can. náchike-gida*, Eng. *the sensitive plant*.

Filices.

The ferns of South Canara are very numerous, amongst those frequently met with may be mentioned—

Adiantum lunulatum.
Adiantum caudatum.
Davallia termifolia.
Pteris geraniifolia
Pteris acquilina
Gymnopteris feei.
Lygodium scandens.
Lygodium flexuosum.
Lygodium dichotomum.
Botrychium virginicum.
Gleichera dichotoma.
Ceratopteris thalictroides.
Osmunda regalis.
Osmunda javanica.
Nephrodium molle.
Nephrodium extensum.
Nephrolepis tuberosa.
Lastrea aristata.
Lastrea sparsa.
Lastrea ochthodes.
Polystichum auriculatum.
Polystichum angulare.
Actiniopteris radiata.
Asplenium (several varieties).
Callipteris esculenta.
Pleopeltis oxyloba.
Pleopeltis membranacea.
Pleopeltis tridactyla.
Pleopeltis hemiontidea.

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Filices.

Niphobolus.
Drynaria quercifolia.
Cheilanthes termifolia.
Cheilanthes farinosa.
Polybotrya appendiculata.
Polybotrya asplenifolia.
Stenochlæna scandens.
Acrostichum aureum.
Blechnum orientale.

The *Adiantum caudatum* is to be seen on every mud wall in the district during the monsoon, and the bushes fringing streams and tanks are covered with the pretty little climbing fern, *Lygodium scandens*. Beautiful banks of the *Osmunda regalis* are to be found beside the rivers in the ghaut forests and in the Hannar Mágane above the ghauts.

Fauna—Wild animals.

The great extent of forest land in South Canara affords a safe retreat to wild beasts of almost every kind and description generally found in Southern India, but the ghaut forests are the especial home of the bison (*Gavæus gaurus*), which is to be found all along the line of ghauts from north to south, and in the Uppinangadi taluk at certain seasons as far as 20 miles from the foot of the ghauts. Owing to the objection on the part of all but the lowest classes of Hindus to eat the flesh of an animal so closely allied to the cow, they are not much shot by other than Muhammadan natives. European sportsmen generally prefer to go after them in the forest during the rains, or shortly after, when they can be tracked by their footsteps in the soft ground, and the fallen twigs and leaves are not so dry as to crackle when trodden on. In the open grass land on the slopes, or on the top of the line of ghauts they can be stalked all the year round in the early morning or in the evening. Occasionally the forests are beaten for them, but the chance of success is much less in this way than in those others before mentioned, while the sport is not nearly so exciting. It is, however, the only way in which they can be got on the plains in the dry weather. Next in size to the bison comes the sambar (*Rusa aristotelis*), a magnificent stag, which not unfrequently stands fourteen hands high, and affords good sport to the stalker on the upper slopes of the ghauts. Low down, owing to the continuous forest, it can only be got by beating the jungle, and as large numbers are shot by the natives, but poor sport is now to be got in this way. In the more open jungle to the west of the large ghaut forests there are still herds of spotted deer (*Axis maculatus*), and occasionally the muntják, jungle sheep, or barking deer (*Cervulus aureus*). The little mouse deer (*Memimna indica*) is also very common in the ghaut forests. From the absence of extensive open plains it is not to be wondered at that there are no antelope in the district, but the precipices near the *Kudre Mukh* and in other parts of the Western Ghauts would seem to offer a desirable home for the ibex or Nílgiri wild goat. None

however, are to be found, and it may be that the heavy rainfall is too much for them.

Fauna—Wild animals.

The tiger (*Felis tigris*) and the cheeta or leopard (*Felis pardus*) both abound, and notwithstanding liberal rewards which lead to the annual destruction of a considerable number of these animals, the loss of cattle from their depredations is very great indeed compared with other parts of the presidency, owing no doubt to the way in which forest and cultivated land are here intermixed. The loss of agricultural stock to the people from this cause is not, however, so great as might be inferred from the figures in returns, as a large number of the cattle killed are worn out and diseased animals that have practically been left to their fate by their owners. Jungle cats of many kinds are common, and there is also the wild dog (*Cuon rutilans*) with, of course, the jackal and the hyæna. The black bear (*Ursus labiatus*) is found near the Kudre Mukh, at Nagodi in the Coondapoor taluk, and probably at some other places on the line of ghauts at an elevation of 2,000 feet and upwards.

All the common monkeys of Southern India are found in South Canara and occasionally the strange little lemur (*Loris gracilis*).

Elephants have a permanent home only in the extensive forests of the Uppinangadi taluk, but a small herd lately made its way through the Mangalore taluk up to the north of the Udipi taluk. Under the measures which have recently been adopted for their protection, and the greater immunity from disturbance afforded by the abolition of '*kumari*' cultivation in the forests, elephants have become more numerous and more daring, and much damage is often done by them to the cultivation adjoining the larger forests. Not only are rice fields trampled down, but an areca-nut plantation, which has taken years to rear, is sometimes destroyed in one night, the elephants delighting in pulling down the trees and tearing them open to eat the pith. There are one or two 'rogues' about, one being known to have killed several men. As in South India generally the only other pachyderm is the common jungle pig (*Sus indicus*), which flourishes wherever there is forest or even good scrub jungle.

Amongst *rodentia* the most handsome is the large red squirrel (*Sciurus elphenstonei*) which abounds in all the ghaut forests, and the most remarkable is the flying squirrel (*Pteromys petaurista*) which one comes across but rarely, owing to its nocturnal habits.

The porcupine (*Hystrix leucura*) is common enough, and the Indian scaly ant-eater (*Manis pentadactyla*) is not infrequent. Otters are to be found in most of the larger rivers. The flying fox (*Pteropus medius*) has established flourishing colonies at Kumbla and Mudbidri.

Domestic animals.

The domestic animals reared in the district are by no means remarkable specimens of their class. The stock is inferior and the cattle are of a small stunted breed without any pretensions either to size or working powers. There are no regular breeders in the district, and the cultivators are consequently dependent to a very great extent upon the annual cattle fair held at Subramanya in the Uppinangadi taluk, for their supply of draught bullocks, buffaloes and cow-buffaloes which are brought thither from above the ghauts. It is computed that nearly 50,000 head of cattle are thus brought from Mysore and disposed of to ryots from all parts of South Canara. The damp climate of the country does not seem to be favorable to animal life and even the cattle imported from above the ghauts often become sickly within a few years of their arrival in the district. Milch cows and goats are procurable in the district, but they, too, are ordinarily poor stunted creatures. From the month of January till the commencement of the rainy season, pasture is scanty, and such cattle as are at all cared for are supported by means of stored fodder. A poor hay is sometimes made of the long grass which grows naturally on some hills and laterite plateaus that are kept clear of bushes for the purpose, and this hay is given to the cattle after being chopped and boiled with rice husks, rice straw being added at night. During the rainy season pasture is abundant and cattle are ordinarily left to graze on the hills and plains. Oil-cake, gram and cotton seed are also given to cattle in addition to other kinds of food by those who are careful of their stock, but the country cows, as a rule, give but a small quantity of milk, and butter and milk are consequently dear articles in South Canara. Cow-buffaloes are largely kept by the people, as they give more milk than cows. Epidemic diseases among cattle are sometimes very destructive. No horses, sheep or donkeys are bred in South Canara, and even ponies of the ordinary country breed of Southern India are not reared. Those who eat mutton are entirely dependent upon Mysore for their supply of sheep which are brought down the ghauts in considerable numbers. Pigs of the common country breed are kept mostly by Native Christians and the lowest classes of Hindus. Pariah dogs swarm in every village, except amongst the Mápillas and are of some service in guarding fields and vegetable gardens from the inroads of wild beasts. Almost every household possesses a cat. Fowls are to be found in the houses of all classes of people except Brahmans. Great attention is paid to the rearing of cocks by Billavas and Bants, among whom cock-fighting is a favourite pastime. It is also a custom among these and some other classes to propitiate the small-pox goddess 'Mári' by decapitating cocks in front of her idol. The head having thus been

sacrificed, the body is taken home by the worshipper and eaten. Turkeys and ducks are imported into Mangalore from Goa and Cochin during the fair season.

Reptiles.

The largest of the South Canara reptiles is of course the crocodile which is to be found in almost all the larger rivers. Owing probably to the rivers being much smaller, the crocodile in Canara neither attains the same size as in Malabar nor is it nearly so destructive. In fact such a thing as a man being killed by a crocodile in Canara is almost unknown. Next in size and first in importance come the snakes, to whom upwards of 150 lives are annually lost. For reasons well known attempts to extirpate snakes by the offer of rewards have had to be abandoned and so long as these reptiles, especially the cobra, are held in such veneration as they now are by all Hindus, their speedy extinction can hardly be hoped for. The ordinary snakes of Canara are much the same as in other parts of Southern India, but the Indian python or boa-constrictor is more common here than in most other districts, and is sometimes found of an enormous size in the ghaut forests, where there is also a bamboo-coloured variety of the cobra. The pretty little harmless green whip snake (*Passerita mycterizans*) is everywhere common. Amongst minor reptiles a peculiar species occasionally to be met with in South Canara is the *Draco dussumieri*, commonly called the flying lizard.

Insects

South Canara, like all eastern countries in which there is a heavy rainfall, abounds in insects. Amongst those which come prominently to notice may be mentioned the cicada or knife-grinder, whose ceaseless whirring is ever on the ear of those who frequent the forests. Butterflies and moths are found in great variety, and there is a considerable number of the *mantidæ* or leaf insects, as well as of the still more peculiar *phasmidæ* or stick insects that resemble dry twigs. The only economically valuable species of insect is the bee which is not domesticated, but is very common in the jungles and on the hills in a wild state. They are of four different kinds, the largest being called in Canarese *togar-jénu*. Some of them build on the higher branches of the loftiest trees or in the clefts of rocks which render the honey-combs difficult of access. The smallest of the species hives in the hollows of the trunks of old trees, and the honey collected by it is much prized for its supposed medicinal properties.

Birds.

The birds of South Canara do not differ materially from those which are generally found in Southern India. Pea fowl, jungle fowl, and spur fowl abound in the forests, but they are difficult to get at, and partridges are rarely found at all. Of pigeons, there are several kinds, including the large imperial pigeon, but the most common of all the edible birds are the doves, of which

CHAP. I. GENERAL DESCRIPTION.

Birds.

many kinds are to be found almost everywhere. Several varieties, both of pigeons and doves, are remarkable for very beautiful plumage. Snipe come in fair numbers in the cold weather, but they are very widely distributed and a large bag is, as a rule, difficult to get, though at times they are met with in very large numbers in some favourite spot, such as a young cocoanut garden, and then a good shot can secure a large bag very quickly. Plovers of sorts are found in large flocks near the coast and on the backwaters, and the lapwing all over the district. Golden plover are somewhat rare. Duck and teal are not very numerous, but there are great quantities of waders of many different kinds including the curlew and the whimbel. The song birds, and those harsh of voice but of beautiful plumage, are much the same as are met with in other well-wooded parts of the country.

Fishes.

In all the rivers of South Canara there are abundance of mahseer, which run up to about 15 lbs. in weight in the larger rivers. The stock would be much larger were it not for the poisoning and indiscriminate netting which goes on. A good deal has been done in the way of stopping the former, but it is still carried on in secluded spots, and the law does not at present permit of any interference with the netting which is carried on in the dry season, when the fish are congregated in the large pools well inland. Poisoning and netting notwithstanding, there are still large numbers of mahseer in the rivers and fine sport with the rod is to be got at Sampaji, Subramanya, Sirádi, Sisila, Neriya, Charmádi and elsewhere. Besides mahseer (*Barbus mosal* and *Barbus tor*), called *peruval* in Canarese and Tulu, there are many other fish in the Canara rivers, of which the following are said by Mr. Thomas to attain a size of upwards of 1 foot in length :—

Labeo calbasu—Kari mínu.
Labeo (new species)—Mul-vél.
Barbus labecula—Kaṭládi.
Barbus carnaticus—Sé-mínu.
Barbus conirostris—Kúrli.
Gobius giurus—Abrôṇi.
Ophiocephalus striatus—Huli kuch-chi.
Ophiocephalus diplograme—Kuch-chi.
Ophiocephalus marulius—Maḍánjí.
Pseudobagrus chryseus—Shéḍe.
Caliichrous checkra—Bále.
Muræna maculata—Mari.
Mastacemblus armatus—Puriyôl.

All the above are freely eaten by almost all classes, but in the Uppinangadi taluk many Hindus will not eat the peruval or

Fishes.

mahseer, as it is treated as a sacred fish at Subramanya, Sisila and other temples. Objection is also taken by some people to the *Ophiocephalus*, as they think it is somewhat too like a snake. The small fish are too numerous to enumerate in detail, but the *Barilius canarensis* (pachilé jabbu) and *Barbus filamentosus* (black spot) may be mentioned as rising freely to fly, the former in the small rapids and the latter in stiller water. Besides the large fresh-water fish mentioned, the *Chanos salmoneus* is found up to 3 feet in length in a slightly brackish pond at Coondapoor. It is however really a sea fish and other well-known 'backwater' fish are found in the same pond. The fishing or rather netting of this pond is a singular sight. Two or three times a year at the discretion of the Head Assistant Collector residing at Coondapoor, a number of boats are brought to the pond and arranged in a line with drag nets falling to the bottom and stretching right across the pond, while another set of nets are held up in the air by men standing in the boats. The whole line is then moved gradually forward with much shouting and beating of the boats, and, as the fish get closed in towards the other end of the pond, a most exciting scene arises, the air being literally alive with large silvery fish, many of which succeed in leaping right over the nets, though the majority strike against them and fall into the boats where they are secured. An incautious boatman is also occasionally knocked clean into the water.

Amongst sea and estuary fish the pomfret, black and white, the seer, the mullet and the whiting are the favourites at European tables, but the species caught in the greatest abundance are the Indian pilchard (*Sardinella neohowii*) and the Indian mackerel (*Scomber kanagurta*), both of which are often found in such numbers that a large surplus remains for use as manure. Now that the old fashioned rough curing with salt-earth has been put a stop to, the fish-curing yards provided by the Salt Department are gradually being resorted to and a brisk trade in salted mackerel appears to be springing up. Great numbers of seer and other larger fish are also caught by Ratnagiri fishermen in the open sea and brought to the South Canara yards to be cured. Besides the comparatively fine class of fish above mentioned, numbers of coarse fish, such as the dog-fish (*Mustelus teris*), the ray (*Trygon namak*), and the hammer-headed shark (*Cestracion cygræna*) are eaten by the poorer classes of natives.

Oysters are met with all along the coast, the best being, perhaps the small oysters on the rocks about the islands off Udipi, and the large oysters at Coondapoor and in the backwater at Mogral near Kumbla in the Kásaragód taluk.

A fair-sized whale was thrown up on the shore a few years ago, and the skin and skeleton were sent by Mr. Thomas to the Central Museum at Madras, where the skeleton may now be seen.

Geology and mineralogy.

With regard to the geology of South Canara, there is absolutely no official information on record. In the Geological map of India of 1877, it is said that the Malabar Coast, which includes South Canara, is chiefly composed of laterite, beneath which in places tertiary rocks occur, but the under-lying formation is believed to be chiefly metamorphic. With regard to the laterite it is elsewhere said that from its position it is presumably of sedimentary marine origin, but it is impossible to be quite certain till the country has been examined by some competent geologist. Later investigations in Travancore and elsewhere, however, seem to point to a different conclusion.

The Western Ghauts, which skirt Canara from north to south, are undoubtedly gneissic, and the following extracts from a paper on Travancore by Mr. King, Deputy Superintendent of the Geological Survey Department, are probably in great measure applicable to South Canara :—

"The gneisses are generally of the massive grey section of the "series, that is, they are nearest to the rocks of the Nilgiris, though "they differ from them in being coarse-grained or more largely "crystallized, and in being generally quartzose rocks.

"So quartzose are they, that there are, locally, frequent thin "beds of nearly pure quartz rock which are at times very like reefs "of vein-quartz. Often these beds are strongly felspathic, the "felspar occurring among the quartz in distinguishable grains, or "larger crystalline masses, giving the rock rather a granitic "appearance. The only other region, where I know of somewhat "similar beds of quartz rock occurring with other gneisses, is in "the schistose region of the Nellore district. There, however, "the quartz rock becomes often a fine compact quartzite; here, "in Travancore, there are no approaches to such compact forms.

"The common gneisses are felspathic quartzose varieties of "white or grey colours, very largely charged with garnets. A "particular form of them is an exceedingly tough, but largely "crystallized, dark-grey or greenish felspathic rock.

"Massive hornblendic gneisses are not common. Indeed, "hornblende may be said to be a comparatively rare constituent "of the Travancore gneisses.

"All the gneisses are more or less charged with litaniferous "iron in minute grains; they are likewise—only more visibly—as

"a rule, highly garnetiferous. In fact, one might say, that Tra-
"vancore is essentially a country of garnetiferous gneisses. The
"garnets themselves are only locally obtainable, it being impossible
"to break them from the living rock, while they are generally de-
"composed or weathered. They are generally of small size, but
"are very rich in colour, the precious garnet being very common.
"Other minerals, such as red, blue, and yellow sapphire and
"jacinth, are found among the garnet sands so common on the
"sea-shore at certain places. The sea-sands are also full of
"litaniferous iron grain. While on this subject, I may instance
"the beautiful and long known constitution of the shore sands at
"Cape Comorin, where, on the beach, may be seen the strongest-
"coloured streaks or ribbons, of good width, of bright scarlet, black,
"purple, yellow and white sands of all these minerals and the
"ordinary silica.

"As will be seen further on, an enormous quantity of fer-
"ruginous matter is collected among certain forms of weathered
"gneiss and other rocks, the source of which is hardly accounted
"for in the apparent sparse distribution of iron in the gneisses.
"After all, however, an immense supply of ferruginous matter
"must result from the weathering of the garnets, when we consider
"that they are so generally prevalent in all the gneisses, and
"crowdedly so in very many of them.

. . . . .

"The great feature about the gneisses in Travancore, and
"indeed also in Cochin and Malabar, is their extraordinary
"tendency to weather or decompose, generally into white, yellow,
"or reddish felspathic clayey rocks, which, in many places and
"often very extensively, ultimately become what is here always
"called laterite. The evidences of this are, after all, only well
"seen in the field; but it may be stated here that these are seen
"principally in the constituent minerals, mainly the quartz, being
"still identifiable in much of the rock; in the lamination or
"foliation being also traceable; in the gradual change from the
"massive living rock to the soft and finally hard, scabrous, and
"vermicular ferruginous clayey resultant called laterite; and in
"the thin, pale, and poorly ferruginous forms exhibited by the
"weathering and alteration of the more felspathic and quartzose
"gneisses.

"This altered form of the weathered gneiss occurs over a
"definite area, which I have laid down approximately in the map.
"At the same time, the change from unweathered gneiss to this
"belt is not sharp; for long before the eastern limit of the more

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"generally lateritized belt is reached, approaching it from the "mountain zone, the great change has begun.

"Very soon after one begins to leave the higher ribs of the "mountains and to enter on the first long slopes leading down to "the low country, the gneiss begins to be weathered for some "depth into a clayey rock, generally of pale colours, streaked and "veined with ferruginous matter, and having always an appreci- "able upper surface of scabrous or pisolitic brown iron clay, which "is, of course, probably, largely the result of a ferruginous wash "and, less so, of ferruginous infiltration. Also the ferruginous and "lateritoid character is devolved to a certain extent according to "the composition of the gneisses; but, on the whole, there is no "doubt that the upper surface generally over large areas is lateri- "tized to a certain depth irrespective of the varying constitution of "the strata.

"Then, as the rocks are followed or crossed westward, the "alteration becomes more frequent, decided, and deeper seated "though still, all over the field, ridges, humps, and bosses of the "living rock rise up from the surrounding more or less decomposed "low-lying rock areas.

"This generally irregular and fitfully altered condition of the "gneisses begins at an elevation of about 400 feet above the sea, "and thus it extends as a sort of fringe of varying width along "the lower slopes of the mountains.

"At a yet lower level, say from 200 to 150 feet, and so "nearer the sea-coast, there is a better defined belt of more "decidely lateritized form of weathered gneiss, in which the "unaltered rock occurs less frequently, and then always in more "or less flatly rounded humps and masses, which never rise above "a general dead level. This belt is, in fact, a country of undulat- "ing downs (where free from thick and lofty jungle), or tolerably "uniform level stretches of forest land. Occasionally it also shows "a plateau surface, or it is broken into small and low flat-topped "hills. Always it is very deeply indented by river and stream "valleys, or even by some of the backwaters which have high and "steep shores.

"Further northwards the plateau character of the lateritic "gneiss belt is very well developed in Malabar.

"It is remarkable of this coastal belt of country that its laterite "(an altered, or ferruginously infiltrated condition of weathered or "decomposed gneiss) is not to be distinguished from any other late "rite, except that which is made up of obviously detrital material.

"Whatever the laterite of Travancore or Malabar may have "been originally, it is a useless form of the rock, being crumbly

"and soft, as a general rule, and oftener of a red colour than brown. "The character of the climate does, in fact, appear to militate "against the changing of the red peroxide of iron in the rock to the "brown peroxide, during which change the proper cementing and "hardening of the sound rock, such as that on the east coast or in "the Deccan, is evidently brought about.

"The next succeeding rock formations, namely, the Quilon "and Warkilli beds, occur as a very small patch on the coast be- "tween the Quilon and Anjengo backwaters.

"The Quilon beds are only known through the researches of the "late General Cullen, who found them cropping out at the base "of the low laterite cliffs edging the backwater of that place, and "again in wells which he had dug or deepened for the purpose. "I was myself not able to find a trace of them. They are said "to be argillaceous limestones, or a kind of dolomite, in which a "marine fauna of univalve shells, having an eocene *facies*, was "found, and they occur at about 40 feet below the laterite of "Quilon, which is really the upper part of the next group.

"The Warkilli beds, on the other hand, are clearly seen in the "cliffs edging the sea-shore, some 12 miles south of Quilon, where "they attain a thickness of about 180 feet and have the following "succession in descending order:—

Laterite (with sandstone masses).
Sandy clays (or lithomarge).
Sandy clays (with sandstone bands).
Alum clays.
Lignite beds (with logs of wood, &c.).

"The bottom lignite beds rest on loose white sand, and noth- "ing is known of any lower strata.

"It will be seen how this set of strata has an upper portion, "or capping of laterite, which is, however, clearly detrital. On "the landward edge of the field of those Warkilli beds, there is "in places only a thin skin, representative of these upper beds "of laterite grits and sandstones lying directly on the gneiss, "which is itself also lateritized; and it is very hard, as may be "supposed, to distinguish the boundary between the two unless "the detrital character of the former deposits is well displayed. "Thus the upper part of the formation has overlapped the gneiss. "It is also this upper portion which overlies the Quilon beds, "which are also apparently overlapped.

"These Warkilli beds constitute, for so much of the coast, the "seaward edge of the plateau or terraced country above de- "scribed and they present similar features. The Warkilli downs

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"are a feature of the country, bare, grass-grown, long, flat undula-
"tions of laterite, with, about Warkilli itself, small plateau hills
"forming the higher round 180 to 200 feet above the sea.
"These downs, too, and the small plateaus or flat-topped hills,
"are partly of the Warkilli laterite and partly of the lateritoid
"gneiss.

"Whatever form of denudation may have produced the now
"much worn terrace of the gneissic portion of the country, the
"same also determined the general surface of the Warkilli beds.
"Indeed, it gradually dawned on me while surveying this coun-
"try, having the remembrance of what I had seen of the plateaus
"and terraced lowland in Malabar in previous years, that here,
"clearly, on this western side of India is an old marine terrace,
"which must be of later date than the Warkilli beds.

"These are, as I have endeavoured to show in another paper,
"of probably upper tertiary age, and equivalent of the Cudda-
"lore sandstones of the Coromandel. Hence this terrace must
"be late tertiary or post-pliocene, and it marks, like the long
"stretches of laterite and sandstones on the eastern side of the
"country, the last great or decided elevation of Southern India,
"prior to which, as is very probable, the Indian land rose almost
"directly from the sea by its Western Ghauts and had an eastern
"shore line which is now indicated very well by the inner edge
"of the Tanjore, South Arcot, Madras, Nellore, and Godávari
"belts of laterite and sandstone.

"Mr. Foote has already generalized in this way for the east-
"ern side of Southern India in particular; but, I think, he makes
"the elevation too great, including, as he does in his laterite de-
"posits, patches of lateritized gravels and rock masses ranging
"up to a height of 500 feet at least, which are not so definitely
" part and parcel of the proper coastal developments.

"The plateau form of the Coromandel areas has often already
"been commented on; but their connection with a terraced form
"of marine denudation is more clearly brought out now that the
"evident conformation of the Travancore and Malabar lowland is
"ascertained.

"The somewhat different level of the surfaces of these plateau
"lands on each side of the peninsula is also interesting in so far
"as there is an evident, general, very slight, inclination of the
"whole to the south-eastward."

Lignite beds, such as those referred to as forming part of the Warkilli beds, have been found in the Kásaragód taluk, and it is probable that they prevail farther north also. Laterite which, whatever may be its origin, has the appearance of nothing more

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than hardened ferruginous red clay, with a perforated or cellular structure, is the ordinary building material of the country. It varies very much in quality, some of it being so soft and friable as to be practically useless, while in other localities it can be safely used even for bridge work if care is used in selection.

The St. Mary Islands off the coast of Udipi are mainly composed of basaltic rocks.

Gold is to be found by washing in a small stream near Mijar in the Mangalore taluk, and near Mádnúr in Kásaragód on the road from Mangalore to Merkára and probably elsewhere.