

## CHAPTER II.

### PRODUCTION.

IRON<sup>1</sup> ore is found in different places in the main range and spurs of the Sahyádris and in the island of Basrádurg about a mile off the coast to the north of Houávar. The ore is compact and in colour is dark-brown with a brown streak. Its specific gravity is 3.90. Though no ore is at present (1882) smelted, there are signs that iron was formerly manufactured in different parts of the Sahyádris.

The building stone in general use below the Sahyádris is iron-clay or laterite, and sometimes granite and granitic schist and clay slate; above the Sahyádris it is nearly always granite. The laterite is a clay stone generally strongly laden with oxide of iron. It is so full of cracks and crannies that heavy rain beating against a new wall soaks through in an hour. Laterite is preferred by the people, and for small bridges and culverts it is the most serviceable stone, especially if protected by plaster, as many of the old Madras bridges are. For large bridges laterite is too soft and suffers when in the bed of a fairly sized stream. Laterite varies in quality from a hard compact stone which never decays to a soft variety which crumbles in the hand. It is cut into blocks of any size and hardens somewhat on exposure to the air. Blocks measuring 18" × 9" × 6" can be got by contract at the quarry for 5s. (Rs. 2½) the hundred, that is about 10s. (Rs. 5) the hundred cubic feet. The men who quarry these stones are nearly all Goanese and are brought in gangs from Goa. The rate for the best laterite masonry is about £2 16s. (Rs. 28) the hundred cubic feet.

Granite, of many kinds and varying greatly in price, is largely used as cut stone and as rubble in bridges. It is seldom used in other buildings. Granitoid gneiss, one of the many varieties of granite, varies from white to dark grey in colour, and breaks into good square blocks of any size that is required. Rubble stones cost about 12s. (Rs. 6) and much larger blocks £1 to £1 10s. (Rs. 10 - Rs. 15) the hundred cubic feet. From its hardness granite is expensive to work, the dressing costing about £1 5s. (Rs. 12½) the hundred cubic feet. Course stone work costs £2 8s. to £3 (Rs. 24 - Rs. 30) the hundred cubic feet, and for bridges the cost varies from £5 to £8 (Rs. 50 - Rs. 80) according to quality. Nearly all the Gaundis or masons come from

#### Chapter II.

#### Production.

##### Minerals.

##### Iron.

##### Building Stone.

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<sup>1</sup> The account of minerals is from materials supplied by the Executive Engineers Messrs. W. J. Lister, R.E., and K. G. Desai.

**Chapter II.**  
**Production.**

**Road Metal.**

Belgaum and Dhárwár. They seldom stop in the district between the end of May and the end of November as, during these months, the climate is very unhealthy for natives of the Deccan, Belgaum and Dhárwár. Trap is almost unknown in Kánara. The only place where it has been seen is in one or two small dykes in the granite on the island of Kurmagad in Kárwár harbour. For road metal, granite, quartz where there is no granite, and an iron stone or hematitic schist are used. The cost of quarrying and preparing varies from 10s. to 18s. (Rs. 5 - Rs. 9) the hundred cubic feet according to the hardness. In some places the laterite is broken into larger pieces than the usual metal. This costs about 6s. (Rs. 3) the hundred cubic feet. The rocks and the rapids in most Kánara river beds make the supply of river sand scanty. Along the coast sand is found mixed with salt in tidal creeks. To dig and carry it costs 2s. to 10s. (Rs. 1 - Rs. 5) the hundred cubic feet.

**Sand.**

**Clay.**

The nearest approach to brick clay is the black pond-bed mud. This makes into bricks, but bricks are seldom used owing to the cheapness and plentifulness of iron stone. A white clay fitted for making porcelain is found at Ramanguli and Idgunji on the Dhárwár-Kárwár road and at other places. The potters of Ramanguli and Haliyál make good unglazed vessels of this clay.

**Lime.**

Above the Sahyádris the lime in general use is made from limestone pebbles dug out of the banks of streams. These pebbles are by no means plentiful, and, in the depth of the forests where no lime-pebble beds have been found, it is cheaper to bring shell lime from the coast. This pebble lime when burnt costs from £3 to £6 (Rs. 30 - Rs. 60) the hundred cubic feet, but if properly made it is of first-rate quality. The lime is slightly hydraulic and sets hard if it is allowed to dry for two days before putting under water. On the coast, lime is made by burning cockle and oyster shells which are abundant in most creeks and rivers, especially in the Kálinadi. As it is a pure lime and does not set under water it is not of much use by itself, but, if carefully mixed with *surki* or powdered bricks and sand in equal parts, it does well in all works that are not subject to water. In works which have to stand water, shell lime is mixed with Portland cement in the proportions of one part lime, two parts sand and a quarter part Portland cement. The mixing requires great care and should not be attempted without unusually good supervision. Burnt shell lime costs about £2 10s. (Rs. 25) the hundred cubic feet. The coral found near Kárwár has been tried but does not make good lime. The water-worn pinnacles of magnesian limestone known as the Yena Rocks do not yield good lime. The same may be said of the Yellápur lime, which, though very pure, almost like alabaster, does not yield good results.

**Tiles.**

Tiles are made from the ordinary black pond-earth which is found almost everywhere. They are of two kinds, pan and pot tiles. Pan tiles are made throughout the district and cost 6s. to 10s. (Rs. 3 - Rs. 5) the thousand. Superior pot tiles, measuring 15" x 5", are made in Haliyál and Mundgod, and though for lightness they are only  $\frac{3}{8}$ " thick they are so waterproof that a single tiling is enough. They cost 9s. (Rs. 4½) the thousand. Large ridge tiles cost 6s. (Rs. 3) the hundred

Of 3910<sup>1</sup> square miles, the whole area of the district, 3548 square miles, or about ninety per cent, are under forest.

The following statement gives the leading details :

*Kánara Forests,<sup>2</sup> 1882.*

DIVISIONS.	SUB-DIVISIONS.	FOREST AREA.					
		Reserved.		Protected.		Total.	
		Square miles.	Acres.	Square miles.	Acres.	Square miles.	Acres.
Northern.	Hallyál ...	251·86	161,191	...	...	251·86	161,191
	Supa ...	...	...	723·85	462,944	723·85	462,944
	Kárwár ...	214·44	137,246	...	...	214·44	137,246
Central.	Yellápur ...	...	...	364·28	233,140	364·28	233,140
	Mundgod ...	55·15	35,296	106·72	68,304	161·87	103,600
	Ankola ...	128·21	82,060	116·83	74,775	245·04	156,835
	Kumta ...	...	...	300·	192,000	300·	192,000
Southern.	Sirái ...	34·01	21,770	665·98	426,230	699·99	448,000
	Siddápur ...	...	...	280·	179,200	280·	179,200
	Honávar ...	...	...	185·	118,400	185·	118,400
	Bhatkal ...	...	...	122·82	78,609	122·82	78,609
	Total ...	683·67	437,563	2864·98	1,833,602	3548·65	2,271,165

The forests are entirely the property of Government ; in protected forests certain privileges are allowed. Reserved areas have still to be chosen in Supa, Yellápur, Kumta, Siddápur, Honávar, and Bhatkal.

The forest area may conveniently be divided into three sections : the tableland above the Sahyádris, the main range of the Sahyádris, and the western spurs of the Sahyádris. In the tableland above the Sahyádris the commonest rocks are clay-slate and quartzite. On the lower lands the soil is mostly black with an underlayer of red, which crops up where the surface is wavy. Where teak prevails the soil is lighter in colour, loose, and mixed with quartz. Except in open tilled spaces and where the surface is rock, and along the more thickly peopled eastern frontier where they have been cleared away, the whole country is covered with trees. West from the eastern frontier towards the Sahyádris hills, tillage becomes rare, and there are splendid forests of teak, blackwood, terminalias, and other trees eighty to 150 feet high, with fine clean stems sixty to ninety feet high and five to twelve feet in girth. Nearer the Sahyádris the country roughens into uplands and hills seamed by water-courses and valleys with rich rice lands and spice gardens. There are also patches of evergreen forest with splendid trees not generally found in the leaf-shedding forests further east.<sup>3</sup>

The central Sahyádris forest belt, though it includes some large iron-clay plateaus with nothing but scrub and grass, has some of the

## Chapter II. Production.

Forests.  
Area.

### Description.

<sup>1</sup> The Forest Section is contributed by Colonel W. Peyton, Conservator of Forests, S.D.

<sup>2</sup> In unsurveyed sub-divisions the forest areas are subject to correction.

<sup>3</sup> Among these trees are the Artocarpus, Calophyllum, Dipterocarpus, Eugenia Cedrela Toona, Antiaris, Sterculia, Vateria, and the Caryota urens or wild sago palm.

Chapter II.  
Production.  
Forests.

finest forests in the district. The chief of these, in hills of clay-slate and quartz, are the magnificent teak forests of the Kálinadi and Káni rivers which run through Supa and Yellápur and of the Bedtihalla and Gangavali rivers which divide Yellápur from Sirsi.

In the western or coast belt the lowlands are under tillage, and most of the forests are found on the spurs that run west from the Sahyádris, in some cases to the sea. The soil is red and gravelly, ill suited for teak, which when found is stunted and insignificant. Bamboos of several valuable kinds grow over the whole of Kánara, sometimes mixed and sometimes alone.

History.

Before Kánara came under British rule, its forests supplied the ship-building yards of the famous Haidar Ali (1761-1782) with the finest teak and other timber. Teak, blackwood, and sandalwood even when growing in occupied land have always been considered the property of the state, and so highly were the forests valued that no portion of them has ever been alienated.

Staff.

Between 1859 and 1865 gradual changes in the establishment have raised the monthly cost from £48 to £103 (Rs. 480 - Rs. 1030).<sup>1</sup>

In December 1865 the district was divided into two Deputy Conservators' charges, one above and one below the Sahyádris, with establishments which together represented a monthly cost of about £300 (Rs. 3000).<sup>2</sup> In 1870, under the advice of Mr. D. Brandis, Ph.D., Inspector-General of Forests, Major now Lieutenant-Colonel W. Peyton, one of the two Deputy Conservators, was promoted to be a Conservator of Forests of the fourth grade, and placed in charge of the Southern Division comprising Kánara, Belgaum, Dhárwár, and Kaládgi. At the same time an establishment was sanctioned representing a monthly charge of £290 (Rs. 2900).<sup>3</sup>

<sup>1</sup> The details of the 1859 staff were : An assistant conservator of forests, one clerk, two overseers, and one *gumásta*. The details of the 1865 staff were : one assistant conservator of forests, with, for office one accountant, one writer, one *gumásta* and four messengers, and for district work one sub-assistant conservator of forests, one overseer, three sub-overseers, three *mitsaddis*, three writers, seven messengers, and sixty foresters.

<sup>2</sup> The details were : In the forests above the Sahyádris, one Deputy Conservator on £60 (Rs. 600) a month with £20 (Rs. 200) travelling allowance. His office establishment was one clerk and two messengers costing monthly £6 12s. (Rs. 66), and his district establishment six overseers, six writers, twelve first class foresters, and twenty-four second class foresters at a monthly cost of £65 (Rs. 650). In the forests below the Sahyádris there was a Deputy Conservator on £50 (Rs. 500) a month with £20 (Rs. 200) travelling allowance; an office of one clerk, one writer and one messenger at a total monthly cost of £5 12s. (Rs. 56), and a district establishment of ten writers, two *havalddárs*, and thirty messengers at a monthly cost of £46 8s. (Rs. 464). Besides this a forest accountant was sanctioned for the Collector's office on £4 (Rs. 40) a month, and a timber depót establishment for the coast, consisting of one superintendent, one storekeeper, one clerk, one measurer, and six peons at a monthly cost of £28 12s. (Rs. 286). The total monthly cost of the new establishment amounted in both divisions to £306 4s. (Rs. 3062).

<sup>3</sup> The details were : An office of two clerks, two writers and four messengers at a monthly cost of £15 4s. (Rs. 152), and under the *mámlatdárs* and *mahálkaris* eleven writers at a monthly cost of £16 10s. (Rs. 165); Forest, eight inspectors and sixty foresters at a monthly cost of £104 (Rs. 1040); Coast Depót, one superintendent, one storekeeper, one clerk, one measurer and six messengers at a monthly cost of £28 12s. (Rs. 286); Inland Depót, six storekeepers and six foresters at a monthly cost of £19 16s. (Rs. 198), giving a total monthly cost of £184 2s. (Rs. 1841). Finally the Deputy Conservator was promoted to the second grade on a monthly salary of £70

Since 1870 the chief changes have been, in 1873 the appointment of a forest accountant, in 1877 the appointment of two additional sub-assistant conservators, and in 1880 of two additional assistant conservators. Since this last addition to the staff the forests have been divided into three charges. A northern including Haliyál, Supa, and Kárwár; a central, including Yellápur, Mundgod, Kumta, and Ankola; and a southern, including Sirsi, Siddápur, Honávar, and Bhatkal. Each of these divisions has a Deputy or Assistant and a sub-assistant conservator. On the 1st of April 1882 the monthly cost of the permanent Kánara forest staff was £451 (Rs. 4510).<sup>1</sup> Besides the permanent staff a temporary establishment is sanctioned by Government from year to year. The establishment sanctioned in 1881-82 cost £3665 18s. (Rs. 36,659).

Each of the three divisions is split into ranges, each in charge of a ranger or forester helped by a certain number of forest guards. The ranger or forester has to see that the mámlatdárs' forest accounts are properly kept, that the forest guards do their duty, that workmen are regularly and correctly paid, and that trees are properly picked and felled. The forest guards are all under the rangers, and as a rule receive their orders from them. Some of them are in charge of plantations and others of forest cuttings, but most of them, in posts two or three strong, patrol the forests or watch the lines of traffic. The guards keep a diary and submit it through the ranger to the divisional officer. A guard is expected to examine the forest within his beat, to put down fires, and report irregularities and thefts. Those on the frontiers have to examine all forest produce that leaves the district and see that the cartmen carry proper passes. These passes, one white and the other green, are issued in duplicate by mámlatdárs and forest rangers to every cartman carrying forest produce. At the frontier post the guard

## Chapter II. Production.

Forests.  
Staff.

*Duties of the  
Establishment.*

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(Rs. 700) and £15 (Rs. 150) travelling allowance; and a sub-assistant conservator was appointed from the 1st June 1871 on a monthly salary of £15 (Rs. 150) and £6 (Rs. 60) travelling allowance.

<sup>1</sup> The details are: Officials at a total monthly cost of £272 10s. (Rs. 2725); a Deputy Conservator of the second grade being on £70 (Rs. 700) a month with a travelling allowance of £15 (Rs. 150); two assistant conservators costing £110 (Rs. 1100), one of the first grade on £45 (Rs. 450) with travelling allowance of £15 (Rs. 150), and one of the second grade on £35 (Rs. 350) with travelling allowance of £15 (Rs. 150); and three sub-assistant conservators costing £77 10s. (Rs. 775), one of the first grade on £20 (Rs. 200) with travelling allowance of £8 (Rs. 80), one of the second grade on £20 (Rs. 200) with travelling allowance of £6 (Rs. 60), and one of the third grade on £17 10s. (Rs. 175) with travelling allowance of £6 (Rs. 60). Office is maintained at a total monthly cost of £37 4s. (Rs. 372), one accountant being on £7 (Rs. 70) a month, three clerks costing £9 (Rs. 90), one on £4 (Rs. 40), one on £3 (Rs. 30), and one on £2 (Rs. 20), one apprentice on £1 10s. (Rs. 15), four peons costing £3 4s. (Rs. 32), and eleven clerks under mámlatdárs and maháلكaris costing £16 10s. (Rs. 165). The Forest staff is maintained at a total monthly cost of £98 (Rs. 980), three forest rangers costing £19 (Rs. 190), one on £8 (Rs. 80), one on £6 (Rs. 60), and one on £5 (Rs. 50), five foresters costing £19 (Rs. 190), four of them on £4 (Rs. 40) each and one on £3 (Rs. 30), and sixty forest guards costing £60 (Rs. 600), twenty of them on £1 4s. (Rs. 12) each and forty on 18s. (Rs. 9) each. The coast depôt is maintained at a total monthly cost of £23 12s. (Rs. 236), two forest rangers costing £17 10s. (Rs. 175), one on £10 (Rs. 100) and one on £7 10s. (Rs. 75), one forester costing £2 10s. (Rs. 25), and six forest guards costing £3 12s. (Rs. 36). The inland depôt is maintained at a total monthly cost of £19 16s. (Rs. 198), six foresters costing £15 (Rs. 150), three of them on £3 (Rs. 30) each and three on £2 (Rs. 20) each, and six forest guards costing £4 16s. (Rs. 48).

**Chapter II.**  
**Production.**

Forests.

Settlement.

compares the contents of the cart with the passes, endorses the white pass and gives it back to the cartman, and takes and returns the green pass to the issuing officer, endorsing on it the date of examination.

In March 1879, under the Indian Forest Act (No. VII of 1878), of a total of 3514·35 square miles of forest, 466·30 in Haliyál and Kárwár were notified as reserved, and the rest (3048·05) as protected forest.<sup>1</sup> Since 1879, from the protected forests of Ankola, Mundgod, and Sirsi, Mr. W. H. Horsley, C.S., has selected a reserved area of 217·37 square miles. In Ankola Mr. Horsley reserved the forests of twenty-four villages with an area of 128·21 square miles and left as protected the forests of thirty-seven villages with an area of 116·83 square miles. In Mundgod he reserved the forests of fifteen villages with an area of 55·15 square miles and left as protected the forests of seventy-six villages with an area of 106·72 square miles. In Sirsi he reserved the forests of nineteen villages with an area of 34·01 square miles, and left as protected the forests of 103 villages with an area of 665·98 square miles.<sup>2</sup>

Rules have been framed for the management of the protected forests,<sup>3</sup> and in these forests nineteen kinds of trees and four forest products have been reserved to Government.<sup>4</sup>

Forest Privileges.

Of the forest privileges exercised by the people, the chief are clearing patches of the forest for wood-ash or *kumri* tillage, lopping leaves for manuring spice and betel gardens, growing pepper in certain evergreen forests, free grazing, and free or cheap wood and fuel. The clearing and burning of forest patches for the growth of hill grains was formerly general and caused great damage to the forests. The practice has been discouraged for many years. It could not at once be stopped without causing hardship and suffering, but the area is being gradually reduced, and, in time, the practice will cease.<sup>5</sup> Formerly the owners of spice and betel gardens held large tracts of forest near their gardens called *betta* which

<sup>1</sup> Government Gazette 6th March 1879. 251·86 square miles in Haliyál and 214·44 square miles in Kárwár were marked off in 1876 as reserved by Mr. E. J. Ebdon, C.S. The increase of 34·59 square miles in the 1882 forest area given at page 21 is due to the completion of the forest settlement of Ankola and Mundgod and the difference found between actual and approximate measurements.

<sup>2</sup> Mr. Horsley's proposals were sanctioned under Government Resolution 5569, 20th October 1880.

<sup>3</sup> These rules are given in the Appendix.

<sup>4</sup> The nineteen kinds of trees are, teak, *sdgván*, *Tectona grandis*; sandalwood, *gandadamara*, *Santalum album*; blackwood, *shisam*, *Dalbergia latifolia*; ebony, *abnus*, *Diospyros Ebenum*; *honi*, *Pterocarpus Marsupium*; poon, *surhoni*, *Calophyllum elatum*; jack-tree, *phanas*, *Artocarpus integrifolia*; *pat-phanas*, *Artocarpus hirsuta*; *balghay*, *Vitex altissima*; *karimutal*, *Ougeinia dalbergioides*; *nána*, *Lagerstrœmia microcarpa*; *shivani*, *Gmelina arborea*; *matli*, *Terminalia tomentosa*; *hirda*, *Terminalia Chebula*; *jamba*, *Xylia dolabriformis*; *bendi*, *Thespesia populnea*; *khair*, *Acacia Catechu*; *shigikai*, *Acacia concinna*; and *ippe mara*, *Bassia latifolia*. The four forest products are *hirda* or myrobalans, the fruit of the *Terminalia Chebula*; *shigikai* or soap-pods, the fruit of the *Acacia concinna*; *ippe huwa*, the flowers of the *moha* or *Bassia latifolia*; and *káth* or *Catechu*, the produce of the *Acacia Catechu*.

<sup>5</sup> As regards the right of clearing land for wood-ash tillage, one *Sántaya Shámaya* in 1874 brought a suit against Government to restore his right to wood-ash tillage which had been granted to his father in 1809 and withdrawn in 1861. The Judge decided for the plaintiff whose claim was finally settled by the payment of £400 (Rs. 4000).

they were allowed to lop and strip for leaf manure. In 1867 the area allotted for leaf manure was limited to eight times the area of the garden. The ownership of Government in certain trees in these patches has also been enforced, the pollarding and stripping have been confined to certain kinds of timber, and the cutting of any trees without leave has been made penal. The people have always been allowed to grow the pepper vine in certain evergreen or *kán* forests, but this does not carry with it any right in the trees. The people have always enjoyed free grazing in certain parts of the forests. Under the survey settlement in each village certain numbers have been set apart for free grazing. All classes are allowed to take free of charge, for their private use, bamboos, poor timber fit to build huts and cattle sheds, head-loads of firewood, grass and fallen leaves for manure, thorns, brushwood, and stakes for hedges and dams, wood for field tools, and dead sago and other palms for water-courses. They are also given good building timber at from one-eighth to a quarter of the market price, and they are allowed to take larger quantities than head-loads of fuel on paying a fee of 6*d.* (4 *as.*) a cart-load.

In occupied arable land, teak, blackwood, and sandalwood, and such other trees as are specially entered in the village register, are Government property. Formerly Government claimed only the first cutting of these trees, but, since 1878, the interest of Government has been extended to all future growths. All other trees in a man's holding are his property. In surveyed villages he may cut them and dispose of them as he pleases.<sup>1</sup> But if he sells his trees he forfeits his claim to get wood for nothing or at specially low rates.

Above and below the Sahyádris the system of working the forests is the same. The forest officer fixes what trees are to be cut, and keeps a register of them; contractors tender to cut the trees and carry the timber to the Government wood stores; and the superintendent of the stores checks the quantities brought by the contractor with the entries in the original register, arranges the timber in lots, and disposes of it to dealers or to private persons at auction or private sales. Though the system is the same, different conditions have caused such a variety in detail that separate accounts are required of the practice above and below the Sahyádris.

In the forests above the Sahyádris a ranger, or competent forester, chooses the trees to be cut in his charge, numbers them, and enters in a register the kind of tree, its position and probable cubic contents, and the number of logs into which it should be cut. Tenders are then invited for felling, cutting, and carrying the marked trees to the wood stores. The contractors are of different classes, mostly Bráhmans or other well-to-do people of the neighbourhood. The contractor whose tender is accepted has to give security, and the contract has to be written on stamped paper

## Chapter II.

### Production.

#### Forests.

#### *Forest Privileges.*

#### *Forest Working.*

#### *System.*

<sup>1</sup> In unsurveyed villages men who have held land since before 1844 are allowed to cut their trees, except the state trees. But they have to get leave, and if they mean to export the timber, they must take out a pass.

Chapter II.  
Production.

Forests.  
System.

and registered. When the contractor has made his arrangements he gives notice to the district forest officer, and a forester and guard are sent to keep watch. The felling, cutting into logs of convenient length, squaring, and carrying are done by labourers and cartmen. Elephants are not used. Except Bráhmans and Jains all the people of the forest villages, Maráthás, Lambánis, Sidis, Vadars, Dheds, and Musalmáns, are willing to work as woodmen and timber carriers.<sup>1</sup> But the only class which has special skill in forestry are the Vadars who are extremely clever both in handling the axe and in carrying the wood to the stores. Instead of the usual day wages Vadars insist on being paid by the piece at 1s. to 1s. 1½*d.* (8-9 *annas*) for every 12½ cubic feet of timber felled, sawn, and dressed. For carting and dragging the logs to the stores they charge 3¾*d.* to 5½*d.* (2½ - 3½ *annas*) a mile according as the ground is smooth or rough. They use a curious low cart, almost entirely made of wood. The floor of the cart and the pole is in one piece of rough planking about four inches thick. The floor is from two to two and a half feet wide, and the pole is dressed to the required length. The yoke is made fast to the end of the pole with a lashing of *kumbia*, *Careya arborea*, bark. The body rests on a *dindal* wood axle about eighteen inches round into which it is fastened by two wooden pegs. The ends of the axle taper and are supported by a pair of low solid wooden wheels each of two or three pieces nailed with wooden pegs at the centre, where they are about four and a half inches thick and from which they gradually fine to two and a quarter inches at the rim. The hole to take the axle is fitted with an iron ring, the only iron in the cart, about four inches across, and made fast by a wooden lynch-pin. Though rude the cart is well suited for difficult rugged roads. After the log has been cut into pieces of convenient size and squared, the pieces are measured, numbered, and entered in the register opposite the estimated cubic contents of the tree.

The logs are then carried along rough tracts cleared by the contractor to some of the main forest roads. The roads lead to timber stores, of which there are seven, at Haliyál, Yellápur, the Kannigeri saw-mills, Kirvatti, Mundgod, Kátur-Singanhalli, and Sirsi. At the stores the logs are remeasured, stamped with the store number, and classed into convenient lots. At Kannigeri, about four and a half miles north of Yellápur, in the heart of a great forest tract, steam saw-mills were established in 1875 at a cost of a little over £6000.<sup>2</sup> The mills have four plain and one cross cut saws and three engines each of twelve horse-power. They are in charge of a European sub-assistant conservator and a professional engineer at a yearly cost of £795. At first the saw mills yielded a handsome profit, but from want of demand the large profit fell to a small profit, and the small profit to a slight loss in 1880-81.<sup>3</sup> A revival of the former demand

<sup>1</sup> The day's wages vary for men from 6*d.* to 7½*d.* (4-5 *annas*), and for women and children from 3*d.* to 4½*d.* (2-3 *annas*). Before the 1877 famine wages were higher, 9*d.* to 1s. (6-8 *annas*) for men and 3*d.* to 5½*d.* (2-3½ *annas*) for women and children.

<sup>2</sup> The amount was £6106 16s. (Rs. 61,068).

<sup>3</sup> The details are: In 1875-76 a profit of £1831, 1876-77 £866, 1877-78 £385, 1878-79 £389; in 1879-80 a loss of £222, in 1880-81 a loss of £227; and in 1881-82 a profit of £10.



has turned the loss into a profit of £10 (Rs. 100) in 1881-82. Even though worked at a small nominal loss the mills are valuable as they save a loss of twenty per cent caused by squaring the logs with the hand and as they supply wood in a state which, if not locally available, might be brought from Bombay. The chief kinds of timber kept in these stores are, teak, *matti*, *kindal*, *honi*, *jámbe*, *hedde*, *nandi*, *karimuttal*, and sandalwood in Sirsi. During the five years ending 1880 the amount of timber in store averaged 147,562 cubic feet (*khandis* 11,805), valued at £15,346 (Rs. 1,53,460). Yearly sales of wood are made at each of these stores lasting from ten to twenty days. The first sale is at Haliyál in December and the last at Sirsi in February. Wood can be bought at any time at a slight advance on the rates at the last sale. Many landlords and husbandmen buy at auctions to meet their own wants. But the dealers, though they belong to no special class, are generally Musalmáns and Lingáyats from Hubli and Dhárwár. Of late, on account of the fall in the price of timber,<sup>1</sup> the dealers have found it difficult to get rid of their purchases, and there has been great delay in recovering outstandings. From the stores the main routes along which the timber passes east, are from Haliyál towards Belgaum, Dhárwár, and Hubli; from Yellápur, Kirvatti, and the Kannigeri saw-mills to Hubli and Dhárwár; and from Mundgod and Kátur-Singanhalli to Hubli, Tadas, Bankápur, and Hángal. Of late years the large sum of £23,204 10s. (Rs. 2,32,045) has been spent from forest funds in improving the roads above the Sahyádris. The important Haliyál-Yellápur and Haliyál-Supa roads are kept up by the forest department. Two serviceable bridges have been built over the Tattihalla and one over the Daudi, and one-half of the cost of the bridges over the Bedti, Tudgani, and Yerkanbail rivers between Yellápur and Sirsi, and of the Barchi bridge between Haliyál and Supa, has been met from forest funds.

In the forests below the Sahyádris a ranger chooses the trees to be cut, numbers them, and enters in a register the kind of tree, its position, and probable contents. When the list is ready a contract is given for girdling the trees by cutting through the sap into the heartwood, an operation which costs about 6d. (*annas* 4) a tree. This girdling kills the tree, the object being to lighten the timber and make it easier to float down the rivers. After the trees have dried for two or three seasons tenders are invited for cutting, dragging, and floating them to the coast stores. The contracts and the contractors are the same as in the upland forests, and when the contractor is ready to begin the same precaution of setting a forest guard to watch the felling is adopted. The felling begins in July or August. In addition to the workmen, who do not differ from those above the Sahyádris, except that there are no Vadars with their bullock carts, elephants are employed. These elephants, which come from the Malabár coast, are the property of the contractors, and cost from

<sup>1</sup> Teak fell from £2 (Rs. 20) the *khandi* (12½ cubic feet) during the seven years before the 1876 famine to £1 8s. (Rs. 14) in the five years ending 1880; blackwood fell from £1 10s. to £1 2s. (Rs. 15-Rs. 11), and other timber from £1 8s. to £1 (Rs. 14-Rs. 10).

## Chapter II. Production.

Forests.  
System.

**Chapter II.**  
**Production.**

Forests.  
System.

£200 to £500 (Rs.2000-Rs.5000) to buy; £1 (Rs.10) a day to hire; and 6s. (Rs. 3) a day to keep. Though well cared for, they are apt to strain themselves and deaths are not uncommon. Each elephant has his driver or *máhut*, who sits on his neck or on a pad on his back. But the elephant often works with no one on his back, and when a log gets into trouble the driver comes in front of the elephant and advises him in what they call elephant-talk. A single elephant, though not easily nor without risk of mishap, can manage a log twenty-five to thirty-five feet long and containing fifty to eighty cubic feet of timber. Larger logs require two elephants, and a contract of 150 to 500 logs, each containing sixty to 150 cubic feet of timber, should not be worked with less than two to six elephants. The timber has generally to be brought down steep hill sides or out of deep dells and over dry boulder-strewn watercourses to rough tracks cleared by the contractors. Up the steepest slopes and into the deepest rockiest dells the elephant unhesitatingly makes his way, and, tackling the largest logs, by pushing and dragging, overcomes every obstacle. Except that in dragging, a heavy hawser-like rope of green fibre<sup>1</sup> is made fast to the drag-holes and caught by the elephant between his teeth he is not harnessed to the log. In moving the log he slightly raises it and draws it alongside of him, always careful to be on the upper side and to keep the log so far from him that there is no risk of its striking his feet. In this way the elephant is much safer than if he was harnessed to the log, as, if the log becomes unmanageable, he can at once let it loose. When special force is required the elephant gets in front of the log with the rope between his teeth and twisting his trunk round the rope brings to bear all his power and weight, backing and hawling the log with him step by step. When two elephants work together one drags and the other pushes. Sometimes the log is pushed with the feet, but as a rule the elephant kneels and pushes it with his knees and with the middle of his skull. In this way the timber is dragged down the steep slopes chiefly to the Kálinadi and the Gangávali rivers. At the river side the logs are marked and measured, noted in the register opposite the original entries, and handed to the contractor who passes a receipt for them. Then between November and March, for after March the rivers run too low, they are floated singly down the river. In passing the logs down the river the elephant is again of great use. He pushes them one by one over the shallows, keeps them straight in rapids, and shoots them along narrow channels blasted in the rock<sup>2</sup>. To get water enough to float the logs through the rock cuttings the river is pounded back by a dam of stakes, leaves, grass, and earth. The logs come down this reach and knock together in hopeless confusion against the dam. One elephant stands nearly up to his middle at the mouth of the rock-cut passage. Another picks his way about among the jumble

<sup>1</sup> The fibre either of the *sánda* *Sterculia villosa*, or of the *kevan* *Heticteres Isora*, is generally used.

<sup>2</sup> These channels, which are from six to ten feet broad, have been cut through belts of rock by the forest department.

of logs, takes them one by one, and turning them straight up and down the stream passes them to the elephant at the mouth of the cut, who, with a strong push, sends a log of two or three tons dancing down the channel like an oar or a walking stick. Sometimes, when the elephant at the cut is busy with a big log, a second log comes down on him from behind. When this happens he plays the second log with his hind leg with marvellous skill, stopping its force and keeping it straight till the gap is clear and he is able to pass it on.

At Kadra on the Kálinadi and at Gundbale on the Gangávali fifty to two hundred logs are put together and made into rafts which float with the tide down the Kálinadi to the Kodibág store or down the Gangávali river to the Gangávali store. When the rafts reach the store, elephants drag the timber above high-water mark. The logs are examined by the storekeeper and checked with the register. If all is correct the storekeeper re-measures and classifies the timber, and when the measurements are finished settles the contractors' accounts.<sup>1</sup> During the five years ending 1880 the quantity of wood kept in the two coast stores averaged 69,575 cubic feet (*khandis* 5566) worth £11,132 (Rs. 1,11,320). There are seldom auction sales at the coast stores. The timber, indented for by the Bombay Dockyard and Gun Carriage Factory, is set aside and sent to Bombay in native craft. The rest is sold to merchants and shipped chiefly to Bombay, Broach, and Bhávnagar.

Both in the lowland and in the upland forests dead wood contracts are sometimes arranged under the share system. The details are the same as in the contract system, except that in the lowland forests the contractors receive one-half of the sale proceeds for teak and five-eighths (10 *annas* in the rupee) for other timber. In the upland forests the contractor receives a share of three to five-sixteenths (3 to 5 *annas* in the rupee) both for teak and for other timber.

Besides the timber that is exported from the district a large quantity is cut to meet the local demand. Timber for local use is marked by forest officers and felled and removed under permit rules.<sup>2</sup> The grant of wood at from an eighth to a quarter of the market price to the people who live near the forests is an old feature in Kánara conservancy. During the five years ending 1882 the cuttings for local use have averaged 101,244 cubic feet (*khandis* 8099). To prevent fraud in measurement ten per cent of the wood stacked is checked by the foresters and ten per cent by the district forest officer. A further small percentage is examined by special patrol parties.

During the five years ending 1882, 1,601,027 cubic feet (128,082 *khandis*) of timber worth £126,013 (Rs. 12,60,130) have been taken out of the Kánara forests. Of this, 1,094,804 cubic feet (87,584 *khandis*) were for export and 506,223 cubic feet (40,498 *khandis*) for local use. The average yearly felling of wood was 320,205 cubic feet (25,616 *khandis*), of which 218,961 cubic feet (17,517

## Chapter II. Production.

Forests.  
System.

Dead Wood.

Local Use.

<sup>1</sup> Logs are often left behind from want of buoyancy. When this happens a certain amount is deducted from what is due to the contractors.

<sup>2</sup> These rules are given in the Appendix.

**Chapter II.**  
**Production.**

Forests.  
*Minor Products.*

*khandis*) were for export and 101,244 cubic feet (8099 *khandis*) for local use.<sup>1</sup>

The minor products of the Kánara forests yield an average yearly revenue of about £5600 (Rs. 56,000). The chief articles are, myrobalans or *hirdas*, £4049 (Rs. 40,490); soapnuts or *shigikai*, £203 (Rs. 2030); catechu or *kát*, £364 (Rs. 3640); honey and wax, £339 (Rs. 3390); cinnamon, £156 (Rs. 1560); and pepper and grass, £501 (Rs. 5010). The right of gathering honey and wax, cinnamon, and pepper is farmed. The making of catechu from thickened *khair* juice was stopped for several years, but, in 1880, a small contract was granted in Honávar. The right of grazing was formerly put to auction. But the practice caused much damage to the forests, as the contractors crowded the forests with cattle and there was no check against the forest being fired to improve the grazing, or the boughs being lopped for fodder. In August 1880 a system was introduced in Supa of charging a grazing fee of 3*d.* (*annas* 2) on every head of cattle allowed into the forest. A ticket was also issued under which the holder engaged to lop no boughs and promised to do his best to check and put out forest fires. Any one found breaking this engagement is liable to have his cattle at once turned out of the forest. The scheme worked so well in Supa that it has been (August 1881) applied to the whole district. Besides the gain to the forests the new system is in many cases an advantage to the people who used to have to pay the contractor higher fees than they have now to pay. It also brings in a larger revenue, the receipts having risen from £300 and £400 (Rs. 3000-Rs. 4000) to £2658 (Rs. 26,580) in 1882.

Myrobalans and soapnuts are gathered by the forest department. Soapnuts, the fruit of the *Acacia concinna*, are of little value and are worth gathering only every second year. Myrobalans or *hirdás*, the fruit or nut of the *Terminalia Chebula*, the right to gather which had formerly been farmed, were first gathered by the forest department in 1877-78, when 2782 *khandis* of 560 pounds each were brought into the forest stores. The whole sold for £5106 (Rs. 51,060), leaving a net profit of £2959 (Rs. 29,590) compared with a yearly average revenue of £656 (Rs. 6560) in the seven previous years. During the three following years the average receipts have been £3697 (Rs. 36,970) and the charges £2238 (Rs. 22,380), leaving a net yearly balance of £1457 (Rs. 14,570). The decline in the revenue is due to the fall in the demand for myrobalans.<sup>2</sup> The demand for myrobalans has had the excellent effect of tempting the hill tribes to take care of the *hirda* trees, not lopping or cutting them, and when possible saving them from forest fires. Taking advantage of the increased value of the *hirda* the Conservator has proposed that the land set apart for wood-ash tillage should be granted rent-free on

<sup>1</sup> Before the 1877 famine the average felling of timber for export was 245,932 cubic feet (19,674 *khandis*), and for local use 124,832 cubic feet (9986 *khandis*).

<sup>2</sup> In 1878 the war between Russia and Turkey is said to have injured the trade in *vallonea* or gallnuts, the acorn cups of *Quercus ægilops*, and raised an unusual demand for myrobalans. Another, perhaps a more important, element in the increased demand was the low freights to England, there being next to no produce to send at the end of the famine.

condition that the holder stocks it with a certain number of *hirda* plants to be supplied to him from the Government nurseries. This plan has worked well in Belgaum. Besides this scheme for re-clothing the forest tracts which have been laid bare by wood-ash tillage since 1857, attention has been given to the growth of plantations, chiefly of teak. About 1000 acres, partly above and partly below the Sahyádris, have been planted with about a million of young trees. Except 100 acres of Casuarinas, on the coast between Kárwár and the Kálinadi, these plantations have been stocked with teak at a cost, including the purchase money of the ground, of £8000 (Rs. 80,000).

As most roads run through shady forests, roadside trees are not so important in Kánara as in other districts. Only along some parts of the coast is there a need of roadside trees. The most useful trees for road planting are, above the Sahyádris, the mango, the jack, the *dhupadamara* *Vateria indica*, and the fig family, especially the banian, as poles five or six feet long and a foot in girth grow readily if planted at the beginning of the rains in pits eighteen or twenty inches deep. The *dhupadamara* *Vateria indica*, with its splendid shade and sweet white flowers, is a beautiful roadside tree, and grows well above the Sahyádris wherever the soil is red. There are magnificent *dhupadamara* avenues in Siddápur planted probably in the beginning of the present century by the Bilgi chiefs. The trees are of grand height and some of them are from ten to fifteen feet in girth. Below the Sahyádris, wherever the soil is sandy, no tree thrives better than the Casuarina, which quickly grows into a handsome tree. In Honávar are fine banians which were planted when Kánara was under the Madras Government.

Of exotics several varieties of the Eucalyptus, the *Pithecolobium saman*, the mahogany, and the *Cassalpinia coriaria* or *divi-divi* are being tried. Except the Eucalypti, which do not prosper, these trees are doing well. Near the Gersappa falls are a few *Cinchona* trees, some of which were planted by a Madras doctor about eighteen years ago and the rest have been added since. None of the plants thrive.

The following statement shows the receipts, charges, and profits of the Kánara forests during the twenty-nine years ending 1881-82:

*Kánara Forest Balance Sheet, 1853-1881.*

YEAR.	Receipts.	Charges.	Profits.	YEAR.	Receipts.	Charges.	Profits.
	£.	£.	£.		£.	£.	£.
1853-54 ...	14,423	5685	8738	1868-69 ...	26,312	15,895	20,417
1854-55 ...	8501	6379	2122	1869-70 ...	50,327	18,804	36,523
1855-56 ...	15,061	9913	11,148	1870-71 ...	40,840	16,913	23,727
1856-57 ...	16,064	5097	10,967	1871-72 ...	45,367	13,314	32,053
1857-58 ...	7065	2335	4130	1872-73 ...	42,077	22,646	18,431
1858-59 ...	10,060	4080	5980	1873-74 ...	40,404	16,548	23,856
1859-60 ...	20,450	5980	14,470	1874-75 ...	85,724	19,002	16,722
1860-61 ...	25,316	7389	17,477	1875-76 ...	38,882	19,450	19,432
1861-62 ...	8390	7592	738	1876-77 ...	34,221	19,423	14,558
1862-63 ...	36,204	4905	31,459	1877-78 ...	23,924	18,247	5677
1863-64 ...	33,872	3222	30,650	1878-79 ...	24,517	22,355	2262
1864-65 ...	41,972	7485	34,487	1879-80 ...	35,024	17,384	17,640
1865-66 ...	26,995	23,545	3450	1880-81 ...	32,906	20,818	12,088
1866-67 ...	23,368	17,986	10,382	1881-82 ...	41,051	24,387	16,664
1867-68 ...	29,960	14,070	15,890				

An examination of this balance sheet shows that for the nine years ending 1861-62 receipts averaged £13,900, charges £5500,

## Chapter II. Production.

Forests.  
*Minor Products.*

*Roadside Trees.*

*Experiments.*

*Finances.*

**Chapter II.**  
**Production.**

Forests.  
Finances.

and profits £8400. In the ten years ending 1871-72 receipts averaged £37,000, charges £13,100 and profits £23,900; and in the ten years ending 1881-82 receipts averaged £34,900, charges £20,100, and profits £14,800. In 1877-78 and 1878-79 the profits were greatly below the average, only £5677 and £2262. Between 1862 and 1864 the great wealth which the American war threw into Bombay and the districts of Belgaum and Dhárwár was accompanied by an immense demand for wood and raised the forest receipts from an average of £13,900 in the nine years ending 1862 to £41,900 in 1864-65. At the close of the American war the receipts fell to £27,000 in 1865-66 and £28,000 in 1866-67. But again in 1869-70 the special demand for the Belgaum barracks and the state buildings at Kolhápúr raised the receipts to £50,000. From this they fell, but continued over £34,000 till, in consequence of the 1876 famine, the demand for timber ceased and the receipts dropped to £24,000 in 1877-78 and £24,500 in 1878-79. The return to a more prosperous state in 1879-80 was accompanied by a rise in receipts to £35,000. Charges have risen from an average of about £5400 in the twelve years ending 1864-65 to an average of about £18,600 in the seventeen years since 1865. Before 1865 there was little or no establishment and little or no guarding of the forests. Nothing was looked for but profit. Another twelve years of this system would have ended in disaster. Since 1865 there has been no great increase in the permanent staff. The rise from an average of about £18,000 in the five previous years to £22,255 in 1878-79 was owing to the cost (£4369) of an important forest case.<sup>1</sup> In 1881-82 both receipts and charges increased considerably, receipts to £41,000 against £32,900 in 1880-81 and charges to £24,400 against £20,800 in 1880-81.

*Forest Details.*

The detailed accounts of the different forest blocks and groups may be given in the following order: Those of Haliyál, Supa, and Kárwár in the northern division; those of Yellápúr, Mundgod, Ankola, and Kumta in the central division; and those of Sirsi, Siddápúr, Honávar, and Bhatkal in the southern division. In Haliyál and Kárwár in the north division all of the forests, and in Mundgod and Ankola in the central division and in Sirsi in the south division, portions of the forests have been reserved. In Supa in the north, in Yellápúr and Kumta in the centre, and in Siddápúr, Honávar, and Bhatkal in the south, reserved forests have still to be set apart.

*Haliyál.*

The Haliyál forests in the north-east of the district include the forest lands of 138 villages with an area of 251·86 square miles or 161,191 acres, and a population of about 28,000. They are bounded on the north by Bidi in Belgaum; on the east by Dhárwár; on the south by the Tattihalla and Kálinadi rivers; and on the west by the Katnal and Barchi streams up to the Kálinadi, and thence by the hills that run north and south between the Kálinadi and the Káni. Over the whole area teak and other leaf-shedding trees prevail in perfection of size and quality, except in the dryer east, where they do not grow

<sup>1</sup> This suit was brought by one Bháskar Appa to recover about 350 square miles of forests from which, he alleged, he had been wrongfully ejected by the Collector in 1861. The Judge found in favour of Government and his decision was upheld on appeal by the High Court.

to so large a size.<sup>1</sup> Unlike most Kánara forests there is very little evergreen timber in Haliyál, only two small patches in Kaule and Shirolí. Useful bamboos, large, middle-sized, and small, are found in most forests. The large bamboos seeded in 1868-69 and the new crop is not yet ready for use. The chief sources of revenue are grazing fees and timber and bamboo sales. There are no myrobalans, soapnuts, or other minor products. The Haliyál forests, which are best towards the south and west, may be arranged into three blocks or groups: Shirolí-Kalbhávi in the south-west with fourteen villages and 43,000 acres; Kegdol-Rámápur in the north-west with thirty-four villages and 73,000 acres; and Aralvád-Muttalmuri in the east with ninety villages and 45,000 acres. The Shirolí-Kalbhávi group, along the Kálinadi, Káni and Tattihalla, includes the forest lands of fourteen villages<sup>2</sup> with an area of about 43,000 acres, 2663 of which are set apart for grazing, and a population of 669, chiefly Maráthás, with a few Sídis and Musalmáns. This forms an unbroken block of the first importance and value, with splendid high forests of teak, blackwood and other valuable timber. Except the Shirolí, Sanmaggi, and Kaule forests, overlooking the Kálinadi, whose timber, when cut, will have to be dragged to the Kálinadi and floated to the Kodibág store near Kárwár, these forests are open to carts from the east. The forests of the first nine villages have been little worked except for dead wood. The others have been more worked, but have still vast stores of teak and other fine timber. The Kegdol-Rámápur group in the north-west, lying along the Kálinadi and the Katnal and Barchi streams, includes the forests of thirty-four villages,<sup>3</sup> with an area of about 73,000

## Chapter II. Production.

Forests.  
Haliyál.

<sup>1</sup> The leading trees of the Haliyál forests are *Ságván*, *Tectona grandis*; *matti*, *Terminalia tomentosa*; *kíndal*, *Terminalia paniculata*; *holematti*, *Terminalia Arjuna*; *goting*, *Terminalia bellerica*; *mandi*, *Lagerstroemia microcarpa*; *homí*, *Pterocarpus Marsupium*; *shisham*, *Dalbergia latifolia*; *karimattal*, *Ougeinia dalbergioides*; *hedde*, *Adina cordifolia*; *kalamb*, *Nauclea parvifolia*; *kumbia*, *Careya arborea*; *jámba*, *Xylica dolabriformis*; *díndal*, *Anogeissus latifolia*; and *sagdi*, *Schleichera trijuga*.

<sup>2</sup> The villages are: *Shirolí-Kalbhávi Group, Haliyál.*

VILLAGES.	Acres.	VILLAGES.	Acres.	VILLAGES.	Acres.
Shirolí ... ..	1662	A'mbge ... ..	5433	Gutti ... ..	2421
Sannamaggi ... ..	2432	Phansoli ... ..	2739	Kalbhávi ... ..	1049
Kaule ... ..	2976	Kulagi ... ..	3338		
Vincholi ... ..	3094	Kumbárkop ... ..	1914		
A'mbgaum ... ..	3047	Addigeri ... ..	6063	Total ... ..	42,911
Jámbe ... ..	3425	Badákánsirda ... ..	3268		

<sup>3</sup> The details are: *Kegdol-Rámápur Group, Haliyál.*

VILLAGES.	Acres.	VILLAGES.	Acres.	VILLAGES.	Acres.
Kegdol ... ..	1266	Naranahalli ... ..	1508	Ambevadi ... ..	3995
Malavadi ... ..	1281	Sámbráni ... ..	2612	A'lur ... ..	5593
Haranod ... ..	2499	Ráypattan ... ..	3336	Bedar Shirgur ... ..	3065
Bomanhalli ... ..	3008	Chimanhalli ... ..	964	Vitnál ... ..	1214
Bhágvati ... ..	3589	Mainol ... ..	1010	Ajgarni ... ..	2884
Bhímanhalli ... ..	2111	Gadgeri ... ..	1316	Handli ... ..	1878
Machápur ... ..	4269	Gardoli ... ..	2443	Kesarodge ... ..	6192
Bogur ... ..	1130	Tátgera ... ..	1176	Shingatgeri ... ..	1140
Tattigeri ... ..	1411	Kariyanpáli ... ..	1235	Ambargi ... ..	1468
Thákur-Basápur ... ..	456	Kervád ... ..	1517	Rámápur ... ..	890
Málvád ... ..	8324	Dándeli ... ..	700		
Chotákánsirda ... ..	1692	Kumbharkopp ... ..	742	Total ... ..	72,904

## Chapter II.

## Production.

Forests.  
*Haliyál.*

acres, of which 7700 have been set apart for grazing, and a population of about 2300, mostly Shenvi Bráhmans, Maráthás, Christians, Vadars, Dheds, Sidis, and Musalmáns. Many of the villages are deserted, and except Sámbráni none of them has more than a dozen huts. The forests are everywhere open to carts. They have been regularly worked for the last sixteen years, but still contain a large stock of mature teak and other valuable timber of great size. Especially in Sámbráni, Ráypattan, Náranhalli, Chotákánsirda, Bomanhalli, Málvád, Thákur-Basápur Máchápur, Bhimanhalli, Bhágvati, and Addigeri, they yield immense numbers of middle-sized and small bamboos which are in great demand in Belgaum and Dhárwár.<sup>1</sup> In spite of every effort to stop them, fires are common. They are either caused by carelessness or wilfully lighted by herdsmen and hunters.

The Arálvád-Muttalmuri group, along the eastern frontier, includes the forests of ninety villages with an area of 45,353 acres, in 32,732 of which grazing is allowed,<sup>2</sup> and a population of about 25,000, chiefly Shenvi Bráhmans, Maráthás, Vadars, Dheds, Sidis, Musalmáns, and a few Jains, Lingayáts, and Christians. The forest area is fairly covered with trees. But they are smaller than in the other Haliyál blocks, and, on account of the larger area under tillage and the greater population, forest fires are common.

*Supa.*

The Supa forests, none of which have yet been reserved, have an estimated area of 723 square miles,<sup>3</sup> with a population of Maráthás, Shenvis, Sidis, Gaulis, Musalmáns, Christians, and in the east a few Havik Bráhmans. They are bounded on the north by the Bidi forests in Belgaum, on the east by Haliyál, on the south-east by the Kálinadi river, on the south by Kárwár, and on the west by Goa. Between Anshi on the Sahyádris and Sitáváda on the Belgaum frontier, the Kárwár-Belgaum road divides the forests into two almost equal but widely different belts, a western and an eastern. The western belt, comprising the Sahyádris between Supa and Goa, includes the lands of forty-seven small villages with an area of about 350 square miles, and a population of about 12,500. The villages, and, except some hill sides allotted for

<sup>1</sup> Before the 1876 famine in one year 2,108,706 bamboos were sent from the Haliyál forests. Since 1875 the export of bamboos has averaged 1,326,145; in 1880-81 it was 1,292,874 and in 1881-82, 1,116,208. Large bamboos pay a fee of Rs. 3 the hundred, middle of Rs. 2, and small of Re. 1.

<sup>2</sup> The villages are: Arálvád, Mundaki, Madanhalli, Kervád, Bujrukh-Kanchinhalli, Mágvád, Málvád, Pála, Madalgeri, Sátmani, Jávoli, Harvalli, Kesarolli, Kurigadde, Haliyál, Guddápur, Hullatti, Bhánasgera, Jogankopp, Tatvani, Mundvád, Gadiyál, Dugginkeri, Dongrikopp, Mangalvád, Antroli, Tergaon, Murakvád, Ammankopp, Chibbalgeri, Teginhalli, Guttibail, Golihalli, Khámdalli, Malvadi, Mugadkopp, Tippangeri, Karalhatti, Kumbhárkopp, Siddápur, Pur, Gundoli, Arashinageri, Kálginkopp, Chinaginkopp, Jattage, Doddakop, Ajminhá, Janage, Khurd Kanchinhalli, Hampehalli, Kávalvád, Guladkopp, Nemdigadde, Belvatige, Adaki Hosur, Pándral Hosur, Jatage Hosur, Nilváni, Bukhankopp, Mavinkopp, Donshirgur, Doddashirgur, Báshattikopp, Gobral, Ajgáon, Niralge, Domgeri, Agsalhatti, Kyátanageri, Kalginhatti, Baloga, Bidrahalli, Yedoga, Kálsápur, Channápur, Boblikopp, Halasi, Timmapur, Sátanhalli, Hunasivád, Nagshattikopp, Dusage, Chatranál, Alloli, Basavalli, Guttigeri, Hangi, Homanhalli, and Muttalmuri.

<sup>3</sup> The area is doubtful as the sub-division has not yet been surveyed.



wood-ash or *kumri* tillage, the cultivation are in the valleys, the cultivation chiefly consisting of rice and *náchni* Eleusine corocana.

The country is hilly and much of it is bare iron-clay hill tops, slopes cleared for wood-ash tillage, and patches of shallow gravelly red soil with stunted ill-shaped trees. The view is redeemed from barrenness by some grand evergreen forests, crowded with lofty trees, and here and there in the nooks and ravines are considerable forests of leaf-shedding trees of good size and value.<sup>1</sup>

Myrobalans and soapnut trees and the wild date are common. The chief evergreen forest trees are the *Artocarpus hirsuta*, *A. integrifolia*, and *A. Lakoocha*, the *Eugenia Jambolana*, the *Calophyllum Wightianum*, the *Myristica laurifolia*, the *Cinnamomum iners*, and the mango and wild sago-palm or *baini* *Caryota urens*.

Except for local use there is no demand for timber and no timber is cut. But the Marmagaum and Hubli railway is expected to open a large market in Goa and along the seaboard. There are few bamboos. Many of the hills are covered with *kórví* or *Strobilanthus* of several kinds, which, according to its kind, flowers and dries after three, five, or seven years, readily reproducing itself in the second season after seeding. The stems are much used in making wattled hut-walls, and so fond are bees of the flower that when it blooms honey farms double or treble in value. The minor sources of revenue are myrobalans, soapnuts, honey, cinnamon, and grass. Myrobalans, soapnuts, and grazing fees are collected departmentally; the right to gather honey and cinnamon is farmed. Since 1877 forest fires have become comparatively rare. The hill people earn good wages by gathering myrobalans and they do their best to stop fires by which many of the seedlings were formerly destroyed. Wood-ash or *kumri* tillage was formerly widespread, but it has gradually been reduced within harmless limits. In 1879-80 the area was 156 and in 1880-81 it was 273 acres.

The eastern belt of the Supa forests stretches from the Sahyádris in the north-west and the Kárvár-Belgaum road in the south-west as far east as the Haliyál border. It has an area of about 373 square miles, including the lands of fifty-six villages, with a population of 8867. Except part of the Sahyádris in the south-east, the country is less rough than the west belt. The scattered houses, the rice and sugarcane lands, and the betel and spice gardens, which cover perhaps a sixteenth of the whole area, are all in the valleys. In the west the country is open and the timber poor, but the rest, especially towards the south, is one grand forest, a mass of fine high timber, both leaf-shedding and evergreen. This area is divided into nine forest groups. In the extreme south-east Gund-Shivápur with three villages and 40,000 acres; to the north of this Aurli-Mandorli with three villages and 9000 acres; again to the north the two joint

## Chapter II. Production.

Forests.  
Supa.

<sup>1</sup> The chief leaf-shedding trees are the *Terminalias*, *tomentosa*, *paniculata*, *Chebula*, *bellerica* and *Arjuna*; the *Lagerstroemias*, *microcarpa* and *parvifolia*; *Xylia dolabriformis*; *Pterocarpus Marsupium*: *Cassia Fistula*; *Buchanania latifolia*; *Dalbergia latifolia*; the *Randias*, *dumetorum*, and *uliginosa*; the *Albizias*, *Lebbek odoratissima*, and *amara*; the *Eugenias*, *Jambolana* and *operculata*; and many of the *Ficus* class.

Chapter II.  
Production.

Forests.  
*Supa.*

blocks of Bámáne-Birampáli and Maulinge-Bádgunđ with four villages and 18,000 acres; still to the north Kundape-Donset with five villages and 12,800 acres; to the north-east Bidoli-Vadkał with nine villages and 33,000 acres; to the east Kodthalli-Holgadda with seven villages and 15,500 acres; to the east Kalsái-Usođe with ten villages and 49,800 acres; and in the extreme east Adangaum-Durgi with fifteen villages and 60,600 acres.

The Gund-Shivápúr group, on the plateau above the Kálinadi river, in the extreme south-east includes the forest lands of three villages<sup>1</sup> with an estimated area of about 40,000 acres or 62.5 square miles and a population of about 450. The best part of this block are the great teak forests of Gund and the splendid evergreen forests of Shivápúr. As the country is too rough for carts the timber has to be pushed and dragged by elephants down slips to the Kálinadi, and floated about sixty miles to the Kodibág wood-store near Kárwár.<sup>2</sup>

The teak logs vary in length from twenty-five to sixty feet and in contents from forty to 150 cubic feet. Felling and carrying charges amount at the Kodibág wood store to £4 (Rs. 40) the ton, and the selling price varies from £7 4s. to £14 (Rs. 72 - Rs. 140) the ton of fifty-two cubic feet. The Aurli-Mandorli group on the north side of the Káni river includes the forest lands of three villages,<sup>3</sup> with an estimated area of 9000 acres or 14.06 square miles, and a population of 168. Acre for acre these forests are in no way inferior to the Gund block. A cart track has been made twenty-one miles to the Haliyál wood store and dead wood taken out, but no trees have been felled. Felling and carrying charges to the wood store amount to 10s. (Rs. 5) the *khandi* of 12½ cubic feet and the selling rates vary from £1 10s. to £2 (Rs. 15 - Rs. 20) the *khandi* for teak and from 16s. to £1 4s. (Rs. 8 - Rs. 12) for other timber. Close to the north of the Aurli forests are the Bámáne-Birampáli block to the south and the Maulinge-Bádgunđ block to the north of the Kálinadi. These blocks, including the lands of four villages, have an estimated area of about 18,000 acres or 28½ square miles and a population of about 270. Especially along the rivers, they contain immense quantities of splendid large teak and other valuable timber, the whole being open to carts. The timber finds its way about eighteen miles north-east to Haliyál at a cost of 9s. (Rs. 4½) the *khandi* of 12½ cubic feet and commands from £1 10s. to £2 10s. (Rs. 15 - Rs. 25) the *khandi* for teak and 16s. to £1 4s. (Rs. 8 - Rs. 12) for other timber. A good forest road runs right through the Bámáne-Birampáli group on the south of the Kálinadi, and a good cart track leads from the Supa-Haliyál forest road at Barchi to the Maulinge-Bádgunđ group to the north of the river.

The Kundape-Donset group, along the Katnal and Barchi to the north of the Maulinge-Bádgunđ forests, includes the lands of five villages<sup>4</sup> with an estimated area of 12,800 acres or about twenty

<sup>1</sup> The villages are Gund, Shaváli, and Shivápúr.

<sup>2</sup> In 1868 and 1869 Mr. H. Barrett, Deputy Conservator of Forests, made a road from a central point in the forests to the head of the Káni pass and from that a slip to the river. Other slips have been made by wood contractors.

<sup>3</sup> The villages are Aurli, Hudse, and Mandorli.

<sup>4</sup> The villages are Kundape, Hareguli, Shingergaum, Kundalgaum, and Donset.

square miles and a population of about 400. This is a first class teak forest which though steadily worked for the last sixteen years, still has much fine teak, blackwood, and other timber. It is easily reached from Haliyál at an average distance of fifteen miles. It is crossed by an excellent forest road with many branch cart tracks. At Haliyál the felling and carrying charges amount to 7s. (Rs. 3½) the *khandi* and the sale price varies from £1 10s. to £2 (Rs. 15-Rs. 20) for teak and from 16s. to £1 4s. (Rs. 8 - Rs. 12) for other timber.

The Bidoli-Vadkal group on the plateau above the Kálinadi comprises the forests of nine villages<sup>1</sup> with an estimated area of about 33,000 acres or 51·56 square miles and a population of 1067. Almost all the villages except Bidoli and Cháperi have a good deal of large teak, and several of them have splendid leaf-shedding woods, and magnificent tracts of evergreen forests covered with lofty trees of great girth.<sup>2</sup> The forests of this group have never been worked except to meet petty local wants. They can be reached both from above the Sahyádris and from the coast and will prove most valuable if the opening of the Marmagaum and Hubli railway causes a demand for wood. With slight improvements to the road any quantity of timber can be passed along the Ulavi-Kumbhárváda road fifty miles to Sitáváda on the railway.

The Kodthalli-Holgadda group, along the Kálinadi and the neighbouring Sahyádris slopes, includes the lands of seven villages<sup>3</sup> with an approximate area of 15,500 acres or 24·21 square miles and a population of 366. This group has fine leaf-shedding forests with a good sprinkling of teak,<sup>4</sup> some rich evergreen patches,<sup>5</sup> and a nice teak plantation of 135 acres.<sup>6</sup> The only outlet for this group is towards the coast. The logs are dragged to the Kálinadi by elephants, and are pushed about thirty-four miles down to the Kodibág wood store, on bamboo rafts, for few of these trees float. The felling, dragging, floating and stacking charges amount to £2 (Rs. 20) the ton of fifty-two cubic feet and the prices vary from £4 16s. to £8 (Rs. 48 - Rs. 80) in the case of teak and from £4 to £4 16s. (Rs. 40 - Rs. 48) for other timber.

The Kálsái-Usode block lies further inland than the Kodthalli-Holgadda group. It includes the forest lands of ten villages,<sup>7</sup>

<sup>1</sup> The villages are Bidoli, Cháperi, Kariyádi, Nandigadde, Bedasgadde, Chinchkhand, Yermukh, Ulavi, and Vadkal.

<sup>2</sup> The leaf-shedding-trees are the *Terminalias*, *tomentosa*, *Arjuna*, *paniculata*, and *bellerica*; the *Lagerstrœmias*, *microcarpa* and *Reginœ*; *Xylia dolabriformis*; *Pterocarpus Marsupium*; *Dalbergia latifolia*; the *Albizzias*, *Lebbek*, *odoratissima* and *amara*; *Nauclœa parvifolia* and *Adina cordifolia* are specially fine. The evergreen forests are specially fine in Kariyádi, Bhedasgadde, Hebbal, Yermukh, Ulavi and Vadkal. The chief trees are *Artocarpus*, *hirsuta*, *integrifolia*, and *Lakoocha*; *Calophyllum*, *elatum* and *Wightianum*; *Myristica*, *laurifolia* and *magnifica*; *Cinnamomum iners*; *Caryota urens*, and almost all the other varieties of evergreen Kánarese trees.

<sup>3</sup> The villages are Kodthalli, Birkholi, Hebbal, Bobargadde, Suligeri, Tárimalápur, and Holgadde.

<sup>4</sup> Splendid specimens of the *Terminalias*, *tomentosa*, *paniculata*, *bellerica*, and *Arjuna*; *Pterocarpus Marsupium*; *Lagerstrœmia microcarpa* and *Adina cordifolia*.

<sup>5</sup> Especially in Kodthalli, Birkholi, Hebbal, and Bobargadde.

<sup>6</sup> Of the 135 acres seventy-five were planted in 1859 and sixty in 1880 and 1881.

<sup>7</sup> The villages are Kálsái, Amboli, Gángoda, Poteli, Virlol, Nagri, Khodli, Konade, Avade, and Usode.

## Chapter II. Production.

Forests.  
*Supa.*

**Chapter II.**  
**Production.**

Forests.  
*Supa.*

with an approximate area of 49,800 acres or 77·84 square miles and a population of 4587. There is little teak but there are fine mixed leaf-shedding woods and especially in Kálsái good patches of evergreen forest. Except in 1865-66 in Usode these forests have been used only to meet local demands. All parts of them can be reached by carts, but their timber will not be wanted unless the Goa-Hubli railway raises a brisk demand.

The Adangaum-Durgi block, in the extreme east as far as the Anshi-Sitávada road, includes the forest lands of fifteen villages,<sup>1</sup> with an approximate area of 60,600 acres or 94·71 square miles and a population of 1559. Though as a rule thin, these forests have some fine large trees, mostly leaf-shedding with several scattered evergreen patches. Except for local wants they have never been worked. The minor products are soapnuts, honey, grass, and myrobalans especially in the west.

Wood-ash or *kumri* tillage was formerly common, but it has been stopped except in a few villages to the south. In the west fires are put down for the sake of the myrobalans and in the east the denseness of the forests prevents fires from being as common as in Haliyál. The evergreen patches are always free from fire. Bamboos seeded all over Supa in 1866-67 and in most places the young crop is fit for use.

*Kárwár.*

The Kárwár forest area is bounded on the north by Goa and Supa, on the east by Yellápur, on the south by Ankola, and on the west by the tilled lowlands between the hills and the Arabian Sea. The forests include the lands of fifty villages with a measured area of 137,246 acres or 214·44 square miles and a population of about 37,000, chiefly Halepaiks, Komárpaiks, Maráthás, Bhandáris, Padtis, Musalmáns, and a few Shenvi Bráhmans and Christians. The forest area was carefully examined in 1876 by Mr. E. J. Ebden, C.S., and divided into 86,269 acres of reserved and 50,977 acres of protected forests. But the whole has since (1879) been declared reserved forest.<sup>2</sup> Wood-ash tillage was formerly widespread but the area is now insignificant.<sup>3</sup>

The hill tops, slopes, and many of the Kárwár valleys are covered with a more or less dense forest growth. The best forests are on the slopes and in the dells facing the Kálinadi, from the meeting of the Kátar and Bhaire boundaries about twenty miles east to the meeting of the Supa and Yellápur boundaries. The rest of the forests lie to the west of this tract along the Kálinadi about twelve miles to the sea. Most of the forests are of leaf-shedding trees with considerable evergreen patches in ravines and near villages, and much scattered dense scrub which, since wood-ash tillage has been stopped, is fast turning into forest. The Kárwár forests may be divided into four blocks, two in the eastern or better belt, the Devkár-Devalmakhi group with nine villages and 48,000 acres to the south of the Kálinadi, and the Balemani-Bhaire group with seven villages and 45,000 acres to the north of the river; and two in the

<sup>1</sup> The villages are Adangaum, Chápoli, Karambal, Timboli, Ámset, Vaijgaum, Karandi, Puseli, Konade, Bamanávdí, Velipkumbeli, Kumbrál, Mirási-Kumbeli, Málambe, and Durgi.

<sup>2</sup> *Government Gazette*, 6th March 1879.

<sup>3</sup> In 1879-80 forty acres, in 1880-81 twenty-nine acres.

western or poorer forest belt, the Khervádi-Kodibág group with twenty-one villages and 29,000 acres on the south, and the Alge-Mudgeri group with thirteen villages and 13,400 acres on the north of the Kálinadi.

The Devkár-Devalmakhi group on the south of the Kálinadi includes the forest lands of nine villages,<sup>1</sup> with an area of 48,631 acres or 75.98 square miles, and a population of about 2400. The evergreen trees and the leaf-shedding trees, except that the *dindal* *Anogeissus latifolia* does not occur and that the *khair* *Acacia Catechu* is common, are the same as those in Supa and Haliyál, only not so large. There is a considerable quantity of second and third class teak. The Bálemáni-Bhaire group on the north of the Kálinadi includes the forest lands of seven villages<sup>2</sup> with an area of 45,799 acres or 71.56 square miles and a population of 1917. Its forests closely resemble those of the Devkár-Devalmakhi group to the south of the river. Both groups have been worked for many years and most of the large timber has been sent to the Kodibág timber store, an average distance of about twenty-five miles. The felling, carrying and stacking charges vary from 4s. to 10s. (Rs. 2 - Rs. 5) the *khandi* of twelve and a half cubic feet, and the price fetched varies from £1 to £1 10s. (Rs. 10 - Rs. 15) for teak and from 14s. to £1 (Rs. 7 - Rs. 10) for other timber. In the west or poorer forest tract the Khervádi-Kodibág group on the south of the Kálinadi includes the forest lands of twenty-one villages,<sup>3</sup> with an area of 29,382 acres or 45.91 square miles, and a population of 21,557; and the Alge-Mudgeri group on the north of the river including the forest lands of thirteen villages,<sup>4</sup> with an area of 13,434 acres or 20.99 square miles, and a population of 11,108. These two groups are closely alike. Though the forests are much thinner than those higher up the river, they contain much useful wood for making field tools and burning. There is a great demand from the thickly-peopled coast villages, and no timber is cut in either group except to meet the local demand. The forests of seven villages close to Kárwár,<sup>5</sup> which were stripped of their wood when the port and town of Kárwár (1865) were established, have since been strictly protected and are now covered with young trees. Bamboos, which were formerly abundant, seeded some ten years ago, and the young crop is not yet fit for use. The minor products of the Kárwár forests are myrobalans and soapnuts, which are gathered by the forest department, and catechu, honey, and cinnamon which are farmed.

In the central division come the Yellápur, Mundgod, Kumta, and Ankola forests. The Yellápur forests are bounded on the north by the Kálinadi and Kalghatgi in Dhárwár; on the east by the Bedti

## Chapter II. Production.

Forests.  
Kárwár.

Yellápur.

<sup>1</sup> The villages are Devkár, Kaiga, Hartuge, Kuchekár, Viráje, Mallápur, Sirve, Nagekuve, and Devalmakhi.

<sup>2</sup> The villages are Bálemáni, Kadra, Gottegáli, Lándé, Kámargaum, Goyar, and Bhaire.

<sup>3</sup> The villages are Khervádi, Kátar, Kadiye, Naiti, Mailváda, Siddar, Kinnar, Kadvád, Bárgal, Belur, Nivali, Todur, Amadalli, Kodár, Chandiyé, Arge, Binage, Sirvád, Bád, Baitkhol, and Kodibág.

<sup>4</sup> The villages are Alge, Hankon, Madheváda, Kánasgeri, Májáli, Ghádsái, Gopsitta, Hottegáli, Mainjini, Sávantváda, Kolge, Arav, and Mudgeri.

<sup>5</sup> The villages are Chendiye, Arge, Binage, Shirvád, Kadvád, Bád and Baitkhol.

Chapter II.  
Production.

Forests.  
Yellápur.

which separates Yellápur from Mundgod and Sirsi ; on the south by Ankola and Kárwár ; and on the west by part of Kárwár and the Kálinadi river. The forests, none of which have been reserved, include the lands of seventy-nine villages with an area of 222,727 acres,<sup>1</sup> or 348 square miles and a population of about 15,600. The Haliyál-Kárwár road which runs north and south and the Mundgod-Katgeganeshgudi road which runs east and west divide the Yellápur forests into four blocks with clear and well marked limits. These blocks are Lálguli-Sistmudi in the north-west with fifteen villages and 46,500 acres ; Kánigeri-Kondemani in the north-east with eight villages and 61,500 acres ; Heggápur-Subgeri in the south-east with twenty-four villages and 47,300 acres, and Sigepál-Jogalepál in the south-west with thirty-two villages and 67,500 acres. The forests of the northern groups are chiefly of leaf-shedding and those of the southern groups chiefly of evergreen trees. They have much teak, bamboo, and fine timber of splendid size and exceeding value to the people of the great bare country to the east and north. In the south, the slopes and tops of the Sahyádris are clothed with the most splendid evergreen forests. In some of the rich valleys and dells are cocoa-palm groves and spice and betel gardens, each with its belt of stripped and pollarded forest. Except close to the Sahyádris ridges all Yellápur forests are open to carts. From the eastern slopes and uplands the timber passes inland, and from the western slopes it is dragged and floated down the Gangávali and Kálinadi rivers. The Lálguli-Sistmudi block in the north-west is bounded on the north by the Kálinadi river, on the east and south by the Haliyál-Katgeganeshgudi road, and on the west by the Kálinadi. It includes the forest lands of fifteen villages<sup>2</sup> with an area of 46,473 acres and a population of 4743, mostly Maráthás or Kunbis, Christians, Sidis, and a few Havik Bráhmans. Nearly the whole area is splendid mixed forest and over the greater part of it there is much teak. In the eight first named villages the teak is of superb growth, seventy to eighty feet to the first bough, and yielding logs thirty to sixty feet long with 100 to 175 cubic feet of solid timber. Especially in Angod there are large tracts of first class evergreen forest<sup>3</sup> with magnificent *bakul*, *toon*, and *angeli* trees ninety to 100 feet to the first bough, crowned by fifty or sixty feet of branches, and yielding 150 to 225 cubic feet of timber. Bamboos of several useful kinds grow freely mixed with the trees.<sup>4</sup> The large bamboos

<sup>1</sup> This is the revenue survey estimate ; the former estimate was 233,140 acres.

<sup>2</sup> The villages are Lálguli, Gotguli, Hukali, Baragadde, Nágarkán, Dehali, Besgod, Katgeganeshgudi, Angod, Gerál, Sávgadde, Kanadgál, Belgeri, Yellápur, and Sistmudi.

<sup>3</sup> The finest evergreen trees are *angeli*, *Artocarpus hirsuta* ; jack or *phanas*, *Artocarpus integrifolia* ; *devdári*, *Cedrela Toona* ; *kempa* or red *devdári*, *Chickrasia tabularis* ; *bakul*, *Mimusops Elengi* ; *balge*, *Vitex altissima* ; *babbi*, *Calophyllum Wightianum* ; *nelatári*, *Alseodaphne semicarpifolia* ; *jámbul*, *Eugenia Jambolana*, and *baini* or sago-palm, *Caryota urens*.

<sup>4</sup> The chief leaf-shedding timber trees are teak or *ságván*, *Tectona grandis* ; *matti*, *Terminalia tomentosa* ; *nandi*, *Lagerströmia microcarpa*, *heddi*, *Adina cordifolia* ; and *jámba*, *Xylia dolabriformis* ; also, but sparingly, *shisham*, *Dalbergia latifolia* ; *kindal*, *Terminalia paniculata* ; *goting*, *Terminalia bellerica* ; *dhámin*, *Grewia tilicefolia* ; *honi*, *Pterocarpus Marsupium* ; *kumbia*, *Careya arborea* ; *holematti*, *Terminalia Arjuna* ; *dindal*, *Anogeissus latifolia* ; *kalumba*, *Nauclea parvifolia*, and *belati*, *Albizia procera*.

seeded in 1868 and the new crop is nearly ready for use ; the middle-sized bamboos seeded in 1874 and in three years will prove a splendid crop. Though most of the forests of this group have been worked during the last sixteen years, they have still vast stores, of splendid mature timber. The teak of the Kálinadi slopes goes by river to the Kodibág wood store. From above the crests of the Kálinadi slopes the produce passes east to the Kannigeri saw mills, four miles and a half north of Yellápur. During the last twelve years about 1927 trees or an yearly average of 160 have been felled and removed from these forests. The felling and carrying charges to the Kodibág store amount to £4 (Rs. 40) a ton of fifty-two cubic feet and to Yellápur and the saw mills to £1 or £1 4s. (Rs. 10 - Rs. 12) the ton. The sale price at Kodibág varies from £7 4s. to £14 (Rs. 72 - Rs. 140) the ton ; at Yellápur from £6 to £8 (Rs. 60 - Rs. 80) the ton ; and at the saw mills from 3s. 6d. to 5s. (Rs. 1½ - Rs. 2½) the cubic foot sawn into scantlings and planks. The cheaper kinds of timber do not bear the cost of carriage to the coast. They are sent to Yellápur and sold at prices varying from £3 4s. to £4 16s. (Rs. 32 - Rs. 48) the ton and at the saw mills at 1s. 6d. to 3s. (ans. 12 - Rs. 1½) the cubic foot.

The Kannigeri-Kondemani block in the north-east of Yellápur is bounded on the north and east by the Tattihalla river, a part of Kalghatgi in Dhárwár, and the Bedti river. It includes the lands of eight villages<sup>1</sup> with an area of 61,500 acres and a population of 1739, mostly Maráthá Kunbis, Dhangar-Gavlis, Christians, and a few Sidis. Most of it is fine high mixed forest with much teak except in Sashrahalli and Kondemani. The best parts of the group are near the west from Kannigeri to the Tattihalla river and thence east to Kalghatgi where the trees are smaller. Again starting from near Kirvátí south along and back from the Bedti river, very fine forests stretch right to the road between the Bedti bridge and Yellápur. The trees are the same as in the Lálguli-Sistmudi group, only there are more and finer *hónis* Pterocarpus Marsupium, *dindals* Anogeissus latifolia, and *belátis* Albizzia procera. The few small patches of evergreen forests in the south are of little value. A splendid crop of the large bamboo which seeded in 1868 is ripe in some favoured spots and in two years will be fit for use. Some of the timber of this group goes to the Kannigeri saw mills and some to the Yellápur and Kirvatti stores. The felling and carrying charges and the sale prices are the same as in the Lálguli-Sistmudi group. About 39,000 trees have been felled and removed from these forests, but they still abound in vast stores of the finest timber.

The Heggápur-Sabgeri group, in the south-east, is bounded on the east and south by the Bedti, on the west by the Arbail-Yellápur road, and on the north by the Yellápur-Mundgod road as far east as the Bedti bridge. It includes the lands of twenty-four villages<sup>2</sup>

<sup>1</sup> The villages are Kannigeri, Kanchinhalli, Kirvatti, Hosalli, Madnur, Kolikeri, Sashrahalli, and Kondemani.

<sup>2</sup> The villages are Heggápur, Kalsur, Hutkhand, Somanhalli, Chandguli, Malalgaum, Mágod, Hegumbli, Dabbguli, Devargadde, Holemadu, Belkhand, Sulgár,

## Chapter II. Production.

Forests.  
Yellápur.

Chapter II.  
Production.

Forests,  
Yellápur.

with an area of 47,316 acres and a population of 2976, mostly Havik Bráhmans, Maráthás, and a few Sidis and Sonárs. The forests of this group are splendid, crowded with lofty leaf-shedding and evergreen trees. The whole is almost equally valuable except small tracts near and a few miles south of Yellápur and some plots a little back from the crests of the Sahyádris which in past times were cleared for grazing or wood-ash tillage. Their nearness to Yellápur and their easy communication with Mundgod and Sirsi give a special value to the fine mixed high forests of Kalsur, Somanhalli, Heggápur, Chandguli, and Malálgau along the Bedti river. Except a few evergreen patches these are chiefly leaf-shedding forests with excellent large teak and besides the trees already mentioned (p. 40) *honi*, *matti*, *kindal*, *nandi*, *shesham*, and *belati*. As in the Kannigeri-Kondimani group, a splendid crop of young bamboos will be fit for use in two years. Next in value to these leaf-shedding forests are the splendid evergreen tracts of Mágod, Hegumbli, Dabguli, Devargadde, Sulgár, Hulgán, Komadi, and Balekhani. In these all the evergreen trees already mentioned except the *Calophyllum elatum* are found in plenty and of great size. Besides evergreens the Mágod and Hegumbli forests have a good deal of teak and much very large *Terminalia tomentosa* and *Lagerstroemia microcarpa*. These forests are easy to work. Elephants drag the timber to the Bedti river down which it is floated thirty-five miles to the Gangávali timber store. The large bamboos seeded in 1866-67, and the young crop has been in use for the last two years. The remaining forests are back from the Sahyádris and between them and Yellápur. They have no teak, but splendid evergreen trees, and a good deal of *matti*, *kindál*, *nandi*, and *jámbe*. They have never been worked except to meet local wants. The large bamboos seeded in 1868 and are again nearly fit for use, but the crop is not so good as in other parts.

The Shigepál-Jogalepál group in the south-west is bounded on the north by the Katgeganeshgudi-Yellápur road, on the east by the Yellápur-Arbail road, on the south by Ankola, and on the west by the Kálinadi river and Kárwár. It includes the forests of thirty-two villages<sup>1</sup> with an area of 67,435 acres and a population of about 6200, mostly Havik Bráhmans, Maráthas, Christians and a few Sidis. The best forests are those of Arbail, Gullápur, Kodlagadde, Ambgaum, Vajrahalli, Honagadde, Targár, Bigár, Kalche, Kodsalli, and Barballi which join and together fill the upper and lower Sahyádris slopes. The leaf-shedding and evergreen forests share the hill sides and rival each other in excellence. Teak is plentiful on the lower slopes. It is not easily carried to the inland wood-stores, but from Arbail, Gullápur, Kodlagadde and Ambgaum it can readily be dragged to the Bedti and floated to the Gangávali wood store.

Analgár, Nandolli, Komadi, Hulgán, Balekhani, Jogadmane, Hastkargadde, Gopadmane, Hitlalkargadde, Kandikeri, and Sabgeri.

<sup>1</sup> The villages are Shigepál, Tatgár, Huttakmane, Hirigál, Lingadbail, Donagár, Bálginane, Gharvás, Idgundi, Haunsangadde, Balgár, Barballi, Báginkatte, Chimanhalli, Telangeri, Arbail, Gullápur, Kodlagadde, Ambgaum, Honagadde, Vajrahalli, Targár, Bigár, Kodsalli, Kalche, Marhalli, Kánur, Bára, Mávmane, Benadguli, Chikkumane, and Jogalepál.



The produce of the other forests is easily floated down the Kálinadi to Kodibág. Teak and other first class woods return a good profit whether sent by the Kálinadi or Bedti-Gangávali rivers. Besides teak there is an immense quantity of grand *matti*, *kindal*, *Arjuna* and *nandi*, a good deal of it available for inland use. The evergreen forests on the upper slopes are crowded with lofty trees of the usual evergreen varieties.<sup>1</sup> Among them the *murqalmara* *Garcinia purpurea* is very common and highly valued for its acid pleasant fruit, and *kokam* oil. The bamboos seeded in 1866-67, and the young crop has been fit for use since 1879. Next to the south are the forest tracts of Mávinmane, Benadguli, Marhalli, Báre, and Kánur. Except some patches of evergreen in the upper slopes and some fine timber in the lowest slopes, these forests have been spoiled by wood-ash tillage.<sup>2</sup>

Besides the forests of this group already described, those of Hirigál, Balgár, Báginkatte, Chimanhalli, and Tellangeri are worthy of note for their splendid evergreen timber which has the special value of being not more than ten miles from the Yellápur store. The less wooded tracts between Yellápur and the great Sahyádri forests contain fair but not very valuable timber. The bamboos of the forests near Yellápur seeded in 1868-69, but except in a few choice spots, the young crop is not yet fit for use.

The minor products of the Yellápur forests are myrobalans, soapnuts, honey, cinnamon, wild pepper, grass, and canes. Myrobalans and the small crop of soapnuts are gathered by the forest department; cinnamon honey and wild pepper are farmed; grass and canes may be cut free of charge for local use, but a yearly fee of 3*d.* (2 *ans.*) a head is levied on all cattle grazing in forest reserves. Before the 1876 famine the largest recorded export of bamboos was 183,599. During the famine year it fell to 44,943. It has again risen from 93,825 in 1879-80 to 116,200 in 1880-81, and to 484,700 in 1881-82. The export fee is the same as in Haliyál 6*s.* (Rs. 3) the hundred for large bamboos, 4*s.* (Rs. 2) the hundred for middle-sized bamboos, and 2*s.* (Rs. 1) the hundred for small bamboos. During the last few years forest fires have been fairly kept down.

The Mundgod forests are bounded on the north by the Bedti river, on the east by Bankápur and Hángal in Dhárwár, on the south by Sirsi, and on the west by the Bedti river. The forest includes the lands of ninety-one villages with an area of 103,599 acres, of which 35,295 are reserved and 68,304 are protected,<sup>3</sup> and a population of about 15,800. They are divided into five groups, two in the west with reserved forests, and three in the east where no forests have been reserved. The two western blocks are Yerebail-Ráyanhalli in the north-west with seven villages and 34,650 acres, and Chikka-Havalli-Halharvi in the south-west with eight villages and 10,900 acres. The three eastern blocks are Hulihond-Kúsur in the north-east with twelve villages and 14,700 acres, Hire-Bachanki-Nyásargi in the east with thirty-one

## Chapter II. Production.

Forests,  
Yellápur.

Mundgod,

<sup>1</sup> See above p. 40.

<sup>2</sup> This has been reduced to 127 acres in 1880 and 125 acres in 1881.

<sup>3</sup> Government Resolution 5569, 20th October 1880.

## Chapter II.

## Production.

## Forests.

## Mundgod.

villages and 24,300 acres, and Hanmápur-Boranágudi in the south-east with thirty-three villages and 19,000 acres. The Yerebail-Ráyanhalli group, mostly along and back from the Bedti river, includes the lands of seven villages<sup>1</sup> with an area of 34,655 acres, of which 29,245 are reserved and 5410 protected, and a population of 869, mostly Marátha-Kunbis, Vadars, Dhangar-Gavlis, and Christian Sidis. Most of this area is high mixed forest with good teak and the other varieties of leaf-shedding trees given under Yellápur. Besides these forests grassy glades occur here and there with *gela* *Randia dumetorum* and *pendri* *Randia uliginosa* bushes. These glades were cleared by the cattle-keeping Dhangar-Gavlis who formerly infested these forests and lived alternately between them and Maisur. There is an abundant supply of the three kinds of useful bamboos. The large bamboo seeded in 1868-69 and the young crop is not yet fit for use. These forests have been sparingly worked for the last twenty years. They still contain large quantities of teak and other useful timber. The produce is taken either twelve miles west to Yellápur or about the same distance east to Mundgod. Felling and carrying charges come to £1 5s. (Rs. 12½) the ton of fifty-two cubic feet and the sale price varies from £4 16s. to £6 8s. (Rs. 48 - Rs. 64) for teak and from £3 4s. to £4 (Rs. 32 - Rs. 40) for other timber. This group has no evergreen forests.

The Chikka-Harvalli-Hálharvi group in the south-west includes the lands of eight villages<sup>2</sup> with an area of 10,964 acres, of which 6050 are reserved and 4914 protected, and a population of 458, chiefly Maráthás, Lingáyats, Vadars, Dhangar-Gavlis, and a few Dravid Bráhmans. This group is well stocked with teak and other fine timber. It has been worked for the last sixteen years. At the Singanhalli wood store about nine miles from the forests, felling and carrying charges amount to £1 0s. 6d. (Rs. 10¼) the ton of fifty-two cubic feet. The sale price varies from £6 to £10 (Rs. 60 - Rs. 100) for teak and from £4 to £10 (Rs. 40 - Rs. 100) for other timber. The *honi* grows to a remarkable size in these forests, and is a great favourite in Dhárwár, often fetching as high a price as the best teak. To the large evergreen forest at Kurli wild elephants used to come from Soráb in Maisur. Their last visit was in 1868. This Kurli forest has *baini* *Caryota urens* or sago-palm and the usual lofty varieties of evergreen trees. Bamboos abound. The large bamboo seeded in 1868-69 and the young crop is not yet fit for use. The forests in the east of Mundgod stretching from Hulihond north to Yamgalli near Badangod in Sirsi are thin but valuable for their teak and sandalwood. They are all protected and are divided into three groups: Hulihond-Kusur in the north, Hire-Bachanki-Nyásargi in the centre, and Hanmápur-Boranágudi in the south. The Hulihond-Kusur group in the north-east includes the lands of twelve villages<sup>3</sup> with an area of 14,718 acres and

<sup>1</sup> The villages are Yerebail, Bálehali, Gunjávati, Mainhalli, Belaginhalli, Kalkeri, and Ráyanhalli.

<sup>2</sup> The villages are Chikka-Harvalli, Dodda-Harvalli, Attanagi, Rámápur, Kodambi, Bomarshikop, Kurli and Hálharvi.

<sup>3</sup> The villages are Hulihond, Nandikatti, Agadi, Hunagund, Attiveri, Vadagatti, Arshinageri, Majjigeri, Indur, Kop, Ugginkeri, and Kusur.

Chapter II.  
Production.

Forests.  
*Mundgod.*

a population of about 3700, mostly Dravid Bráhmans, Lingáyats, Musalmáns, Maráthás, Buruds, and Vadars. The forests are very thin except in Ugginkeri, Hulihond, and part of Nandikatti, which are well stocked with trees of fair growth, chiefly teak, *matti*, *kindal*, *hovi*, and *dindal*. There is also much sandalwood *gandha* Santalum album, and large quantities of bamboos. The large bamboo seeded in 1872-73 and the young crop is not yet fit for use. The forests of this group have not been worked for profit and timber has been cut only to meet local wants. As the sandalwood matures, it is gathered and sent to Sirsi where the felling and carrying charges come to from 16s. to £1 (Rs. 8-Rs. 10) and the sale price varies from £12 to £13 (Rs. 120-Rs. 130) the *khandi* of 560 pounds. The Hire-Bachanki-Nyásargi group occupies both sides of the road between Sirsi and Mundgod from a little north of Mundgod to the Singanhalli wood store. It includes the lands of thirty-one villages with an area of 24,298 acres and a population of 5730, mostly Dravid Bráhmans, Lingáyats, Maráthás, Vadars, Buruds, and Musalmáns.<sup>1</sup> Though as a rule thin, most of the forests have here and there a promising growth of young teak, *matti*, *kindal*, *dindal*, *shisham*, and sandalwood at certain favoured places near streams where the soil and shelter are good. Bamboos of three kinds are found but not to the same extent or so well grown as in the cooler west. The large bamboo seeded in 1872-73 and the young crop is not yet fit for use. Some cuttings begun in 1879 are still going on in the Sanavalli forests, where old and fire-damaged trees are being cut and worked into field-tools. These field-tools are in great demand and sell at 3d. to 1s. (*ans.* 2-8) each, people coming fifty or sixty miles from parts of Dhárwár and taking cart-loads.

The Hanmápur-Boranágudi group in the south-east occupies both sides of the Sirsi-Mundgod road from the Singanhalli wood store to near Badangod in Sirsi. It includes the forest lands of thirty-three villages with an area of 18,965 acres and a population of 5055, mostly Dravid Bráhmans, Lingáyats, Maráthás, Vadars, Musalmáns, and Buruds.<sup>2</sup> The forests are much the same as those of the Hire-Bachanki-Nyásargi group, only that there is less teak and *dindal* and more *muttal* Butea frondosa. Jambekop, Siddápur, Jalgeri, Naginkeri, Bikod, Kalebail, Janageri, and Hallikop are also much heavier-wooded than the general run of frontier lands, and in Hallikop there is a fair-sized evergreen forest with numerous lofty trees. This patch of evergreen forest used to be visited by wild elephants from Maisur. The forests of this group have not been worked. Only sandalwood as it matures is gathered and sent to Sirsi. Bamboos of three useful

<sup>1</sup> The villages are Hire-Bachanki, Pura, Tattihalli, Teginkop, Tamyánpop, Karguli, Chavdalli, Kálgankop, Malvalli, Lákoli, Tumbargi, Andalgi, Kalhalli, Hirehalli, Mávkop, Kávákkop, Alhalli, Mundsáli, Kanvi-káthur, Chigalli, Hoskop, Sálgávi, Ajjihalli, Bapalkatti, Bapalgundi, Sanavalli, Kargankop, Malgankop, Kundargi, Mundgod, and Nyásargi.

<sup>2</sup> The villages are Hanmápur, Nágnur, Káthur, Shinganhalli, Margadi, Hulihond, Borangguáde, Voralgi, Hudelkop, Bhadrápur, Pála, Ingalgi, Kalkop, Kadabgeri, Ghotgadi, Kop, Hallikop, Jambekop, Siddápur, Kolgi, Malgi, Jalgeri, Naginkeri, Bikod, Kalebail, Janageri, Gungsur, Andebail, Harganhalli, Virápur, Kyádikop, Yemagalli, and Boranáguádi.

**Chapter II.**  
**Production.**

Forests.  
*Mundgod.*

kinds are met with, but in abundance only in the west. The large bamboo seeded in 1872-73 and the young crop is not yet fit for use.

The minor products of the Mundgod forests are honey and grass. There are very few myrobalans or soapnuts. The honey farm is sold yearly. Grass may be cut free; but cattle grazed in the reserves pay a yearly head-fee of 3*d.* (2 *annas*). Before the 1876 famine the largest recorded export of bamboos was 282,501, in 1876 the number fell to 114,792, in 1879-80 it was as high as 376,062, but in 1880-81 it again fell to 272,496. The export fee is the same as in other sub-divisions.<sup>1</sup> Fires are very common. Many if not most are wilful, the people firing the forests either to increase the quantity of dead wood, or in pursuit of game.

*Ankola.*

The Ankola forests are bounded on the north by Kárwár and Yellápur; on the east by Sirsi and Kumta; on the south by Kumta; and on the west by the Arabian Sea. They include the lands of eighty-two villages and have a measured area of 183,715 acres or 287.05 square miles, of which 82,060 acres or 128.21 square miles are reserved and 101,655 acres or 158.84 square miles are protected.<sup>2</sup> The chief forests classes, who number about 33,800, are Halepaiks, Hálvakki-Vakkals, Havik Bráhmans, Nádigars, Karivakkals, Musalmáns, and a few Christians. The country is hilly. Along the north and north-west the forests on the hill tops and higher slopes have suffered severely from wood-ash tillage, but the lower slopes, the dells, and the Gangávali valleys are well wooded. Splendid high mixed forests stretch up the Gangávali valley and in the neighbouring hills from near Agsur to the border of Yellápur and Sirsi. The forests may be divided into five groups: three in the richer eastern tract, Kuntguni-Brahmur in the extreme south-east, with twenty-one villages and 26,880 acres; Shávkár-Shirguni in the south-east, with eleven villages and 48,375 acres; and Kodlagadde-Hebbul in the east, with five villages and 29,670 acres; and two in the barer west, Heggármakigadde-Gule in the north-west, with nineteen villages and 54,400 acres; and Agsur-Shettikeri in the west, with twenty-six villages and 24,400 acres. The Kuntguni-Brahmur group in the extreme south-east is a splendid block of forests lying immediately below the Vaddi pass and between its crest and the Gangávali river. It runs about six miles along the Sahyádris with an average breadth of about seven miles or an area of about forty-two square miles, all reserved. It includes the forest lands of twenty-one villages<sup>3</sup> with a population of about 7450 mostly Hávik Bráhmans, Maráthás, Hálvakki-Vakkals, Mukáris, Nádigars, Ambigars, Musalmáns, and a few Christians.

The forests along the Sahyádris are mostly evergreen. Though marred by former wood-ash tillage they have some splendid trees. Below the Sahyádris and towards the Gangávali, many parts of the leaf-shedding forests are very fine, with magnificent *matti*, *kindal*,

<sup>1</sup> See above p. 43.

<sup>2</sup> *Government Gazette*, 28th October 1880.

<sup>3</sup> The villages are Kuntguni, Gundabála, Morahalli, Mogata, Andle, Kárbail, Balále, Takatgeri, Kenkane-Shivápur, Mulvari, Devigadde, Sagadgeri, Kámage, Adigon, Agrágon, Hegre, Jug, Angadibail, Mánigadde, Kabgál, and Brahmur.

*hovi, nandi, heddi, ságdí, jámba, and khair* in the south. This group has never been worked. It was formerly in Kumta and was transferred to Ankola in 1880.<sup>1</sup>

The Shávkár-Shirguni group to the north of the last group has also splendid timber. It includes the lands of eleven villages<sup>2</sup> with an area of 48,375 acres, of which 31,684 are reserved and 16,691 are protected, and a population of 2518. Good sized teak is found sparingly over the higher ground. The chief and largest trees are the *Terminalias, tomentosa, paniculata, and Arjuna*; *Lagerstroemia microcarpa, Terocarpus Marsupium, Adina cordifolia, Xylia dolabriformis, and Schleicheria trijuga*. Fine patches of evergreen forest, notably near the Mushki pass, are also found along the hills and in the ravines, with all the usual varieties of evergreen trees. Fine canes and palms are also abundant. Formerly much timber used to be cut and sent to the coast, but for more than sixteen years, except that dead wood has been taken from them, these forests have had rest.

The Kodlagadde-Hebbul group to the north of the Gangávali includes the lands of five villages,<sup>3</sup> with an area of 29,671 acres, of which 22,114 are reserved and 7557 are protected, and a population of 1213. The trees are the same and are equally well grown with those of the Shávkár-Shirguni group. There is a good deal of fair sized teak, and evergreen patches are common along the hills and in the ravines. The *Calophyllum elatum* or Poonspar is not found. In 1878-79 about 800 tons of teak and other timber were cut and sent to the Gangávali wood store. Since then, except for dead wood cuttings these forests have had rest. The felling and carrying charges amounted to £2 4s. (Rs. 22) the ton of fifty-two cubic feet, and the sale price varied for teak from £4 16s. to £6 8s. (Rs. 48-Rs. 64), and for other timber from £3 4s. to £4 16s. (Rs. 32-Rs. 48) a ton. In the protected forests of Kattinhakla and Kaulalli arrangements were made at the time of the survey settlement for a yearly grant of  $13\frac{1}{10}$  acres for wood-ash tillage. To meet this  $139\frac{2}{3}$  acres of thick scrub have been marked off, and to this the wood-ash tillage is to be confined. The other less important forests to the north of the Gangávali are divided into two almost equal parts by the range of hills that runs from Agsur to the coast at Algeri. To the north of this ridge, the Heggármakigadde-Gule group includes nineteen villages<sup>4</sup> with an area of 54,401 acres of which 28,262 are reserved and 26,139 protected. The population numbers about 5600. These forests have greatly suffered from wood-ash tillage, all the hill tops and higher slopes having been left bare or covered with close scrub. In the dells are some scattered patches of forests and along both sides of the Avarsa which rises on the Sikli-Turli,

## Chapter II. Production.

Forests.  
Ankola.

<sup>1</sup> Government Notification 6535, 10th December 1880.

<sup>2</sup> The villages are Shávkár, Heggár, Dorangera, Kalleshvar-Sirasgaum, Kakali, Halvalli, Muski, Dongri, Hillur, Kammáni, and Shirguni.

<sup>3</sup> The villages are Kodlagadde, Sunksál, Kattinhakla, Kaulalli and Hebbul.

<sup>4</sup> The villages are Heggármakigadde, Kanchimale, Marrugadde, Shevegule, Sikli-Turli, Kendije, Lakkeguli, Malláni, Heggarni-Kotebhávi, Nellur-Kunchibál, Berde, Algeri, Hattikeri, Belikeri, Avarsa, Hárvád, Sakalben, Varilben, and Gule.

**Chapter II.**  
**Production.**

Forests.  
Ankola.

Sheveguli, and Kendije hills are tracts of fairly high forest. Some evergreen patches have also escaped the axe of the wood-ash tiller. These forests have not been worked for profit. Except some dead wood for poles and firewood no timber has been cut. The trees are the same as in other parts of Ankola, only they are much smaller. *Khair* is the prevailing tree all over the lower lands towards the coast. It is extremely valuable and has been strictly protected since 1873. At the time of the forest settlement a yearly grant of  $217\frac{3}{40}$  acres for wood-ash tillage was made in the protected forests of Shevegule, Mallani, Kendije, Lakkeguli, Sikli-Turli, Hegarni-Kotebhávi, and Kanchimale. To meet this grant 1810 acres of dense scrub were marked off, and to this area wood-ash tillage is now restricted.

The Agsur-Shetikeri group to the south of the Algeri hills includes the lands of twenty-six villages<sup>1</sup> with an area of 24,388 acres of protected forest and a population of 9635. These forests have suffered so severely from wood-ash tillage that the hill-sides are covered with a dense mass of thorny scrub instead of with forest. Over the lower lands also the forests are thin and poor. The trees are the same as in the Heggármakigadde-Gule group to the north of the Algeri hills, only they are still smaller and patches of evergreen are rarer. The prevailing tree is the valuable *khair* Acacia Catechu, and this since 1873 has been strictly protected with the best results. These forests are not worked for profit and no timber is cut except to meet local wants. Wood-ash tillage has been completely stopped. The bamboo which is found in large quantities, seeded in different parts of Ankola between 1868 and 1875. The new crop promises well, but is not yet fit for use.

The minor products are myrobalans, soapnuts, honey, cinnamon, catechu, grass, and canes. Myrobalans and soapnuts are gathered by the Forest Department; the others, except the canes which are free and much used for baskets, are farmed.

Kumta.

The Kumta forests are bounded on the north by Ankola, on the east by Sirsi and part of Siddápur, on the south by Honávar and part of Siddápur, and on the west by the Arabian Sea. The forests include the waste and forest lands of 109 villages with an estimated area of about 260 square miles of forest and with a population of about 31,300. None of it has yet been marked off as reserved.

The forests lie between the water-shed of the Sahyádris and the sea. Except some heavy evergreen forests along the Sahyádris, which either traditional sacredness or the size of the timber protected from the axe of the wood-ash cultivator, and in some valleys and dells, the forests have everywhere suffered severely. Still in favourable places sixteen years of protection have done much to change dense scrub into young forest. On the lower slopes and parts nearer cultivation the better kinds of trees have been replaced

<sup>1</sup> The villages are Agsur, Adlur, Navgadda, Sirkuli, Boleguli, Bagribail, Shedgeri, Hosgadde, Vandige, Bole, Talgadda, Sirgunji, Vasarkudrige, Belse, Surva, Belambár, Shinganmakki, Hadav, Kangil, Honnebail, Hichkad, Kodsani, Shirur, Bilehoyange, Manjuni, and Shetikeri.

by the hardier and valuable Acacia Catechu, which more readily than most trees adapts itself to poor and worn-out soils.

The forests form four groups, in the east two better groups nearer the hills, and in the west two poor groups nearer the sea. The eastern groups are Morse-Uppinpattan in the south-east with twenty-seven villages and about 41,600 acres, and Hebbail-Yelvalli in the east with eight villages and 32,000 acres. The poorer coast groups are Antravalli-Bhandvá in the north with twelve villages and 34,000 acres, and Hosád-Manki in the south-west with nine villages and 20,500 acres.<sup>1</sup> The best forests are in the Morse-Uppinpattan group, in the south-east in the valley of the Tadri river and its tributary the Bennihalla and along the neighbouring hills between Uppinpattan and the Nilkund and Doddamani passes. This group includes the forests of twenty-seven villages<sup>2</sup> with an approximate area of 41,600 acres or sixty-five square miles and a population of about 3000, chiefly Hávik Bráhmans, Maráthás, Halepaiks, Karivakkals, Musalmáns, and a few Christians. The greater part is good mixed forest with teak; best in the east but it is everywhere damaged by wood-ash tillage. Of leaf-shedding trees *matti* and *kindal* are the commonest with much *khair* on the lower ground. There are also heavy evergreen forests of which the best is in the Nilkund pass with poonspar and a little ebony, besides the usual large and lofty evergreen trees.

The next best forests are the Hebbail-Yelvalli group, to the north of the last group along both sides of the Devimane pass road between Sirsi and Kumta and stretching from the crest of the Sahyádris at Devimane to the foot at Katgál. This group includes the lands of eight villages<sup>3</sup> with an area of 32,000 acres or fifty square miles and a population of 851, mostly Hávik Bráhmans, Maráthás, Karivakkals, Halepaiks, and Musalmáns. Though wood-ash tillage was formerly very general, there are some fine stretches of good timber, notably the splendid evergreen forests on both sides of the Devimane pass-road with many poonspars, *Calophyllum elatum*, and other lofty trees. There is little teak, but there are fine *matti*, *kindal*, *nandi*, *hedde*, *jámbe*, *manjuti*, *sagdi*, and a great deal of *khair*. In the evergreen forests there is also a good deal of those fine woods, the *balge* *Vitex altissima*, and the *angeli* *Artocarpus hirsuta*; and the useful *baini* *Caryota urens* or wild sago-palm, and the valuable *tálipat* palm *Corypha umbraculifera*.

The Antravalli-Bhandvá group occupies the north of the sub-division between the Tadri river where it changes its course near Uppinpattan and the Ankola sub-division, having for its eastern limits the villages of the Hebbail-Yelvalli group. It includes the lands of twelve villages<sup>4</sup> with an approximate area of about fifty-three square

<sup>1</sup> Of 109 forest villages, only fifty-six have been arranged in groups; the remaining fifty-three which are small and more or less mixed with cultivation, cannot be arranged until the final settlement.

<sup>2</sup> The villages are Morse, Shamemane, Sappinahosalli, Mudanhalli, Meddhini, Ullurnath, Honageri, Amboli, Harvalli, Algár, Hindabail, Hegadihosalli, Basolli, Sántgal, Divalli, Santeguli, Bastikeri, Bengane, Chimalli, Kavalade, Mudlige, Kalve, Kandale, Malvalli, Hallvalli, Sirgunji, and Uppinpattan.

<sup>3</sup> The villages are Hebbail, Anegunde, Sántur, Belange, Alkod, Yán, Mattolli, and Yelvalli.

<sup>4</sup> The villages are Antravalli, Divgi, Mirján, Kodkani, Mugvekenvadi, Nagur, Betkuli, Bargi, Hiregutti, Kolimanjuni, Mádangeri, and Bhandvá.

## Chapter II.

### Production.

Forests.

Kumta.

Chapter II.  
Production.

Forests.  
Kumta.

miles or 33,920 acres, and a population of about 7000, mostly Sárasvat and Sásastkar Bráhmans, Nádigars, Halepaiks, Hallakki-vakkals, Grámvakkals, Sherugars, Mukaris, and a few Havik Bráhmans, Musalmáns, and Christians. The forests are everywhere thin and have suffered much from wood-ash tillage. The chief leaf-shedding trees are, besides *khair* which is commonest, *matti*, *kindal*, *jamba*, and some *kásarkán* or *Nux vomica*. In the evergreen forests there are the usual varieties including the *rámpatri* *Myristica laurifolia*, *dálchini* *Cinnamomum iners*, and the *baini* or sago palm.

The fourth or Hosád-Manki group occupies the south of the sub-division south of the Tadri river, and between the sea and the west boundary of the first group near Sántgal. It includes the forest lands of nine villages<sup>1</sup> with an area of about thirty-two square miles or 20,480 acres, and a population of about 5900 souls belonging to the same classes as the people of the third group, except that there are no Nádagers or Shevugárs and that Hávik Bráhmans are more numerous. There are many betelnut gardens, *khair* is the prevailing tree, and all the varieties given for the Antravalli-Bhandvál group occur. There are some evergreen forests but of no great size. Wild pepper is gathered in the evergreen forests of Kallabbe and Murur.

The large bamboo seeded all along the coast in 1863-64 and in the inland parts during 1865-66. They were reproduced from self-sown seed and are now in use. The minor products are myrobalans, soapnuts, honey, cinnamon, wild nutmegs, wild pepper, vegetable ivory of the *Corypha umbreculifera* or *tálipat* palm, *shembe* bark, and canes. Myrobalans and soapnuts, which are not very plentiful, are gathered by the forest department, the other products, except canes which are free, are farmed.

Sirsi.

The southern division includes the forests of Sirsi, Siddápur, Honávar, and Bhatkal. Except Sirsi none of these forests have been marked off as reserved. The Sirsi forests are bounded on the north by Yellápur and Mundgod; on the east by Maisur and part of Hángal in Dhárwár; on the south by Maisur and Siddápur; and on the west by Kumta and Ankola. The forest area, including the lands of 269 villages, is calculated at 700 square miles. Of the 269 villages 131 have been surveyed. Of the 131 surveyed villages the forests of 122 have been settled, 103 ranking as protected and nineteen as reserved. The forest area may be divided into two belts, to the east and to the west of the Sirsi-Yellápur road which passes north and south through the heart of the sub-division. In the eastern belt there are six and in the western belt there are three forest groups. Beginning from the north the six eastern groups are Bilki-Bhartanhalli in the extreme north with eleven villages and an estimated area of 38,400 acres; to the south Devarkallahalli-Adanhalli with eleven villages and 20,480 acres; to the east Basavankopp-Bhedasgaum with nineteen villages and 30,300 acres; to the south Sampekopp-Navánageri

<sup>1</sup> The villages are Hosád, Kallabbe, Karkimakhi, Murur, Hegale, Kujjali, Konalli, Urkeri and Manki.



Chapter II.  
Production.Forests.  
Sirsi.

with fifty villages and 27,000 acres; to the east Hallikopp-Kadgod with thirty-three villages and 17,000 acres; and in the extreme south Kerkop-Mogavalli with twenty villages and 10,700 acres. Beginning from the north the three west belts are in the north-west Kadbál-Hulekal with eleven villages and 48,000 acres; in the west Manjguni-Devimane with eight villages and 33,280 acres; and in the south-west Kalgár-Shivgávi with eighteen villages and 118,400 acres.<sup>1</sup> The Bilki-Bhartanhalli group in the extreme north of the sub-division is still unsurveyed. It includes the forest lands of eleven villages,<sup>2</sup> with an approximate area of about sixty square miles and a population of about 600, mostly Hávik Bráhmans, Maráthás, Karivakkals, and a few Lingáyats, Sidis, and Musalmáns. There is abundance of fine teak and splendid *matti*, *kindal*, *nandi*, *shisham*, and *honi*, the *honi* unusually common and of great size. There are no evergreen forests and there is little cultivation. This splendid group, when settled, will form part of the great reserved block of not less than 200 square miles that is to be chosen from the best forests of Sirsi, Yellápur, and Mundgod. The large bamboo, which is almost the only kind, seeded in 1872-73. The new crop is splendid and is nearly fit for use. The forests of this group have been worked regularly since 1867. For the first four years dead wood alone was gathered and taken to the Kátur-Singanhalli store. But since 1871 as the supply of dead-wood fell short of the demand 350 standing trees, each about fifty cubic feet, have been yearly felled and brought to the store. The average distance of the group from the store is fourteen miles. The felling and carrying charges amount to £1 6s (Rs. 13) the ton, and the sale price varies from £4 16s. to £10 (Rs. 48-Rs. 100). The *honi* is much fancied owing to its fine qualities and great size, and commands a better price even than teak.

The Devarkallahalli-Adanhalli group lies to the south of this block and also to the east of the Sirsi and Yellápur road. It includes the forest lands of eleven villages<sup>3</sup> with an area of thirty-two square miles and a population of about 1820, almost entirely Háviks, Maráthás, and Hálepaiks with a few Musalmáns. Nearly the whole area is of leaf-shedding forests a good deal broken by spice gardens and rich cultivation with considerable pollarded tracts or *bettás*. Still some parts bear splendid *honi*, *matti*, and *kindal*, besides many other choice trees and a little sandalwood. The large bamboo, which is almost the only kind, seeded in 1872-73 and a splendid new crop is coming on. Timber is sent to Sirsi at a cost of 18s. (Rs. 9) a ton and sold at £2 to £4 (Rs. 20-Rs. 40). But there is little demand from Sirsi as other stores are better placed for the plain district to the north-east.

The Basvankopp-Bhedaugaum group in which are nineteen reserv-

<sup>1</sup> Of 269 forest villages, the chief 181 villages have been arranged in groups; the remaining eighty-eight will be arranged at the final settlement.

<sup>2</sup> These villages are Bilki, Málkopp, Shirnále, Hotgeri, Mádangi, Jakkalli, Hullarmani, Jadjankopp, Bhendigeri, Savani, and Bhartanhalli.

<sup>3</sup> The villages are Devarkallahalli, Kanenhalli, Kundargi, Sonda, Malenhalli, Arsapur, Hulgol, Belali, Shivalli, Bappanhalli, and Adanhalli.

Chapter II.  
Production.

Forests.  
Sirsi.

ed forests, lies to the east of the Devarkallahalli-Adanhalli group. These lands like the Bilki group border on the best forest of Yellápur in the north and of Mundgod in the east, and will be formed with them into one great reserve. The group includes the forests of nineteen villages<sup>1</sup> with an area of 30,336 acres of which 21,777 are reserved and 8559 protected. The population is 628, mostly Shenvi and Hávik Bráhmans, Maráthás, Halepaiks, Sonárs, Lingáyats, Vadars, Karivakkals, Sidis, Musalmáns, and a few Christians. Except in Togarhalli and Bhedasgaum where there are evergreen patches the whole forest is of leaf-shedding trees. The first twelve villages have teak, but except in Chippgeri, Amatgár, Kanchikopp, and Attabail, it is small. Unlike the teak the other trees are of great size.<sup>2</sup> There is also some sandalwood and bamboos of four useful kinds. The large bamboo seeded in 1872-73, but the new crop is not yet fit for use. In the evergreen forests of Bhedasgaum and Togarhalli there are the usual varieties of evergreen trees<sup>3</sup> and abundance of *baini* or sago-palm. Wild elephants from Maisur last visited these forests in 1868. Except to meet local wants no timber has been felled in this group for twenty years.

The Sampekopp-Navánageri group of settled villages lies to the south of the Basavankopp-Bhedasgaum group in the fourteen miles of hill ranges between them and Sirsi. It includes the forests of fifty villages<sup>4</sup> with an area of 26,965 acres and a population of about 4900, much like the people of the Basavankopp-Bhedasgaum group except that there are more Lingáyats. Most of these forests are evergreen, some of them large with fine lofty trees and wild sago-palms.<sup>5</sup> In the best evergreen forests in Benage, Ekkambi, Hebballi, Gonur, Halgadde, Yesale, Sugaum, Kalgundikopp, Unachvalli, Bidarhalli, and Navánageri is abundance of fine jack, *Artocarpus hirsuta* and *angeli* *Artocarpus integrifolia*, *balge* *Vitex altissima*, *bakul* *Mimusops elengi*, and *devdari* *Cedrela Toona*. In the leaf-shedding forests are all the usual trees.<sup>6</sup> They are of fair size but not to be compared to the trees in the Basavankopp group. Much sandalwood is found all over this group and bamboos are common but neither so abundant nor so good as in the Basavankopp forests. The large bamboo seeded in 1872-73 and some of the new crop is fit for use. Timber was taken from the Mádankeri, Malalgaum, Doddanhalli, and Mávinkopp forests in 1864 and sold at the Ekkambi store. None has since been felled except for local wants.

<sup>1</sup> The villages are Basvankopp, Tattihalli, Gánadhali, Chittgeri, Chalgeri, Chippgeri, Amatgár, Umachgeri, Virápur, Kanchikopp, Hasalmani, Attabail, Bellambe, Shánvalli, Bijankopp, Tenkal, Umachgi, Togarhalli, and Bhedasgaum.

<sup>2</sup> The chief other trees are *matti*, *kindal*, *honi*, *nandi*, *jamba*, *hedde*, *goddahrunshi*, *beláti* and *dindal*.

<sup>3</sup> See above p. 40.

<sup>4</sup> The villages are Sampekopp, Hostot, Bálekopp, Anagodkopp, Ullal, Muddebail, Vadgeri, Surgar, Jánmandi, Tuilkopp, Hudelkopp, Bisalkopp, Benage, Bugadikopp, Malalgaum, Ekkambi, Hebballi, Mavinkopp, Sannakeri, Kuppali, Bilur, Achanhalli, Pur, Isur, Hulidevansaru, Gandhalli, Narebail, Gánageri, Gongatte, Doddanhalli, Gonur, Halgadde, Madankeri, Kamankopp, Nurkalkopp, Husari, Landganhalli, Bhikkanhalli, Yesale, Bachgari, Basalikopp, Bilgerikopp, Kabbi, Halsinkopp, Suggaum, Kalgundikopp, Vaddinkopp, Unachvalli, Bidarhalli and Navánageri.

<sup>5</sup> The chief evergreen trees are given at p. 40.

<sup>6</sup> See above p. 40.

Chapter II.  
Production.Forests.  
Sirsi.

The Hallikopp-Kadgod group lies to the south of Mundgod, between the Sampekopp-Navánageri group and the east of the district, and passing south to the Banvási-Sirsi road. It includes the forest lands of thirty-three villages<sup>1</sup> with an area of 16,893 acres and a population of about 5850 of the same classes as in the last group except that Lingáyats are more numerous. This group has many evergreen forests, some of them large, notably those of Bankahal, Kandraji, Margundi, Kalkardi, Bengali, Madarhalli, Hadligi, Kanakapur, and Gudnapur. The trees are the same as in the Sampekopp forests quite equal to them in size, and with great numbers of *baini* or sago-palm. The wild Maisur elephants in their visits to Kánara generally passed through the evergreen forests of Hadligi and Margundi. The leaf-shedding forests of this group are fair and contain much excellent timber. There is no teak, but sandalwood is everywhere plentiful. Bamboos occur, but are not nearly so good or so abundant as in the other large groups. The large bamboo seeded in 1872-73. In 1864 some logs were brought from the Phársi forests to the Banvási store. Except this there has been no cutting in this group.

The Kerkopp-Mogavalli group, to the south of the Sirsi-Banvási road, includes the forest lands of twenty villages<sup>2</sup> with an area of 10,689 acres and a population of 4760, mostly Lingáyats but also many of the classes before named. There is no teak and the leaf-shedding forests are thin except those of Kalli, Kop, and Kogodu, where are excellent *matti*, *kindal*, and *honi*. There is much sandalwood but little bamboo. The large bamboo seeded in 1872-73. There have been no recent cuttings. Many years ago some fine timber, mostly *honi* *Pterocarpus Marsupium*, was taken to build large houses in Sirsi. Every year as it matures, the sandalwood is gathered. The cost of preparing and carrying it to Sirsi is about 14s. (Rs. 7) the *khandi* of 560 pounds, and the sale price varies from £12 to £13 10s. (Rs. 120 - Rs. 135). There are a few evergreen forests of no great size. Those of Bhási and Narur are the best.

The condition of the western forests between the Yellápur-Sirsi road and the Sahyádris is not nearly so good as that of the north and north-eastern forests. The western forests have suffered from wood-ash tillage, from grazing clearings, and from leaf-lopping. Wood-ash tillage and grazing clearings have been stopped and leaf-loppings restricted to eight acres of forest or every acre of garden. Still there is a large unsatisfactory area, and in places even firewood has to be brought comparatively long distances. It is calculated that in this sub-division the area of garden land is not less than 5610 acres, requiring about 44,880 acres of forest and three-fourths of this area is

<sup>1</sup> The villages are Hallikopp, Kotikopp, Danaganhalli, Umude, Badanagod, Kálangi, Belankeri, Mattihalli, Kuppigaddi, Vaddal, Hoskopp, Bankanal, Málánji, Kandraji, Santvalli, Kirvatti, Phársi, Hebbatti, Kyádikopp, Andagi, Chandgeri, Margundi, Gudigeri, Kalkardi, Tandkopp, Bengali, Hárukopp, Hadligi, Kanakapur, Madarhalli, Venktapur, Gudnapur, and Kadgod.

<sup>2</sup> The villages are Kerkopp, Somanhalli, Uplikopp, Umblekopp, Gulikatti, Kalli, Kop, Kogodu, Sahasravalli, Mundigehalli, Kantrá, Ajarne, Banavási, Tigani, Lingamatti, Bhási, Narur, Kalkop, Chikkadugli, and Mogavalli.

Chapter II.  
Production.

Forests.  
Sirsi.

in and near the Sahyádris. The best of the west Sirsi forests is the Kadbál-Hulekal group in the north-west. It includes the forest lands of eleven villages<sup>1</sup> with an area of about seventy-five square miles and a population of about 1070, mostly Háviks, Maráthás, Karivakkals, and a few Musalmáns. The forest is alternately leaf-shedding and evergreen, and most of both is good. In the leaf-shedding forests there is some good teak near the Muski pass and the Bedti river and a fine growth of *matti*, *kindal*, *honi*, *nandi*, and other fine varieties. The evergreen forests have also very good trees especially near the Sahyádris and the Bedti. This block is not everywhere open to carts. Most of it is rough and scarred by streams and ravines. But the timber can always be dragged to the Bedti and floated to the coast.

The Manjguni-Devimane group stretches, with an average breadth of about two miles, for twenty-seven miles along the Sahyádris from near Muski in the north-west close to the Nilkund pass in the south-west. It includes the forest lands of eight villages<sup>2</sup> with an area of about fifty-two square miles, and a population of about 1840, mostly Háviks, Maráthás, and Karivakkals. Almost the whole group is evergreen forest crowded with fine and lofty trees including the *Calophyllum elatum* or poonspar. Most of the bamboos along the Sahyádris belong to the small kind. But in many parts the large bamboo is common; it seeded in 1866-67. The Kalgár-Shivgávi group in the south-west of the sub-division, between the Sahyádris and the Yellápur-Sirsi road, includes the forest lands of eighteen villages<sup>3</sup> with an approximate area of 185 square miles and a population of 6531, chiefly Háviks, Jains, Lingáyats, Maráthás, Karivakkals, Haslars, and Musalmáns, with a few Shenvis, Sárasvats, and Sonárs. The country abounds in splendid spice gardens and most of the forests are stripped for leaf manure or used as grazing grounds. Here and there are some fine evergreen groves whose sacredness has saved them from the axe. But except in these groves and some patches of leaf-shedding forest there is little but firewood. The *hirda* is found everywhere but does not grow to a large size. Sandalwood also occurs; bamboos are found only along streams and in cool woody spots. The minor products found in the Sirsi forests are myrobalans, soapnuts, honey, wild pepper, cinnamon, wild nutmegs, and canes. Myrobalans and soapnuts are gathered by the forest department, canes are free, and the other products are farmed.

The greatest recorded export of bamboos before the 1876 famine was 301,433. Since the famine the export has fallen to an average of about 160,000. Fires are common in the east except in the myrobalan tracts where they are well kept down.

<sup>1</sup> The villages are Kadbál, Shigehalli, Handimane, Modur, Nilkani, Naigár, Sálkani, Manadur, Devatimane, Menshigadde and Hulekal.

<sup>2</sup> The villages are Manjguni, Khursi, Badgi, Teppár, Hebbre, Bennagávi, Hosur, and Devimane.

<sup>3</sup> The villages are Kalgár, Toranási, Hedigemane, Bettalli-Bhagi, Kengeri, Voni-gadde, Valabhagi, Agsál, Hanmanti, Shivalli, Bomanhalli, Hásangi, Bandal, Manjguni, Sampkhand, Mattigár, Tarchalli and Shivgávi.

The Siddápur forests, none of which have been surveyed or demarcated, are bounded on the north by Sirsi; on the west by Honávar; and on the south and east by Maisur. They have an estimated area of 280 square miles and a population of about 31,000, chiefly Hávik and Shenvi Bráhmans, Lingáyats, Jains, Maráthás, Halepaiks, Karivakkals, Buruds, Haslars, Gramvakkals, and a few Musalmáns and Christians. Nearly one-half of the forests has been destroyed by wood-ash and grazing clearings or stripped for leaf manure. Clearing for wood-ash tillage and for grazing has been stopped and leaf-logging restricted. Still as every acre of spice garden requires eight acres of leaf-strippings and as there are 5146 acres of garden, over 40,000 acres or about one-fourth of the whole forest area is lopped for manure. The lopping and stripping for leaf-manure greatly injures and in time kills the trees. In many parts areas that were formerly lopping ground are now bare and much of what is now in use shows signs of being likely soon to become bare. The best forests are along the Sahyádris, those further inland, except some patches of preserved evergreen, being used almost entirely for leaf-stripping and branch-logging. For convenience of description the Siddápur forests may be divided into four groups, Balur-Nilkund to the north of the Muthalli river in the extreme north with sixteen villages<sup>1</sup> and an area of about seventy-four square miles; Muthalli-Bilgi south of the Muthalli river and north of the Siddápur Bilgi and Gundbala road in the centre with twenty villages<sup>2</sup> and seventy-five square miles; Aigod-Musvalli to the east of the Sirsi, Siddápur and Gersappa pass road with twenty-five villages<sup>3</sup> and sixty square miles; and the Kodkani-Dodmane group in the south-west between the Bilgi-Gundbala road and the Shirávti river with seventeen villages<sup>4</sup> and seventy-one square miles.

Separate population returns for each group are not available. It is denser in the north and east, and Lingáyats are specially numerous in the east and Havik Bráhmans near the Sahyádris. The Sahyádris forests in the south-west are the best. They are mostly all evergreen with splendid trees of great size and height. East of the Sahyádris the forests are chiefly leaf-shedding and have been greatly stripped and pollarded for leaf manure. The best part of the Sahyádris forest is in the Kodkani-Dodmane group in the south-west where a belt about four miles broad runs from the Gersappa falls to Malemane near the boundary of Honávar, and thence about twelve miles north along the slopes to Dodmane and the Lushington

## Chapter II. Production.

Forests.  
*Siddápur.*

<sup>1</sup> The villages are Balur, Kibbli, Bannige, Vunchalli, Shivalimane, Hutgar, Hingar, Vumbalmane, Halibail, Shirguni, Bidramane, Hulande, Herur, Karajgi, Vajigod, and Nilkund.

<sup>2</sup> The villages are Muthalli, Hosmanji, Husur, Kastur, Kunaji, Nidgod, Sampgod, Kattekai, Huvinmane, Kelginmane, Golgod, Bidrakan, Balgulli, Kodgebail, Mattige, Mogeagar, Kadvadi, Godlabilu, Harigar, and Bilgi.

<sup>3</sup> The villages are Aigod, Hasvante, Akunji, Arandur, Kalur, Heggekop, Malvalli, Dubbikop, Amblikai, Killar, Halgeri, Hulgod, Hosur, Holekop, Padvanbail, Kodtikop, Manganur, Sairgi, Siddápur, Kolagi, Kangod, Kavachur, Nejur, Korlakani, and Musvalli.

<sup>4</sup> The villages are Kodkani, Kudgund, Mattige, Tyashri, Keremane, Ettage, Bedkani, Menashi, Balgod, Kibli, Kyadige, Talekari, Gunjgod, Ahlvalli, Sasigoli, Kalkai, and Dodmane.

Chapter II.  
Production.

Forests.  
Siddápur.

falls near Hostot, giving a well wooded area of about forty-eight square miles. All through the Gersappa pass the road lies in a splendid forest of evergreen trees of great height and bulk. The finest are the poonspar or *surhonne mara* *Calophyllum elatum*; *bobi mara* *Calophyllum Wightianum*; the wood-oil tree or *challani mara* *Dipterocarpus Indicus*; the wild nutmeg tree or *jajikai mara* *Myristica laurifolia*; *bakul mara* *Mimusops Elengi*; the wild jack or *angeli* *Artocarpus hirsuta*; cinnamon or *dálchini* *Cinnamomum Tamala*; *balage mara* *Vitex altissima*; black dammer tree or *ral-dhupa mara* *Canarium strictum*; *doddele mara* *Sterculia alata*; the wild sago palm *baini* *Caryota urens*, and all or most of the other evergreen trees which are common to this class of forest in Kánara. The gamboge tree or *arsinagurgi mara* *Garcinia Morella* is very common, as it also is in most of the evergreen forests of the Siddápur sub-division. In the south-west block back from or east of the Sahyádris there is about twenty-three square miles of leaf-shedding forest of *matti* *Terminalia tomentosa*; *kindal* *T. paniculata*; *nana* *Lagerstrœmia microcarpa*; and *karmal* *Dillenia pentagyna*, but mostly stripped and pollarded for leaf manure and broken by betel gardens. There is also a good deal of *hirda* *Terminalia Chebula* and a little sandalwood. Curiously enough, there is a little teak three miles down from the Gersappa falls on the northern slope looking into the Shirávatí river.

The Aigod-Musvalli group in the south-east has also some evergreen forest in the extreme south, and from the extreme south stretches north along the eastern boundary little beyond Aigod, a distance of about fifteen miles by three and a half broad, that is an area of about fifty-two square miles. This forest is leaf-shedding, mixed with patches of evergreen, which are greatly stripped and pollarded for leaf manure. The evergreen trees are mostly of the same varieties as those already mentioned, only not so large, the leaf-shedding forests include an inferior growth of *matti* *Terminalia tomentosa*, *kindal* *T. paniculata*, and *nana* *Lagerstrœmia microcarpa* with a good deal of *hirda* *Terminalia Chebula*, sandalwood, and *moha* *Bassia latifolia*.

The central Muthalli-Bilgi group with its twenty villages and area of seventy-five square miles has also some heavy evergreen forests on its extreme western end, and again about Muthalli and along the river which takes its name from that village where the trees are large and fine like those before described as belonging to the south-west group. This group, on a rough estimate, contains some twenty miles of evergreen forest, the rest is leaf-shedding with the same trees such as *matti*, *kindal*, *nana*, *karmal*, *moha* and sandalwood, only that the trees are better grown and there is also *honne* *Pterocarpus Marsupium*, *jámba* *Xylia dolabriformis*, and much *hirda* *Terminalia Chebula*. The leaf-shedding forests of this group have been greatly destroyed by stripping and pollarding for leaf manure and by being everywhere broken by betel gardens. Lastly there is Balur-Nilkund group in the extreme north to the north of the Muthalli river with sixteen villages and seventy-four square miles. The leaf-shedding forests of this group are by far the best

and most extensive of the sub-division, and there is a great deal of excellent leaf-shedding timber particularly *honne* Pterocarpus Marsupium which is a first class wood and held next in esteem to teak. The *hirda* tree Terminalia Chebula is also specially common in this group and so is the *moha* Bassia latifolia, which, as in Khándesh, may hereafter prove of value as a spirit-yielding tree. The leaf-shedding area of this group cannot be less than about sixty-five square miles. Fine evergreen forest is also found near Nilkund and scattered over the whole area, and as in other Siddápur leaf-shedding forests there is much lopping of trees for manure, and betelnut gardens are everywhere common. Woodash tillage, which was once general along the Sahyádris, has for some years been greatly restricted. As in other sub-divisions a fee of 3*d.* (2 *as.*) is taken yearly on every head of cattle grazed in the forests. The Siddápur forests have never been worked for profit. Trees required for public works and local use are alone cut. The only exception is sandalwood which, as it ripens, is gathered by the forest department and sent twenty-four miles to Sirsi. The felling and carrying charges come to about £4 (Rs. 40) the ton and the sale realizes £48 to £54 (Rs. 480 - Rs. 540).

The large bamboo seeded in 1866-67 and the new crop is ready for use. The small bamboo *shibu* or *sheme* is used for floors and roofs. The minor products are myrobalans, soapnuts, honey, cinnamon, wild nutmegs, wild pepper, and canes. Myrobalans and soapnuts are gathered by the forest department; the other products, except canes which are free, are farmed.

The Honávar and Bhatkal forests, most of which are unsurveyed, are bounded on the north by Kumta; on the east by Maisur and Siddápur; on the south by South Kánara; and on the west by the Arabian Sea. The forests and waste lands of their 136 villages are estimated to cover an approximate area of 300 square miles. Wood-ash tillage was once general and in Bhatkal has destroyed nearly all the forests. It has for some years been greatly restricted.<sup>1</sup> Honávar has forests of both the leading varieties, leaf-shedding forests to the south of the Shirávati and evergreen forests to the north. They may be arranged under four groups, Hinnur-Gersappa in the south-east with nine villages and an area of ninety-nine square miles; Hegar-Manki in the south-west with eight villages and thirty square miles; Jánkadkal-Mahime in the north-east of the Shiravati with sixteen villages and sixty square miles, and Sálkod-Mallápur in the north-west with ten villages and twenty square miles.

The Hinnur-Gersappa group in the south-east is the best of the leaf-shedding forests. It includes the forest lands of nine villages<sup>2</sup> with an approximate area of ninety-nine square miles and a population of about 1170, mostly Sárasvat and Hávik Bráhmans, Maráthás, Karivakkals, Halepaiks, Gramvakkals, Sherugars, Musalmáns, and Christians.

## Chapter II. Production.

Forests.  
Siddápur.

Honávar and  
Bhatkal.

<sup>1</sup> In 1880-81 in Honávar 122 and in Bhatkal 143 acres were granted.

<sup>2</sup> The villages are Hinnur, Kodáni, Shirkur, Khandodi, Hágeri, Begodi, Anegundi, Kalkatti, and old Gersappa.

**Chapter II.**  
**Production.**

Forests.  
*Honávar and*  
*Bhatkal.*

They contain fair teak, chiefly at Hinnur and Kodáni; also *matti*, *kindal*, *honi*, *jámba*, *nandi*, *hedde*, *ságdí*, *holedasul*, and *kumbia*, many of them five or six feet in girth. There are a few small evergreen forests and a good deal of the *tálipat* palm *Corypha umbraculifera*.

The Hegar-Manki group in the south-west is an inferior leaf-shedding forest. It includes the forest lands of eight villages<sup>1</sup> with an approximate area of thirty square miles and a population of about 6700 of the same castes as in the Hinnur-Gersappa group. The trees are also the same but thinner and not nearly so well grown. There is a good deal of *khair* *Acacia Catechu*, and teak occurs at Heggár. The Jánkadkal-Mahime group in the north-east from the Shirávati to the Sahyádris, includes the lands of sixteen villages,<sup>2</sup> with an area of about sixty square miles. It is a very fine evergreen forest with all the varieties found on the Gersappa hills including the poonspar and the *tálipat* palm. There was formerly much wood-ash tillage near the village of Mahime.

The Salkod-Mallápur group in the north-west is of mixed leaf-shedding and evergreen forest. It includes the lands of ten villages with an area of about twenty square miles.<sup>3</sup> The evergreen forests of Sálkod are good, and the other nine villages in the north-west have teak mixed with fine *honi*, *matti*, *kindal*, *hirda*, *nandi*, *jámba*, and much *tálipat* palm. *Khair* prevails everywhere, except in the evergreen forests. The only parts of the Honávar forests which have been worked for sale are about Jankadkal. The large bamboo seeded in 1863-64 and the fresh crop is now fit for use. The Bhatkal forests have an area of about ninety square miles and a population of about 31,000 of the same classes as in Honávar. The forests have nearly all been destroyed by wood-ash tillage. The best, chiefly of leaf-shedding trees, are about Kop and Gundalkatta fifteen miles north-east of Bhatkal. There is much *khair* everywhere and at Bailur, twelve miles north of Bhatkal on the coast, there are about 800 sandal trees. There are a few bamboos chiefly near Hadil. They seeded in 1863-64 and the fresh crop is now fit for use. The minor products of the Honávar and Bhatkal forests are catechu or *kát*, cinnamon or *dálchini*, wild nutmeg or *jajikai*, wild pepper, honey, the vegetable-ivory or *bájerbetta*, the seeds of the *Corypha umbreculifera*, and a few myrobalans and soapnuts. All, except the myrobalans and soapnuts, are farmed.

*Liquor-yielding*  
*Trees.*

The chief liquor-yielding tree is the cocoa-palm, *tenginmar*, *Cocos nucifera*. It is common along the coast and is grown to a limited extent above the Sahyádris, but for its nuts not for its juice. In Kárwár, Kumta, Ankola, and Honávar there are luxuriant cocoa-palm gardens. Near the coast in favourable soil and inland in valleys and well watered lands, the trees begin to bear in six or seven years, but on high lands and in hard and dry soil they do not

<sup>1</sup> The villages are Heggár, Kota, Sasikodla, Adikekuli, Chittar, Tálgod, Gumavanti, and Manki.

<sup>2</sup> The villages are Jánkadkal, Kabbinhakkal, Nágingtivra, Hanehalli, Sarlige, Upponi, Allanki, Kelgin-Mudkani, Melin-Mudkani, Harvalli, Karki, Kervalli, Chikrankod, Mavinkurve, Melin-Mahime, and Mahime.

<sup>3</sup> The villages are Salkod, Mallápur, Chendávar, Kekkar, Kadtoka, Hodkesirur, Vandár, Nilkod, Kalche, and Kadle.



begin to bear until they are ten or eleven years old. Palms go on bearing nuts and yielding juice till they are fifty or sixty years old. Bráhmans in many cases own cocoa-palm gardens. They do not themselves tap or make liquor, but they have no scruple in letting their trees to licensed drawers and liquor farmers. Other palm owners are Hálepaiks in the coast tracts of Kumta and Honávar, and Bhandáris in Ankola and Kárwár. They have no objection to their trees being tapped and themselves freely engage in tapping and liquor-making. Cocoa-palms have never been separately assessed in Kánara. The garden rates which are levied on the land were considered assessment enough. Similarly the tapping was a matter of private arrangement between the owners of trees and the farmers of liquor-shops. From the 1st of August 1860 to check smuggling, a special license to tap trees was required and an uniform rate of 2s. (Re.1) was levied on every tree tapped. The holders of licenses were allowed to sell juice by retail at the foot of the tree, but the right to distil was vested exclusively in shopkeepers licensed to sell country liquor. In 1881-82 the tapping fee was raised to 12s. (Rs. 6) a tree; in 1882-83 it was reduced to 6s. (Rs. 3); in 1883-84 this reduced fee has been kept with the restriction that instead of allowing each shop to have its own distillery, only two distilleries are allowed for each of the coast and one for each of the upland sub-divisions.

The approximate area of land under cocoa-palms is given at 13,700 acres which at a rough acre average of 100 trees gives an approximate total of 1,370,000 trees. The number of trees licensed to be tapped in 1880-81 was 11,713. The new system met with some opposition, but it has been overcome. Juice-yielding palms fetch from 2s. to 6s. (Re. 1-Rs. 3) a year, the yield of juice varying from twenty-five to forty gallons (6-10 *mans*). Liquor-shop holders are licensed to make liquor and no separate licenses are issued for liquor-making. Fermented palm-juice or *tádi* costs 1d. to 1½d. (½-1 *anna*) the quart of sixty *tolás*. The two kinds of palm spirit most in use are the *chali* a weak and the *feni* a strong spirit. The light or *chali* costs 4½d. to 6d. (3-4 *as.*), and the strong or *feni* 9d. or 1s. 6d. (6-12 *as.*) a quart. The cost of making twelve quart bottles of the light spirit is 2s. 6d. (Rs. 1¼) and of the strong spirit or *feni* is 5s. (Rs. 2½). The stills, of which each farmer has generally one or two, must be worked close to the shops.

Palms grown solely for their nuts are calculated to yield on good coast garden land a net yearly profit of about £5 (Rs. 50) a hundred or 1s. (8 *as.*) a tree.<sup>1</sup>

## Chapter II. Production.

Forests.  
Liquor-yielding  
Trees.

<sup>1</sup> The details are: The yearly average return from 100 cocoa-palms is £12 10s. (Rs. 125) for 5000 cocoanuts at the rate of 5s. (Rs. 2½) the hundred; 16s. (Rs. 8) for 800 palm leaves at 2s. (Re. 1) the hundred; and £1 (Rs. 10) for the husk and shells of 5000 cocoanuts used as firewood; making a total return of £14 6s. (Rs. 143). The yearly average cost for 100 cocoa-palms is £2 (Rs. 20) for watering for four months fifty trees a day on alternate days at 10s. (Rs. 5) a month; 4s. (Rs. 2) towards building a well which costs about £10 (Rs. 100) and lasts for about fifty years; 10s. (Rs. 5) for fencing; £1 5s. 6d. (Rs. 12½) for Government assessment including local fund cess; £1 5s. (Rs. 12½) for manuring 100 trees at 3d. (2 *as.*) a tree; 3s. 1½d. (Rs. 1½) for cleaning 100 trees at ½d. (½ *anna*) a tree; 8s. 4d. (Rs. 4-2-8) for gathering cocoanuts four times in the year at ¼d. (¼ *anna*) a tree; and

## Chapter II.

## Production.

## Forests.

Liquor-yielding  
Trees.

Besides from the cocoa-palm liquor is made from the *baini*, *Caryota urens*. This grows above the Sahyádris in the evergreen forests called *kans* in Siddápur, Sirsi, Yellápur, and Supa. A few are also found in the evergreen forests called *arnos* or *kans* in the coast subdivisions of Ankola and Honávar. The trees, which are Government property, are estimated at 48,900. Under the system introduced in August 1880 the right to tap these wild palms was sold at 1s. (8 *as.*) a tree. In 1881-82 the tree tax was raised to 4s. (Rs. 2) and in 1882-83 it was reduced to 3s. (Rs. 1½). During the year 1881-82, 13,300 trees were licensed. Very little liquor is distilled from the juice of the wild palm as it is both inferior and expensive.

Above the Sahyádris, where palm juice is not distilled, spirits are made from sugarcane juice flavoured with the bark of the *hevra* tree which is brought from Dhárwár.

The following list gives in alphabetical order the more important trees and shrubs of the Kánara forests with their botanical, Kánarese, and Maráthi names, and their chief uses<sup>1</sup>:

## Trees.

1. ACACIA ARABICA, *jáli K.*, *bábul M.*, is the well-known bábul tree. The wood is close-grained, dark-brown, hard, and tough. A cubic foot when seasoned weighs fifty-four pounds. It is good for carts, sugar and oil mills, and field tools, but is too crooked to make useful building timber. It yields much clear gum, and its bark is greatly used in dyeing and tanning. The pods and leaves form good fodder for sheep and cattle.
2. ACACIA CATECHU, *kháirda K.*, *khair M.*, does not grow to a large size. The wood is very hard and strong, and is supposed to be as durable as teak. A seasoned cubic foot weighs close on eighty pounds. *Káth* catechu or Terra japonica is the thickened juice of its boiled wood.
3. ACACIA CONCINNA, *shige K.*, the soapnut tree. Its pods are used as soap and sell at £1 4s. to £2 (Rs. 12 - Rs. 20) the *khandi* of 560 pounds. Every other year comes a bumper crop with an outturn of about 1000 *khandis*, valued at £1200 (Rs. 12,000). The cost of gathering and bringing to market is about 12s. (Rs. 6) a *khandi*.
4. ACACIA FARNESIANA, *jali K.*, *iri bábul M.* The wood is hard and tough, and from the trunk gum oozes in considerable quantities.
5. ACACIA LATRONUM, *donn mullina jali K.*, *dev babul M.*, does not grow to any size, but is useful for tent pegs and for fences.
6. ACACIA LEUCOPHLEA, *bile jali K.*, *hivár M.* The wood is hard strong and much used. When seasoned a cubic foot weighs about fifty-five pounds. The bark is used in distilling, and yields a tough strong fibre which is used for fishing nets and cordage.
7. ACACIA SUNDRA, *kempu khairada* or *shemi K.*, *lál khair M.*, is much like the *Acacia catechu*. The wood is equally hard and tough, and when seasoned weighs about eighty pounds to the cubic foot.

£3 4s. (Rs. 32) for yearly interest at four per cent on a capital of £80 (Rs. 800) invested, making a total cost of £8 19s. 11½d. (Rs. 89-15-8), and yielding a net profit of £5 6s. ½d. (Rs. 53-0-4) a hundred or about 1s. ¾d. (*annas* 8½) a tree.

<sup>1</sup> A complete list of Kánara trees prepared by Mr. W. A. Talbot, Assistant Conservator, is given in the Appendix.

Chapter II.  
Production.

Forests.  
Trees.

8. *ACHRAS SAPOTA*, *kumpole* K., is a large cultivated tree with dull red wood, short but straight in the grain, and very dense. It is apt to split if not well seasoned. The fruit is pickled and eaten with curries.

9. *ADENANTHERA PAVONINA*, *manjuti* K., and M., is a large tree, whose wood, though tough and said to be good, is not in general use in Kánara. A seasoned cubic foot weighs fifty-six pounds. It yields a red dye which is used by Bráhmans to mark their foreheads, and jewellers use the scarlet seeds as weights.

10. *ADINA CORDIFOLIA*, *yettagal* K., *hedu* M., an immense and very common tree, yields a yellow close grained wood which, though liable to crack if not properly seasoned, is very valuable for building and for furniture. A seasoned cubic foot weighs about forty-two pounds.

11. *ÆGLE MARMELOS*, *belpatri* K. and M., the bael tree, is sacred to Shiva and is never cut. The wood is poor though close-grained. A seasoned cubic foot weighs about forty-three pounds. The fruit is used in diarrhoea and dysentery.

12. *AILANTHUS MALABARICA*, *guggula dhupada* K. and M., is a large tree whose resin is burnt as incense in Hindu temples. The wood is useless.

13. *ALANGIUM LAMARKII*, *ansaroti* K., *ankul* M., is a small tree or climber with yellow-brown hard and tough wood which weighs forty-nine pounds to the cubic foot. The fruit is eaten, though astringent and acid, and the root is a native medicine.

14. *ALEURITES MOLUCCANA*, Belgaum walnut, *akrod* K., is an ornamental tree with poor timber. The kernel yields a fine clear oil.

15. *ALBIZZIA AMARA*, *bilkambi* K., *láli* M., has a short thick trunk with many heavy branches. The tree is common and yields dark-brown, close-grained, and very strong and durable timber, one of the most favourite woods in Kánara. A seasoned cubic foot weighs about seventy pounds.

16. *ALBIZZIA LEBBEK*, *godda hunshe* K., *siras* M., is common and in general use. A seasoned cubic foot varies in weight from thirty-eight to fifty-three pounds. A dark gum oozes from wounds in the bark.

17. *ALBIZZIA PROCERA*, *belláti* K., is a large tree, which yields excellent timber and is in great request.

18. *ALBIZZIA STIPULATA*, *bagana* K., is a very pretty tree whose wood is believed to be good.

19. *ALSEODAPHNE SEMICARPIFOLIA*, *neltháre* K., *phudgus* M., is a large and handsome tree whose excellent wood has the special value of resisting the attacks of white-ants. A seasoned cubic foot weighs fifty-two pounds.

20. *ALSTONIA SCHOLARIS*, *kodále* K., *sátvin* M., is a large up-standing tree whose soft wood is useless except for making boxes. A seasoned cubic foot weighs about forty pounds.

21. *AMOORA LAWII*, *madarasada* K., *boramb* M., is a moderate-sized evergreen tree.

Chapter II.  
Production.

Forests.  
Trees.

22. *ANOGEISSUS LATIFOLIA*, *dindal* K., *dhaura* M., is moderate-sized on the outskirts of forests, but very large in favourable spots among other lofty trees. The wood is light and sometimes beautifully mottled and veined; hard, close-grained, and very tough and elastic. A seasoned cubic foot weighs sixty pounds. The people hold it in great esteem, using it for all field-tools and for certain parts of their carts. From the bark oozes a fine gum like the *Acacia arabica* gum.
23. *ANTIARIS INNOXIA*, *ajjanapatte* K., *kharvat* M., is a tree of great size, but with soft worthless wood. The bark yields strong fibre suited for cordage, matting, and sacking. In making sacks a branch or trunk is cut to the required length, soaked in water, and beat till the fibre separates from the wood. It is then turned inside out, and the wood sawn off except a small piece at the bottom. The fruit is intensely bitter.
24. *ANACARDIUM OCCIDENTALE*, *godambe* K., *káju* M., is the well known Cashew tree. The wood is of no value except for charcoal. The pericarp of the nut yields a bitter oil which is used as a caustic. A clear gum not inferior to gum arabic oozes from the trunk and is used as varnish. The roasted kernels are a well-known dessert dish. They also yield an oil. The enlarged crimson pedicel is also eaten and has a pleasant bitter flavour.
25. *APOROSA LINDLEYANA*, *salle* K., is a middle-sized, very straight tree, much used for rafters.
26. *ARECA CATECHU*, *adike* K., *pophali* M., the betelnut palm, rises in a straight slender stem fifty to eighty feet high. It makes excellent rafters and shed-posts. The nut, which is chewed and used in many religious ceremonies, forms one of the chief articles of trade in Kánara.
27. *ARTOCARPUS HIRSUTA*, *hebbalasina* K., *pát phanas* M., is a very large and handsome evergreen tree whose massive trunk occasionally rises straight and clean-stemmed for 150 feet. It yields the *anjili* wood of commerce and is equally valuable for ship and house building. A seasoned cubic foot weighs about forty pounds. The fruit is eaten.
28. *ARTOCARPUS INTEGRIFOLIA*, *halasina* K., *phanas* M., the well known Jack, is both cultivated and found wild in the evergreen Sahyádrí forests. The trunk grows to a great girth. The wood is yellow when cut but gradually darkens. It becomes beautifully mottled with time and takes as fine a polish as mahogany. A seasoned cubic foot weighs forty-two pounds. It is used for building and for furniture. The fruit weighs up to sixty pounds and is much used by the people. The roasted seeds are not unlike chestnuts, and in bad seasons are often the only food of the poorest hill people.
29. *ARTOCARPUS LAKOOCHA*, *vonte* K., *votamba* M., has soft and poor wood and a fruit which is eaten in curries.
30. *ATALANTIA MONOPHYLLA*, *kán limbe* K., *mákad limba* M., is a small tree found in the evergreen forests. Its wood is close-grained and heavy, but is not generally used.
31. *BAMBUSA*, *biduru gala*, *medar gala*, *kiribiduru gala*, *sheme biduru gala*, *vonte biduru gala*, *galágin kaddi* K., is one of the most

Chapter II.  
Production.Forests.  
Trees.

useful of forest products. The large or *biduru gala* bamboo is used in building, for masts of native vessels, spars, yards, and boat-decking, tent-poles, scaffolding, floors, bridges, ladders, water-pipes, for floating timber, hollow cases, waterbuckets, and many other purposes. The middle-sized or *medargala* bamboo is used in house building, floors, masts and spars for small boats, boat-decking, and scaffolding. It is also split to make walls for houses, matting, and baskets. The *kiri-biduru gala* bamboo is used for battens, roofing, flooring, decking, spear-handles, and walking-sticks. They are also split and used for various other purposes. The *sheme biduru gala* bamboo is solid and used for roofs, battens, floors, and spear handles. The *wonte biduru gala* bamboo is used for flutes, matting, and baskets, and the *galagiu kuddi* bamboo for pens. The large bamboo takes ten to fifteen years to reach its full size. When full grown the shoots rise from the root seventy to ninety feet in one season. Beddome is of opinion that the large bamboo seeds and dies after thirty-two years, but according to the people of Kánara it does not seed until it reaches the age of fifty or even sixty years. Other bamboos seed at periods varying from seven to thirty years, the *medár gala* living next longest to the *biduru gala*. The seed or grain of the large bamboo or *biduru gala* is gathered and eaten and in the scarcity of 1865-66 thousands of people flocked from Dhárwár, Belgaum and Linsgur in Maisur to gather and carry it to their homes. In both these years thousands of lives were saved by the timely seeding of the large bamboo. The seed is more like wheat than rice and is very heating. The bamboos of certain tracts, sometimes several square miles wide, seed at the same time. In Kánara the last general seeding began in 1864 and ended in 1875. The root of the large bamboo ceases to send up shoots one season before it flowers. The middle-sized bamboo or *medar gala* also seeds at the same time over large tracts. Its seed is also gathered and eaten.

32. *BARRINGTONIA ACUTANGULA*, *hole kauwa* K., *mánkumba* M., is a moderate-sized tree, common along streams and in moist places. The wood is reddish, and though tough and strong is not in general use. A seasoned cubic foot weighs fifty-six pounds. The bark is used to stupefy fish.

33. *BASSIA LATIFOLIA*, *ippe* K., *moha* M., grows to a good size. In other parts of India the wood is said to be strong and durable, but in Kánara it is not used. A cubic foot of seasoned wood weighs sixty-one pounds. The flowers are eaten and used in making a spirit. A gum oozes from wounds in the bark.

34. *BASSIA LONGIFOLIA*, *huli ippe* K., *moha* M., grows to a good size. The wood is not used, but the seeds yield an oil that would make candles and soap.

35. *BAUHINIA LAWII*, *basavanpad* K., is a large shade-tree with soft useless wood.

36. *BAUHINIA PURPUREA*, *sheádla* K., *kanchan* M., is a small tree with strong wood, but seldom large enough for building.

37. *BAUHINIA RACEMOSA*, *banne* K., *ápta* M., is a moderate-sized tree with strong close-grained wood. A seasoned cubic foot weighs fifty-six pounds.

Chapter II.  
Production.

Forests.  
Trees.

38. *BAUHINIA VARIEGATA*, *mandar* K. and M., is an ornamental tree with variegated flowers and hard serviceable wood, but seldom large. The bark is used in tanning and dyeing.

39. *BIXA ORELLANA*, *arnattu* K., is common in gardens. It yields a good orange dye.

40. *BOMBAX MALABARICUM*, *burlā* K., *sāyar* M., has an immense stem, straight, round, and of great length. The wood is soft and useless. A dark gum oozes from the wounds in the bark and the fruit is gathered for its cotton.

41. *BORASSUS FLABELLIFORMIS*, *tāle* K., *talat mād* M., the Palmyra palm, is grown in gardens. Its hard and lasting outer wood is used in building and for water pipes. The leaves make excellent thatch, and the sap is either boiled into sugar or fermented and distilled.

42. *BRIEDELIA MONTANA*, *āsana* K., *kaunchi* M., gives an excellent timber fit for building, sleepers, and furniture, standing exposure well. A seasoned cubic foot weighs sixty pounds.

43. *BRIEDELIA RETUSA*, *mullu honne* K., *kānta kauchi* M., grows to a large size. The wood is strong, tough, and stands water. It is used in building and for well frames.

44. *BUCHANANIA LATIFOLIA*, *nurkal* K., *chār* M., is a moderate-sized tree. The heartwood is hard, but the rest of the wood is poor. A seasoned cubic foot weighs thirty-six pounds. The fruit is dark purple and is pleasant to the taste. An oil is expressed from the seed.

45. *BUTEA FRONDOSA*, *muttala* K., *phalas* M., is very common and strikingly handsome when covered with its scarlet blossoms. The flowers yield a yellow dye, and the juice is one of the kino gums. The lac insect is often found on its branches. The wood is coarse and poor. A seasoned cubic foot weighs thirty-three pounds.

46. *CALOPHYLLUM ELATUM*, *sur-honne* K., *nāgani* M., is a magnificent evergreen tree often growing 150 feet high, the stem straight, of great girth, and from eighty to a hundred feet to the first branch. It yields the poonspars so much used for masts. The wood is reddish and coarse-grained but ornamental. A single tree has been known to fetch more than £100 (Rs. 1000). The seed yields an oil.

47. *CALOPHYLLUM INOPHYLLUM*, *vuma* K., *undi* M., is moderate-sized on the coast, but often very large in the forests. The wood is coarse but useful, and the seed yields an excellent much-used oil for which along the coast the tree is grown.

48. *CALOPHYLLUM WIGHTIANUM*, *bobbi* K., *irai* M., is a large tree found along streams and in moist places. The wood is coarse but strong and ornamental. The seed yields an oil scarcely inferior to the oil of the *Calophyllum inophyllum*.

49. *CALOSANTHES INDICA*, *tetu* K. and M., is a small tree with poor wood. The bark and fruit are used in tanning.

50. *CANARIUM STRICTUM*, *rāl-dhupada* K., *rāl dhup* M., is a beautiful evergreen tree known to Europeans as the black dammer. Its resin or dammer is used in medicine.

Chapter II.  
Production.Forests.  
Trees.

51. *CESALPINIA SEPIARIA*, Maisur thorn, Ver. *chillar*, is a prickly bush with yellow flowers, forming impassable thickets in many places, often where the bamboos seeded in 1865-66. The young pod contains an essential oil.

52. *C. NUGA* is a common climber along the sides of tidal creeks.

53. *C. CORIARIA*, Ver. *divi-divi*, is a small thornless tree whose pods yield a tanning material. It has been introduced into Dhárwár, Belgaum, and Kánara. The wood is not in general use.

54. *CANTHIUM DIDYMUM*, *yellal* K., *arsul* M., is a handsome evergreen tree with close-grained, hard, and heavy wood, yellowish with central masses of black.

55. *CAPPARIS GRANDIS*, *toráte* K., *kauntel* M., has small wood but close-grained and good for turning. It yields an oil which is used in medicine and for burning.

56. *CARALLIA INTEGERRIMA*, *andermurgal* K., *panasi* M., has reddish brown timber, rather brittle, but very ornamental.

57. *CAREYA ARBOREA*, *kaval* K., *kumbia* M., is crooked and stunted on the outskirts of the forests but with other large trees grows to a considerable height and girth. The wood, though strong and tough, is not generally used, except the heartwood for ploughs. A seasoned cubic foot weighs about fifty pounds. The bark yields a coarse strong cordage. The fruit is eaten by cattle.

58. *CARYOTA URENS*, *baini* K., *berli* M., the Indian sago-palm, is abundant in the evergreen Sahyádrí forests. The wood is fibrous, hard, and in general use for field-tools. The trunk is used for water-courses. The pith yields a sago, the fermented or distilled juice an intoxicating drink, and the leaves a fibre.

59. *CARISSA CARANDAS*, Ver. *coronda*, is a bush whose fruit is much esteemed and is excellent in tarts.

60. *CASSIA AURICULATA*, *talvád* K. and M., is a bush or small tree very common in the lower hill slopes and plains. The bark is much used for tanning.

61. *CASSIA FISTULA*, *kakkai* K., *báya* M., is remarkably handsome with its hanging bunches of primrose flowers. In the inland forests it grows to a considerable size, but it is dwarfed towards the plain country where the rainfall is scanty. The wood is extremely good, being exceedingly hard and tough and beautifully mottled. It takes a good polish and is well suited for furniture. A seasoned cubic foot weighs fifty-four pounds. The pulp that fills the pod is a strong purgative used both by Europeans and natives. A gum oozes from wounds in the bark.

62. *CASSIA FLORIDA*, *sirsal* M., is a handsome and excellent roadside tree. The wood is dark but brittle and perishable. A seasoned cubic foot weighs fifty-eight pounds.

63. *CASUARINA EQUISETIFOLIA*, *sura* K., was introduced into India about the beginning of the present century and is now well established. It thrives best on sandy tracts along the sea shore. It

**Chapter II.**  
**Production.**

Forests.  
Trees.

is of rapid growth and yields an excellent heavy and hard dark-brown wood. A plantation formed near Kárwár a few years ago is succeeding well.

64. *CEDRELA TOONA*, *tundu* or *devdari* K., *todu* M., grows to a considerable size. The timber is reddish brown, light, even, but open-grained and fairly strong. It seasons readily, is easily worked, and takes a fine polish. It is very fragrant when cut. A seasoned cubic foot weighs thirty-one pounds. It is much used for furniture. A red or yellowish dye is made from the flowers.

65. *CELASTRUS MONTANA*, *málkanguni* K., *hanmachá jhád* M., is a small and very common tree. The wood is fairly good, though not much used.

66. *CHICKRASSIA TABULARIS*, *dul* or *devdari* K., *pabba* M., is an immense tree, one of the largest of the many large Kánara evergreens. It is often found up to twelve feet in girth with a clean, thick, and straight trunk fifty to eighty feet to the first branch. It is the Chittagong wood of commerce and from its fresh cedar-like smell is called *lal* or *devdari* in Kánara. The wood is dark coloured and close in the grain. It is used for every purpose and is much valued. A seasoned cubic foot weighs forty-two pounds.

67. *CHLOROXYLON SWIETENIA*, *mashvála* K., *halda* M., is not found in Kánara, but is common, though small, in parts of Belgaum and Kaládgi, where it is known under the name of *mashvala*. The wood is close-grained, hard, and durable; excellent for turning or any fancy work which does not require large-sized wood. It is highly prized by the people. A seasoned cubic foot weighs about fifty-eight pounds.

68. *CHRYSOPHYLLUM ROXBURGHII*, *hale* K., *tursiphal* M., is a good sized tree. The wood is employed in house-building, but is not by any means in general use. The fruit is eaten.

69. *CINNAMOMUM TAMALA*, *dalchinne* K., *dálchini tiki* M. A very common evergreen forest tree of moderate size. The wood is poor and is not used. The bark is also inferior and is not the true cinnamon of commerce. An aromatic oil extracted from the fruit and leaves is used as a medicine.

70. *CORDIA MYXA*, *chella* K., *bhokur* M., is a middle-sized tree. The wood is inferior and is not in general use. A seasoned cubic foot weighs about forty pounds. The bark is made into ropes and the fibre is used in caulking boats. The fruit is eaten as a vegetable and pickled.

71. *CORYPHA UMBRACULIFERA*, *tále* K., *táli* M., is known as the Talipat palm. It grows sixty to seventy feet high. The beaten pith yields an edible flour, the leaves are made into umbrellas, and the seeds, a species of vegetable ivory, are an article of trade with the Arabs who visit the coast and buy them at rates varying from £2 to £2 10s. (Rs. 20 - Rs. 25) the *khandi* of 616 pounds.

72. *CISSUS DISCOLOR* is a beautiful climber, common in the rains in Kánara. It requires a moist climate. The leaves are differently coloured above and beneath.



Chapter II.  
Production.Forests.  
Trees.

73. *CITRUS MEDICA*, Ver. *limbu*, the common bitter lime, is much grown in the Sahyádrí villages.

74. *CITRUS DECUMANA*, the pomelo, is grown throughout Kánara and reaches great perfection.

75. *CITRUS AURANTIUM*, Ver. *god náring*, the sweet orange, is grown throughout Kánara but does not produce superior fruit.

76. *CLEMATIS GOURIANA*, a creeper, is found everywhere in the Southern Marátha Country. It flowers in the cold season.

77. *CLEODENDRON INFORTUNATUM*, a common shrub found as undergrowth in the Kánara forests.

78. *C. INERME*, a climbing shrub found on the coast where it forms dense thickets.

79. *CRATEVA RELIGIOSA*, Ver. *bitusi*, is a moderate-sized tree with trifoliate leaves and large handsome flowers. It is found on the Sahyádris. The wood is yellowish white, tough, and durable.

80. *DALBERGIA LATIFOLIA*, *bite* K., *sisu* M., is the well-known blackwood tree. The timber is one of the most valuable in India; it is strong, very hard, close-grained, and of a purple black. It takes a beautiful polish and is reckoned the best furniture wood. A seasoned cubic foot weighs fifty pounds.

81. *DALBERGIA PANICULATA*, Ver. *padri*, a soft-wooded tree, is common in the dry forests of Dhárwár and Kánara. The wood is divided by more or less complete rings of soft tissue which is used as firewood.

82. *DESMODIUM TRIQUETUM* is a shrub common throughout Kánara. The pods are covered with bent hairs and stick fast to anything with which they come in contact.

83. *D. PULCHELLUM* is a common shrub which flowers in the rains.

84. *DILLENIA PENTAGYNA*, *kanagala* K., *karmal* M., is a moderate-sized tree and very common. Whatever may be thought of it elsewhere, in Kánara the wood is considered useless except for burning. The fruit, which as a rule is most abundant and falls during May, is greedily eaten by all animals both wild and tame.

85. *DIOSPYROS EBENUM*, *kare* K., *abnús* M., is a moderate-sized rather uncommon tree. The heartwood is generally jet black and very heavy. A seasoned cubic foot weighs eighty-one pounds. It is one of the trees which are not allowed to be cut.

86. *DIOSPYROS MELANOXYLON*, *balai* K., *tumri* M., is a middle-sized tree. Only the heartwood of old trees contains ebony, and even that is streaked with dull yellow lines. The wood, though strong tough and fairly durable, is not held in much esteem. A seasoned cubic foot weighs fifty to seventy pounds. The fruit when perfectly ripe has a pleasant taste and is much liked.

87. *DIOSPYROS MONTANA*, *tendu* K. and M., is a small tree of the ebony kind with black and variegated streaks towards the heart. The wood is pretty strong but is not much used.

Chapter II.  
Production.

Forests.  
Trees.

88. *DIPLOSPORA APIOCARPA*, *báchange* K., *paniyara* M., is a large evergreen tree whose wood is used to make combs and toys.

89. *DIPTEROCARPUS INDICUS*, *challáne* K., is an immense evergreen tree which, when tapped, yields an oil of considerable value. The wood is coarse-grained, soft, and seldom used.

90. *DODONÆA VISCOSA*, Ver. *bandurgi*, is a very common shrub growing over large areas in Dhárwár. The leaves are covered with bright yellow resin, but it is not put to any use.

91. *ELÆOCARPUS TUBERCULATUS*, *rudrák* K., is a very large tree found in the Sahyádris. The seeds are made into rosaries by some Bráhmans. The wood is not used.

92. *ELÆODENDRON ROXBURGHII*, *thámároja* K., is a tree of fair size. The wood is not strong, but it is used for combs and picture frames.

93. *ERINOCARPUS NIMMONII*, *haladí adavi bhende* K., is a small tree whose wood though soft is used for yokes, and the bark makes excellent ropes.

94. *ERIODENDRON ANFRACTUOSUM*, *bile burlu* K., *pándhari sávar* M., the white cotton tree, though fairly large does not grow to the same size as the *Bombax malabaricum*. The pods are gathered for their cotton. The wood is useless except for making toys.

95. *ERIOLENA HOOKERIANA*, *hadang* K., is a small tree with very tough wood commonly used for axe handles.

96. *ERYTHRINA SUBEROSA*, Ver. *pangra*, is a very common middle-sized tree with corky bark. Its white soft wood is used for planking.

97. *ERYTHRINA INDICA*, *mullu muttala* K., *pangara* M., is a tree of moderate size whose soft wood is only used to make toys and boxes.

98. *EUGENIA JAMBOLANA*, *nerlu* K., *jambul* M., is a very large and beautiful tree. The wood is in general use for house-building, carts, field-tools, and a variety of purposes; it stands the action of water and is used for well frames. It is fairly close-grained, not very strong or lasting except in water, and in colour a dirty brown. A seasoned cubic foot weighs forty-eight pounds. The fruit is eaten.

99. *EHRETIA LAVIS*, *adak* K., is common on the Sahyádris. The wood is strong and hard.

100. *EUGENIA ZEYLANICA*, *nerkal* K., *bhedas* M., is a middle-sized tree common in streams. The wood is in use for house-building and for field tools.

101. *EUPHORIA LONGANA*, Ver. *vumba*, is a rather large tree whose wood is hard but splits and does not bear exposure. It is not much used.

102. *EUPHORBIA NERIIFOLIA*, a small thorny tree with leaves at the ends of the angular spiral branches. It is much used as a hedge plant in Dhárwár and Belgaum.

Chapter II.  
Production.Forests,  
Trees.

103. *E. TIRUCALLI*, Ver. *nevi*, the milk-bush, is the well known hedge plant with bitter milk-like juice.

104. *FERONIA ELEPHANTUM*, *kovit* M., the wood-apple tree, is generally found in comparatively dry parts of the district and near gardens. The wood, which is hard strong and lasting, is used for a variety of purposes. A gum oozes from the tree not unlike gum arabic. The pulp of the fruit makes good jelly and the leaves are used in medicine.

105. *FICUS ASPERRIMA*, *khargas* K., *kharvat* M., is a middle-sized tree with poor unused wood. The leaves are in general use to polish horns and as sand-paper.

106. *FICUS RETUSA*, *pinvól* K., *nándruk* M., is a handsome shade-giving tree, excellent for roadsides. The wood is soft and useless.

107. *FICUS GLOMERATA*, *atti* K., *rumadi* M., is both cultivated and found in evergreen forests. The wood is inferior, but is often used for doors and well frames. The fruit is eaten and the leaves bark and fruit are used in native medicines. A seasoned cubic foot weighs about thirty-one pounds.

108. *FICUS BENGALENSIS*, *álada* K., *vad* M., the well known banyan or Indian fig, grows to a great size and often shades a space 150 feet and more in diameter. The banyan sends aërial roots from the branches which taking hold of the soil grow into trunks. These roots are very elastic tough and strong and are used for tent-poles, poles for carrying loads, and cart yokes. The wood is sometimes used for doors and well frames. A seasoned cubic foot weighs about thirty-three pounds. It is an excellent roadside tree, giving great shade and suiting itself to almost any soil. In forests the different varieties of fig do much harm. The birds leave seeds in the forks of trees, where they sprout and sending down their roots gradually encircle and destroy the tree. No fig tree should be allowed to live in a carefully preserved forest.

109. *FICUS RELIGIOSA*, *arle* K., *pippal* M., grows to a good size but is not a first class roadside tree, as its shade is scanty and it is not easily raised from cuttings. It is held sacred by almost all classes of Hindus. The wood is inferior and is not used.

110. *FICUS SPECIOSA*, *basari* K., a rather thick-set variety bearing small fig-shaped fruit, is found near streams. The wood is said to be tough and to stand the action of water.

111. *FICUS WIGHTIANA*, *pimpari* K., a tree of considerable size but not so common as the other varieties. The wood is inferior like all fig wood, and the fruit is small and yellow.

112. *FLACOURTIA MONTANA*, *hannu sampige* K., *champer* M., is a middle-sized tree, with red strong and durable wood, and edible fruit.

113. *GARCINIA MORELLA*, *arsina gurgi* K., *darámba* M., is a middle-sized tree found in the southern evergreen forests. This is the true gamboge of commerce. The wood is hard and close-grained but is not in general use.

**Chapter II.**  
**Production.**

Forests.  
Trees.

114. *GARCINIA PICTORIA*, *hardāta* K., grows in evergreen forests and is far commoner and larger than the *G. morella*, to which it is allied. The resin that oozes from the trunk has been analysed at Madras and is said to equal the true gamboge.

115. *GARCINIA PURPUREA*, *murgala* K., *bhirand* M., common in and near evergreen forests, is not large; its lemon-coloured wood is straight-grained and elastic. The fruit is eaten, and a concrete oil called *kokam* is made from the seeds and used as a medicine and in cooking.

116. *GARDENIA LUCIDA*, Ver. *dipamāli*, is a small tree with large white flowers. The wood is white, fine-grained, and good for turning. Its resin is useful in the treatment of sores and for keeping off flies and worms.

117. *GARUGA PINNATA*, *halabālage* K., *kudak* M., is a moderate-sized tree, whose timber is poor and is little used except for fuel. The bark is used in tanning and a gum oozes from the trunk. The fruit is eaten both raw and pickled. A seasoned cubic foot weighs fifty-two pounds.

118. *GIVOTIA ROTTLEIFORMIS*, *polki* K., a rather small tree, is common in dry forests. The wood is light and soft and in Gokāk and other places is used to make toys. It takes paint well and the seeds yield a valuable oil.

119. *GLOCHIDION SPECIOSA*, *nirchelli* K., does not grow to any size, and has worthless timber.

120. *GMELENA ARBOREA*, *shivani* K., *shivan* M., is a large and valuable tree. The wood is whitish, strong, and close-grained, but not heavy. A seasoned cubic foot weighs thirty to forty pounds. It does not crack in seasoning and takes paint and varnish well. It stands water well and on the whole is one of the most valuable of Kánarese woods. The fruit bark and roots are used in native medicines.

121. *GMELENA ASIATICA*, *kal-shivani* K., *láhán shivan* M., is a small tree with very hard wood.

122. *GREWIA OBLIQUA*, *darsuk* K., *pándhari dháman* M., is a middle-sized tree. The wood is used for field tools and posts and ropes are made from its fibre.

123. *GREWIA TILLEFOLIA*, *dadsal* K., *dháman* M., is a tree of considerable size. The wood is a light reddish brown, compact, close-grained, and very elastic. A seasoned cubic foot weighs thirty to forty pounds. It is excellent for coach building.

124. *GREWIA LEVIGATA*, *kaori* K., is a small tree yielding a favourite fibre.

125. *HARDWICKIA BINATEA*, *karacho* or *asana gurgi* K., *anjun* M., is a handsome straight-growing tree. The wood is a dark reddish brown, close-grained, hard and heavy. A seasoned cubic foot weighs about seventy-six pounds. The bark yields an excellent fibre which is strong and used for cordage. Cattle are very fond of the leaves.

Chapter II.  
Production.Forests.  
Trees.

126. HETICTERES ISORA, *kavargi* K., *kevan* M., is a small tree whose bark yields a fibre which is made into coarse cordage and sacking.

127. HEMIGYROSA CANESCENS, *kálu yatle* K., *lokhandi* M., is a common good-sized tree, with hard whitish wood which is used in house-building.

128. HEYNIA TRIJUGA, *koro* K., *khoro* M., is a moderate-sized tree with straight trunk. The wood is soft and not used.

129. HOCOMLIA MONTANA, *sampage* K., *támbat* M., is seldom large. The wood is white hard and tough, and is used for field-tools.

130. HOLIGARNA LONGIFOLIA, *hole ger* K., *sudra bíbo* M., is a large tree. The timber is soft and is not used except for native boats. The fruit and bark are used in medicine and yield an excellent black varnish.

131. HIBISCUS FURCATUS is a prickly climber common on the Sahyádris. It flowers beautifully in the cold season.

132. HOPEA WIGHTIANA, *haiga* K. *kavsi*, M., is a tree of considerable size. The wood is good, very hard and lasting, and much used.

133. HYDNOCARPUS ALPINA, *toratti* K., *kástel* M., is a large handsome tree, whose wood makes good beams and rafters. The seeds yield an oil which in Kárwár is used for burning.

134. HYMENODICTYON OBOVATUM, Ver. *kárví* is a large handsome tree, with a close-grained pale mahogany coloured wood. It deserves attention.

135. IXORA COCCINEA, flame of the woods, is a common bush, always covered with red flowers.

136. IXORA PARVIFLORA, *hennu gorvi* K., *khura* M., is a small ornamental tree known as the torch tree. The wood is of a reddish brown, close-grained, and used for buildings and furniture. A seasoned cubic foot weighs sixty-six pounds.

137. JASMINUM LATIFOLIUM is a common climber with handsome, white, sweet-smelling flowers.

138. KYDIA CALYCINA, *bellaka* K., *iliya* M., is a small tree whose wood is used for yokes. It yields a fibre.

139. LAGERSTREEMIA MICROCARPA, *bile nandi* K., *nána* M., is a large and handsome tree, very common all over Kánara. The wood is light-red straight-grained and excellent for house building; but if exposed it decays and is rapidly attacked by white-ants. A cubic foot of seasoned wood weighs thirty-seven pounds.

140. LAGERSTREEMIA PARVIFLORA, *channangi* K., *bondára* M., grows to a moderate size and is not so common as *L. microcarpa*. The wood is light brown, close-grained, straight, and fairly durable. It is in general use for house building and all ordinary purposes. A cubic foot weighs forty pounds.

141. LAGERSTREEMIA REGINAE, *hole dásál* K., *táman* M., is a large and very ornamental tree. It is common along the Kálinadi river and when in blossom in May its rich masses of rose purple and lilac are strikingly handsome. The wood is a light red fairly strong and

Chapter II.  
Production.

Forests.  
Trees.

much used. A seasoned cubic foot weighs thirty-six to forty-seven pounds.

142. *LASIOSIPHON ERIOCEPHALUS*, *rámi* K., *rámíta* M., is a small tree very common along the Sahyádris. The leaves are bruised and thrown into pools to stupefy fish. The people believe that the wood or its ash destroys the teeth and are most careful not to use it.

143. *LINOCIERA MALABARICA* is a small tree common in the evergreen Sahyádris forests near Bára.

144. *MABA NIGRESCENS*, *kari* K., *kála jhád* M., is a small but remarkably hard and strong evergreen. It is particularly prized for round rafters in native houses.

145. *MACARANGA TOMENTOSA*, *chandkal* K., *chandora* M., is a large tree with soft useless wood. A gum oozes from the bark which is used in medicine.

146. *MACHILUS MACRANTHA*, *gumáva* K., is a large and handsome evergreen tree. The wood is not used but would answer for boards.

147. *MALLOTUS PHILIPPINENSIS*, *kunkuma* K., *shindur* M., is a small tree. The wood is not used except as fuel; the bark is valued for tanning, and the red powder of the capsules yields an orange dye.

148. *MANGIFERA INDICA*, *mavina* K., *amba* M., is the well known mango tree. The wood is of little value except for boards and fuel. It decays at once if exposed. The tree is largely grown for its fruit and gives excellent shade.

149. *MELASTOMA MALABARICUM* is a shrub with opposite hairy three-nerved leaves, which is common in Kánara above and below the Sahyádris. The fruit is edible.

150. *MELIA AZEDARACH*, *bevina* K., *mem* M., is a moderate-sized tree grown in the dry east beyond the regular forests. It is also found self-sown in hedge-rows and over the low hills. The heartwood varies in shade according to the age of the tree, being sometimes light and often reddish. The older trees yield good building timber. A seasoned cubic foot weighs thirty pounds. The bark, leaves, and fruit are intensely bitter and are used in native medicines. The seeds yield an oil and the wood is safe against white-ants.

151. *MELIA COMPOSITA*, *kari bevin* K., *kariyápát* M., is a larger and finer tree than *M. azedarach*, but with much the same properties. It is found nearer to and sometimes in the forests. The wood also is darker and better marked, being sometimes beautifully mottled; it is safe against white-ants.

152. *MELIA INDICA*, *kare uttatte* K., *kadu khájur* M., is a large and handsome tree found along the Sahyádris. Some very fine specimens are to be seen along the road at the top of the Anshi pass and again at Sonda between Yellápur and Sirsi. The wood is dark and beautifully mottled. It is not felled for building purposes, but the leaves, fruit, and bark are used in medicine, and for the same purposes as the other two varieties. It is also like them free from the attacks of white-ants.

153. MEMECYLON UMBELLATUM, *limbtoli* K., *limba* M., is a small tree common on the Sahyádris. The wood is hard and tough, and the flowers yield a dye.

154. MESUA FERREA, *nága sampige* K., *nága chámpa* M., is a handsome tree with fragrant flowers. The wood is very hard and heavy though not much in use. A seasoned cubic foot weighs sixty-nine pounds.

155. MICHELIA CHAMPACA, *kola sampige* K., *kud chámpa* M., is grown for its sweet-scented flowers which are used in temples. The wood is said to be good, but it is not used.

156. MIMUSOPS ELENGI, *bakule* K., *vovali* M., is a large and ornamental tree. The wood is reddish brown and close-grained, and takes a good polish. It is used for house building and cabinet-making. A seasoned cubic foot weighs sixty-one pounds. The seeds yield an abundance of oil and the root and fruit are used in medicine.

157. MOROCARPUS LONGIFOLIA, Ver. *karával*, is a small tree yielding a fibre.

158. MORINGA PTERYGOSPERMA, *nugge* K., *shevgi* M., the horse raddish tree, has soft useless wood not even good for fuel. The seeds yield a pure sweet oil which is used in salads. The sap which oozes from wounds in the bark is used in rheumatism.

159. MORINDA EXSERTA, *akk* or *ainshi* K., is a moderate-sized tree with bright yellow wood. The root yields a yellow and red dye and the wood is made into dishes.

160. MUSSENDA FRONDOSA, Ver. *bebana*, is a large handsome shrub, part of whose calyx forms what looks like a large white leaf.

161. MYRISTICA LAURIFOLIA, *jájikái* K., *jáyaphal* M., the wild nutmeg tree, grows to a great size, but only in evergreen forests. The nutmeg and mace are of little value, and the wood is soft and useless.

162. NAUCLEA ELLIPTICA, *keravára* K., is a tree of considerable size. Its wood is light and yellow close-grained and in general use for house building. It is like the *Adina cordifolia* only smaller.

163. NAUCLEA PARVIFOLIA, *kadavár* K., *kalamb* M., is a larger tree than *N. elliptica*. Its wood is light coloured and close-grained and is much used for house building and cabinet-making. It does not stand exposure and must be kept dry. A seasoned cubic foot weighs about forty-one pounds.

164. NEPHELIUM LONGANUM, *kánakindale* K., is a lofty tree with straight trunk and fine globular head. The wood is seldom used being poor and apt to crack.

165. NOTHOPEGIA COLEBROOKIANA, Ver. *amberi*, is a small tree whose wood is not used.

166. OCHROCARPUS LONGIFOLIA, *suragi* K., *surangi* M., is a large tree. The wood is little used, but the flowers yield a dye.

167. ODINA WODIER, *gojel* K., *moi* M., is a moderate-sized very common tree. The wood is poor, the heartwood alone, which is

## Chapter II. Production.

Forests.  
Trees.

Chapter II.  
Production.

Forests.  
Trees.

a dull red, being used in house building. A seasoned cubic foot of the heartwood weighs fifty pounds. A gum that oozes from the trunk is used in medicine.

168. *OLEA DIOICA*, *burra nuge*, K., *karambu* M., the Indian olive, is a small tree with light coloured strong and close-grained wood.

169. *OUGEINIA DALBERGIOIDES*, *kari muttala* K., *kála phalas* M., is abundant in parts of Kánara and grows to a fair size. The wood is used for almost every purpose both in house building and for furniture. It is very hard strong close-grained and handsome. It is unharmed by white-ants, and considered fully equal to if not better than teak. A seasoned cubic foot weighs about fifty-eight pounds. An astringent red gum oozes from cuts in the bark.

170. *PÆCILONEURON INDICUM*, *kirballi* K., is a middle-sized evergreen tree, whose hard wood is used for rice pounders.

171. *PAJANELIA RHEEDII*, *bendi beli* K., is a rare and very handsome evergreen.

172. *PHYLLANTHUS EMBLICA*, *nelli* K., *avali* M., is a small tree, common in Kánara and the neighbouring forests of Dhárwár and Belgaum. The wood is poor and is scarcely ever used except for fuel.

173. *PONGAMIA GLABRA*, *thor hongala* K., *karanj* M., grows to a considerable size and is mostly found along the banks of rivers and streams. The wood is light tough and of a yellowish colour. It is put to a variety of uses. An oil expressed from the seed is used for lamps and as a cure for itch and mange. A cubic foot of seasoned wood weighs forty pounds.

174. *PARKINSONIA ACULEATA*, Ver. *vilayti kikar*, is a common roadside and hedge tree in Dhárwár and Belgaum.

175. *POLYALTHIA CERASOIDES*, *vubbina* K., *hum* M., is a straight growing and handsome tree of considerable size. The wood is light coloured, splits badly in seasoning, and is not regarded with favour.

176. *POLYALTHIA FRAGRANS*, *gauri* K., is a large evergreen tree. The wood is not used, but the bark yields fibre.

177. *PROSOPIS SPICIGERA*, *sheme* K., *saundar* M., grows to a good size. The wood is dark-red, hard, and lasting. It is used for house building and for making carts. A seasoned cubic foot weighs seventy-two pounds. A gum oozes from the bark.

178. *PSIDIUM GUÁVA*, *perala* K., *peru* M., the guava tree, besides its fruit yields a small but hard wood which is used for engraving and makes good gun-stocks.

179. *PTEROCARPUS MARSUPIUM*, *honne* K., *ásan* M., grows to a great size in Kánara and is common though smaller in Belgaum and Dhárwár. The wood is particularly prized for idol cars and for the solid-wheeled timber carts which are used in the forests. It is dark, hard, strong, and lasting. It is much used for house building and is altogether a very favourite timber. A seasoned



cubic foot weighs fifty-six pounds. A reddish gum resin which oozes from the wounds in the trunk is known as *kino* or Dragon's blood.

180. *PTEROSPERMUM RUBIGINOSUM*, *vurachandu* K., grows to a good size. The timber is said to be used in house-building and for other purposes.

181. *PUTRANJIVA ROXBURGHII*, Ver. *putrajiva*, is a middle-sized evergreen tree. It is rather rare and the wood is not used. It gets its name of *putrajiv* or child's life, because the nuts are worn as necklaces by children as a preventive against sickness.

182. *RANDIA DUMETORUM*, *káre gida*, K., *geli* M., is a small tree found in moist forests. The wood is white fine-grained and heavy. The fruit is used to stupefy fish.

183. *RANDIA ULIGINOSA*, *pandri*, K. is a small tree with white fine-grained wood. The fruit is eaten as a vegetable.

184. *SALIX TETRASPERMA*, *boch* M., is found generally near water and on the dams of rice fields. The wood is soft and useless. A cubic foot weighs thirty-seven pounds.

185. *SANTALUM ALBUM*, *gandada* K., *chandan* M., the sandalwood tree, rarely grows more than thirty feet high and four feet in girth. The outer or sapwood is white and useless, but the heartwood is yellow-brown, hard, fine-grained and fragrant. A seasoned cubic foot weighs fifty-eight pounds. The heartwood is used in making ornamental work-boxes, glove-boxes, card-cases, and paper-cutters. A valuable oil is distilled from it and it is burnt as incense in temples. The tree is very common and grows well along the south eastern frontier. The wood is in great demand and sells readily at 10s. to 12s. (Rs. 5-Rs. 6) a *man* of twenty-eight pounds.

186. *SAPINDUS EMARGINATUS*, *aratála* K., *rita* M., is a good-sized tree with fairly hard and strong but not much used wood. A seasoned cubic foot weighs sixty-four pounds. The fruit is used as soap and the nut yields an oil.

187. *SARACA INDICA*, *ashoka* K., *ashok* M., is a very handsome, middle-sized tree, common in evergreen forests. Though the heartwood is hard and dark coloured, it is not much used. The bright scarlet and gold flowers are a favourite temple decoration.

188. *SCHREBERA SWIETENISDES*, Ver. *moka*, is a moderate-sized tree, not common in the Southern Marátha Country. The wood is hard and close-grained like boxwood. It is used for turning.

189. *SCHLEICHERA TRIJUGA*, *ságáde* K., *kasamb* M., is a very common large and beautiful tree. The wood is much prized for screw-rollers for sugar mills and presses. It is reddish, very hard and heavy, and much used for house building and other purposes. A seasoned cubic foot weighs about sixty-eight pounds. The lac insect is found on the branches, and oil is pressed from the seed.

190. *SEMECARPUS ANACARDIUM*, *ger* K., *bibha* M., the marking-nut tree, does not grow to any size. The wood is soft and useless. The black juice of the fruit is used to mark linen and as a medicine.

191. *SOYMIDA FEBRIFUGA*, *swámi* K., *rainyi* M., is a tree of considerable size. The wood is a dull red and is much used for

## Chapter II.

## Production:

Forests.  
Trees.

Chapter II.  
Production.

Forests.  
Trees.

house building. It is lasting and strong, though apt to split and rough to work. A seasoned cubic foot weighs sixty-six pounds. The bark is a febrifuge.

192. SPATHODEA ROXBURGHII, *varas* M., is a small tree with soft poor wood.

193. SPATHODEA XYLOCARPA, *genasing* K., *kharsing* M., grows to a good size. Its close-grained and rather ornamental wood is used in building and for furniture.

194. SPONDIAS MANGIFERA, *amate* K., *ránambáda* M., grows to a very large size. The wood is considered of no value. The fruit is eaten by deer and is also made into pickles. A gum oozes from the bark.

195. SPONIA WIGHTII, *bendakarke* K., *karváli* M., known to planters as the charcoal tree, is a rather small tree that springs up where there have been heavy forest clearings and burning. The wood is of no value, but the bark yields a good fibre. A gum oozes from the trunk.

196. STERCULIA ALATA, *doddole* K., *sophy* M., grows to an immense height in the evergreen forests. The wood is soft and useless.

197. STERCULIA GUTTATA, *happu savaga* K., is a large handsome tree. The wood is not used, but the bark yields good cordage. Further down the coast the bark is made into clothing.

198. STERCULIA HAYNII, Ver. *bekaro*, is a medium-sized tree. The wood is not used.

199. STERCULIA VILLOSA, *savaga* K., *sárda* M., the wood is soft and useless; but the bark yields an excellent fibre which is much used in making elephant ropes for dragging timber.

200. STERCULIA COLORATA, Ver. *khovsay* or *bhakkoi*, is a tree with soft wood found in the dry forests south of Dhárwár. The flowers which appear in the hot season are of a beautiful red and are covered with thick resinous stellate hairs.

201. STEREOSPERMUM CHELONOIDES, *bond bále* K., *padvale* M., is a moderate sized tree with tough wood used in house building and for furniture. A seasoned cubic foot weighs forty-five pounds.

202. STEREOSPERMUM SUAVEOLENS, *kirsal* K. and M., yields a tough wood which is used for building and furniture. A seasoned cubic foot weighs forty-four pounds.

203. STRYCHNOS POTATORUM, Ver. *nermuli*, is an evergreen tree with white fragrant flowers. The seeds are used to clear muddy water.

204. STRYCHNOS NUX-VOMICA, *kásarkana* K., *káro* M., is a common, middle-sized tree. The wood is bitter, of a light brown, and unharmed by white-ants. A seasoned cubic foot weighs fifty-six pounds. It is hard and lasting, and is used in house-building and for carts. The seed is the nux vomica of commerce which yields strychnine. The pulp is harmless and is eaten by hornbills, crows, monkeys, and even by cattle. The root is used as a medicine.

Chapter II.  
Production.Forests.  
Trees.

205. *TABERNÆMONTANA VERTICELLATA*, *nágin kada* K., does not grow to a large size. The wood is said to be white, tough, and strong.

206. *TAMARINDUS INDICA*, *hunase* K., *chinch* M., is a very handsome tree of slow growth, but reaching to a great size. It is rarely seen in the forests but is found in gardens, near old temples, and along roads. The wood is hard, dark, lasting, and often finely veined. It is used in screws for mills and presses, also for carts and for house-building. A seasoned cubic foot weighs seventy-nine pounds. The leaves, fruit, and seed are used in medicine and a dye is prepared from the leaves. The fruit is highly esteemed and in times of scarcity the seeds are pounded and eaten. The powder of the thick seeds mixed with gum makes a cement.

207. *TECTONA GRANDIS*, *tegina* K., *ságván* M., the well-known teak tree, yields one of the most valuable timbers in the world. In Kánara it is very abundant particularly along the Kálinadi river, where clear stems seventy to eighty feet to the first branch and up to twelve feet in girth are by no means uncommon. On the Gund plateau one tree has a girth of over twenty-one feet and close to it is another of nineteen feet. But anything over twelve feet with a clean straight and sound stem is rare. In the Belgaum and Dhárwár forests there is much small teak, but except a few square miles in south Belgaum, nothing that will square into more than nine inches of hard wood. The tree grows best on granite and sandstone formations and along ridges, where the drainage is good, and the elevation up to and over 2000 feet. It is raised easily from seed and is largely planted. It also grows rapidly and well from old stools cut level with the ground. The wood though very hard is easily worked and is used for all house building and furniture making. A seasoned cubic foot weighs about forty-five pounds or two pounds more than the Burmah teak. The wood gives a good oil and the leaves yield a red dye.

208. *TERMINALIA ARJUNA*, *hole matti* K., *sávi mádat* M., is an immense tree growing in or along rivers. It is also planted along roads. The wood is used for house and boat building and for various other purposes. It is dark hard and heavy. A seasoned cubic foot weighs fifty-four pounds. The bark is considered an excellent tonic and is laid on wounds.

209. *TERMINALIA BELLERICA*, *táre* K., *goting* M., attains a great height and girth. The wood is yellowish and poor. It is rarely or ever used. A seasoned cubic foot weighs about forty pounds. The tree has a very offensive smell when in flower. The fruit is eaten by deer goats and cattle. It is one of the myrobalans of commerce and is used in dyeing and tanning. An oil is expressed from the kernels.

210. *TERMINALIA CHEBULA*, *alale* K., *hirda* M., grows to a considerable size and is very common. The wood is dark-brown with a yellowish tinge; it is hard, close-grained, and heavy and is in general use. The fruit, the myrobalan of commerce, is largely used in tanning and dyeing. The right to gather it and export it from Kánara and Belgaum used to be sold yearly and in the seven years

**Chapter II.**  
**Production.**

Forests.  
Trees.

ending 1877 yielded an average revenue of £2488 (Rs. 24,880). In 1877-78 the nuts were for the first time gathered by the forest department and yielded a net revenue of £7,696 (Rs. 76,960). The total myrobalan crop of the southern division is estimated at 11,000 *khandis* of 560 pounds worth about £10,000 (Rs. 1,00,000). The cost of gathering is about one-third of the receipts.

211. *TERMINALIA PANICULATA*, *hunáb* K., *kindal*, M., is fully equal in size and shape to the *Terminalia tomentosa*. The timber, though good and in general use, is lighter in colour, and is neither so strong nor so lasting as the *tomentosa*.

212. *TERMINALIA TOMENTOSA*, *matti* K., *ain* M., is a very straight and lofty tree of considerable girth. The wood is dark sometimes almost black. It is hard and lasting, and is in general use for house building and other purposes. A cubic foot weighs sixty pounds. The bark is used in tanning.

213. *TETrameLES NUDIFLORA*, *jermála* K., *ugáda* M., is a very large tree with soft useless timber.

214. *TETRANTHERA LONGIFOLIA*, *hase bende* K., is a fair sized tree, with a yellowish wood used for rafters and other purposes.

215. *THESPIESIA POPULNEA*, *adavi bende* K., *rán bhendi* M., is a handsome tree of rapid growth but not of more than moderate size. The timber, when ripe, is strong tough and lasting, and at one time was much used by the gun carriage department. A seasoned cubic foot weighs forty-nine pounds. The capsules yield a yellow dye.

216. *TREWIA NUDIFLORA*, *pitári* M., is a small tree with soft valueless wood.

217. *TROPHIS ASPERA*, *punje* K., *poi* M., is a good hedge plant, but does not grow more than twenty feet high. The wood is said to be fairly good, but is not used. The leaves are used to polish wood and the milk as a medicine.

218. *ULMUS INTEGRIFOLIA*, Ver. *vavali*, is a large leaf-shedding tree with light strong yellow wood used in cart-making.

219. *VATERIA INDICA*, *dhupada* K., is a large and particularly handsome roadside tree. The wood is inferior and not much used. A piney gum resin which oozes from wounds in the trunk yields an excellent varnish like copal. A solid oil is pressed from the seeds called piney tallow or *dhupada* oil.

220. *VIREX ALTISSIMA*, *balage* K., *bandálge* M., is a very large and particularly handsome evergreen. The timber is well known and highly prized. It is of a light brown, close-grained, hard, tough, and very lasting no matter to what use it is put. It is used in house-building, cart-making, and for many other purposes. It does not split or warp. A seasoned cubic foot weighs sixty-three pounds.

221. *VITEX NEGUNDO*, Ver. *nirgunda*, is a small tree or shrub very common along the Sahyádris.

222. *VITEX LEUCOXYLON*, *senkani* K., *songarbi* M., is a middle-sized tree common near streams. The wood is light-coloured and fairly strong. A seasoned cubic foot weighs forty-two pounds.

223. *WAGATEA SPICATA*, *vágáti* K., is a common thorny shrub. The pod is supposed to be good for tanning.

224. *WRIGHTIA TINCTORIA*, *kodmurki* K., *kálákudu* M., is a small tree with beautiful, white, hard and close-grained wood. The leaves are said to yield an inferior indigo.

225. *XANTHOXYLUM RHETSA*, *jummina* K., *tirphal* M., is a tree whose wood is little used. Oil made from the seeds is used as a medicine.

226. *XANTHOCHYMUS PICTORIUS*, *janagi* or *devamkái*, K. bears a pleasant yellow fruit of the size of an orange from which a yellow gamboge-like resin oozes.

227. *XYLIA DOLABRIFORMIS*, *jambe* K., *jámbe* M., grows to a great size and is common. It is one of the iron woods. The wood is dark-red and is very hard and lasting. A seasoned cubic foot weighs from sixty to sixty-six pounds. It is in general use, and for piles for bridges and for sleepers cannot be surpassed. It is used by the lac insect but is unharmed by white ants.

228. *ZIZYPHUS JUJUBA*, *ilanjimara* K., *bor* M., grows to a moderate size and is mostly found in grass lands and gardens in the plains. The wood is dark hard and fairly close-grained and lasting. It is used in house-building and for many other purposes. A seasoned cubic foot weighs fifty-eight pounds. The fruit especially of the garden trees is extremely good. The bark which is used by tanners gives a kind of *kino* gum, which, with the bark root, seed, and leaves is used medicinally by the natives.

229. *ZIZYPHUS XYLOPYRA*, *mullu káre* K., *kánte gotti* M., is a small common tree. It is hard lasting and of a yellow colour. It is made into torches and field-tools. Its fruit is used to blacken leather.

The domestic animals<sup>1</sup> of the district are, according to 1881-82 returns, oxen (109,034), cows (111,354), buffaloes (63,773), sheep and goats (6756), and horses (374). Everywhere but especially below the Sahyádris the stock is inferior. On the coast the pasture yields little nourishment. No Indian millet is grown, and rice straw is a poor substitute. In Kárwár, Kumta, Ankola, and Honávar there are few domestic animals of local breed. Bullocks in these coast sub-divisions are thin weak and stunted. Horses are brought by European officers, and some native officials keep ponies. But the climate is unsuited to horses, which always look thin and ragged. The *munchil* or hammock slung to a bamboo pole and the palanquin are the usual modes of travelling on the coast. A special class of men, belonging to the fisher castes, Bhois, Harikantárs, Khárvis, and Ámbers accustom themselves from boyhood to carry palanquins, constant usage raising a hard lump on the shoulder, which enables them to bear the weight of the pole without inconvenience. Above the Sahyádris, in the forest sub-divisions of Supa and Yellápur, domestic animals are extremely rare. In Mundgod, Haliyál, Sirsi and Siddápur ponies are kept for carrying packs by Pendhárís,

## Chapter II. Production.

Forests.  
Trees.

### Domestic Animals.

<sup>1</sup> Most of the details of Domestic Animals are contributed by Mr. R. E. Candy, C. S.

**Chapter II.**  
**Production.**

Domestic Animals.

*Bullocks.*

and some good bullocks and buffaloes are also found. Both above and below the Sahyádris, the best cattle are imported from Dhárwár and Maisur.

Bullocks begin to work at about six years old. Carts and ploughs are generally drawn by one pair of bullocks. The usual cart-load varies from twenty to thirty *mans* of twenty-eight pounds. Pack-bullocks are used by Lambánis, Korchars, and Maris, who move from village to village selling rice, cocoanuts, plantains, and salt. A pack-load is three or four *mans*. In the rainy season the pack-bullocks are left to graze in the fields, but in the fair season they are stall-fed on straw, gram, oil-cake, and cotton-seed. The price of a bullock varies from £2 to £4 (Rs. 20-Rs. 40). Cows begin to calve at about five years of age, and go on bearing until they are about fifteen. They give one to two pints of milk a day for about six months after calving. Townspeople, in some cases, make special arrangements with husbandmen for rearing heifers. The husbandman rears the heifer till she is of age and in reward is allowed to keep the first calf on condition of sending the cow with its second calf to the owner. The price of a cow varies from 16s. to £2 (Rs. 8-Rs. 20), and is sometimes as high as £2 10s. (Rs. 25). She-buffaloes begin to calve at five and go on bearing till they are about fifteen. They yield about six pints of milk a day for about eight months, and their price varies from £2 10s. to £5 (Rs. 25-Rs. 50). He-buffaloes are used for draught, ploughing, and pack carrying, and are stronger than bullocks. Formerly Gavlis used to roam the forest with large herds of buffaloes. These animals were found to cause much damage to saplings, and the Gavlis were ordered to leave the district unless they took to tillage and kept no more animals than were wanted for farm work. Hubli is the chief buffalo mart. Buffaloes are also brought from Hubli, Ránebenur, and Bankápur, to Gokarn, Sirsi, and Haliyál for sale; the nearer they go to the coast the dearer they become. In Hubli the price of a good she-buffalo varies from £4 to £5 (Rs. 40 - Rs. 50). Haiga Bráhmans keep a large number of buffaloes as milk is their chief article of diet.

*Cows.*

*Buffaloes.*

*Sheep.*

On the coast, sheep are brought from Haliyál, Sirsi, and Hángal. But the climate suits them so badly that they lose condition even in a single week. Good mutton is dear and little used. Milch-goats are occasionally kept by Muhammadans and Christians, but they are of a poor breed. Above the Sahyádris flocks of sheep and goats can obtain pasturage and keep in fair condition. In this part of the district a sheep can be bought for 2s. 6d. or 3s. (Rs. 1¼ or Rs. 1½), but below the Sahyádris the price is rarely less than 6s. (Rs. 3).

*Pigs.*

In Kárwár, Kumta, and Honávar the Goanese and other Christians keep pigs. These are of the common breed though better than those kept by Mhárs, Vádars, and others above the Sahyádris. Pigs are allowed to range about at will, picking up any food they can get. Great complaints are made by field-owners of the injury they do to their crops. A well fed pig fetches from 12s. to £1 (Rs. 6 - Rs. 10).

*Fowls.*

Fowls are kept by all classes except Bráhmans. The lower grades of husbandmen delight in cock-fighting, and they feed and train

the birds with great care. It is an universal custom at fairs, especially at fairs in honour of Mari or Bhaváni, to offer cocks to the goddess. The head is cut off in front of the idol and the body is carried away by the worshipper and eaten. Fowls are offered for sale in the Kárwár and Kumta markets. In villages they are kept only for private use. A fowl in good condition costs 1s. to 1s. 3d. (8-10 *ans.*), a half fowl 6d. to 9d. (4-6 *ans.*), and a chicken 3d. to 4½d. (2-3 *ans.*). No eggs are exported. In Kárwár many turkeys and ducks are reared by Christians of the better sort. Turkeys and ducks are also largely imported from Goa. A turkey-cock costs about 10s. (Rs. 5) and a turkey-hen 4s. to 6s. (Rs. 2-Rs. 3). Ducks are sold at 10s. (Rs. 5) the dozen.

Thirty<sup>1</sup> years ago the Wild Elephant, *Elephas indicus*, *áne K.*, *hatti M.*, was a yearly visitor from Maisur to Kánara. Small herds used to find their way from Sorab, through the Chandragutti hills, into parts of Sirsi, and even as far north as Bhagvati, half-way between Haliyál and Yellápur. Three miles south of Bhagvati a small pond on the roadside is still known as the *ánehonda* or Elephant's Pool, where wild elephants used to drink and sport. These herds did not remain in Kánara throughout the year. Their last visit was made in 1868.

The Tiger, *Felis tigris*, *hebbuli K.*, *vágh M.*, was thirty years ago found in all parts of the Bombay Kánarese districts. The wild animal reward returns seem to show that the last tiger shot in Kaládgi was in 1857. But the returns are apt to confuse tigers and panthers, and it is probable that tigers continued to be killed in Kaládgi for some years later. In Belgaum tigers were formerly very numerous. As many as thirty-nine were killed in 1840-41. They are now seldom heard of except in the south-west of the Bidi sub-division close to the Kánara border. In Dhárwár also tigers are now scarce. Those that are met with no doubt find their way from Kánara. Kánara is the only one of the Bombay Kánarese districts where tigers are found in any numbers, and even in Kánara their number has considerably decreased within the last few years. Still in most parts of the district they are not uncommon and if the shooting is properly managed fair bags may be made. The tiger's favourite haunts are near the Sahyádris where they breed in the wildest and most difficult parts. But they love to rest in densely wooded river banks and in safe cool spots in islands thick with thorns, rank grass, and creepers. It is believed that Kánara tigers do not differ in habits, size, or colour from the tigers of other parts of India. They vary in colour from bright to tawny, the beautiful satin skin and the sharply marked stripes of the young tiger growing dull and faint with age. Full-grown tigers average from nine feet to nine feet eight inches. Five have been shot over ten feet, one of which was ten feet two and a half inches. The tigress averages from eight feet to eight feet seven inches. Two have been shot over nine feet, the largest of which measured nine feet two inches.

## Chapter II.

### Production.

#### Domestic Animals.

##### Fowls.

#### Wild Animals.

##### Elephants.

##### Tigers.

<sup>1</sup>The section on Wild Animals is contributed by Colonel W. Peyton, Conservator of Forests S. D.

**Chapter II.**  
**Production.**  
 Wild Animals.  
*Tigers.*

Of the tiger's pairing season little is known. The Kánara idea is that tigers pair during the cold weather. This scarcely agrees with the fact that cubs of a few days' old have been found at all times of the year, and that tiger's caterwaulings are heard at other times besides the cold weather. In March 1882 a tiger and a tigress came out together near Yellápur and were both killed. For some days before this many cattle had been carried off and caterwaulings had been heard day and night. It seems probable that tigers have no particular pairing season. The tiger's age is also doubtful. The natives have a curious fancy that the age can be told by the number of lobes in the liver, a lobe for each year. As a rule a tigress has two to four cubs, but a litter of five is by no means uncommon. Tiger cubs often stay with the mother till they are as big as herself, which supports the view that tigresses have young only once in three years. A tigress with five half-grown cubs was shot near Tinái in 1878. She came out with all her cubs about her. On being fired at she sprang into the fork of a tree some twelve feet from the ground and seized the charred end of a date-tree which she no doubt took for her enemy. The second shot missed her and lodged in the tree. But the first had struck her through the heart, and she fell backwards dead. All but one of the cubs were shot in a few moments. On another occasion, also near Yellápur, a family of five, all about the same size, came out together. Of the five two were killed, one was wounded, and two got away without being fired at. Instances of three or four cubs of the same size and family are well known. In April 1882 a tigress and five cubs, about seven months old, were killed near Poteli in Supa. A tigress with cubs is far more dangerous than a tigress without cubs. After the birth she remains with the cubs about her for seven or eight weeks keeping to the same place, except to sally out in search of food, till they are able to travel with her. Tigers are ever changing their hunting grounds and travel long distances during the night. When on the move they keep to the roads and pathways, and their marks may often be traced along a road for miles at a stretch. Though they move so freely tigers have certain favourite haunts where they are always found year after year. Formerly tigers chiefly fed on wild animals. Now that the stock of wild animals has been reduced the tiger's chief food is the village cattle. Tigers take cattle out of pens or sheds and pull them down at all times of the day, often in the presence of their watchers who sometimes show the greatest spirit in driving the tiger off. Of wild animals, bison, hog, and deer are the tiger's favourite prey. But it is well known in Kánara that the tiger also feeds on the putrid carcass of animals which he has not killed. During the 1876-77 famine, when the cattle from the plains were driven into the forests and died there in thousands, tigers, panthers, wild dogs, even hog, fed on the putrid carcasses. Another curious point in regard to a tiger's food is that one tiger will kill and eat another. A case of this occurred near Kundpe in Supa on the 3rd of April 1875. According to the people of a hut not more than a hundred yards distant, there was a battle-royal between a tiger and a tigress with two half-grown cubs. The tiger had killed a bullock and



Chapter II.  
Production.  
Wild Animals.  
*Tigers.*

eaten part of it during the night. Next night a tigress and her two cubs, no doubt accidentally, came across the dead bullock. They were busy eating when the tiger to whom the bullock belonged came up. For some time there was much noise and growling, and then an unmistakable fight, which lasted for about half an hour. Next morning the people cautiously crept to the scene of the fight and found much of the bullock eaten and the ground greatly torn. On the same morning the story of the fight was told to a sportsman who happened to pass near the hut. He went with the people to the scene of the fight and found that their story was true. A trail in the high grass showed that something heavy had been dragged through it. On following this trail, the forefoot of a young tiger was found, and, within three hours a tiger was beaten out and killed. He measured eight feet eleven inches and was very robust. Further search discovered the young tiger's head and some of the bones, stomach and skin. The tiger shot was a good deal scratched and torn about the face and chest. Two days later, on the 5th of April 1875, another bullock was killed within a mile of the same spot, and in a beat a tigress and a half-grown cub came out and were both shot. This was the tigress of the fight. She was badly mauled, and her wounds were fresh. She measured eight feet six inches and her cub which was a male measured six feet eight inches. On another occasion, in following up a tigress which had been wounded the evening before, one of her cubs was found badly mauled and dead. No doubt in her pain the mother had killed her cub, which had perhaps tried to play with her where she lay during the night.

In attacking cattle tigers either steal in or rush on the herd from some neighbouring thicket. When they secure one of the herd they drag it into the thicket, sometimes at once, but often when they come back towards dusk to feed. If not disturbed they lie up near till the carcass is finished. Unless he is forced to leave the place from want of water the carcass of a large bullock will last a tiger for two, three, or even four days, and the carcass of a bison will last a tiger for a week. Opinions vary regarding the way in which a tiger seizes its prey. Some sportsmen hold that the tiger seizes its prey by the throat; others hold that the victim is caught by the nape of the neck. In nine cases out of ten the animal is seized by the throat. At the same time wounds seen on the back of victims and the statements of herdsmen prove that cattle are sometimes seized from behind, and by the nape of the neck.

It is sometimes said that the tiger uses his dew claws to make the large wounds in the neck and throat, and that he applies his mouth to the wounds and sucks the blood. There is probably no truth in this story, except that it is the case that in seizing their prey tigers use their terrible forepaws to bring the victim down and dislocate his neck. It is not unusual for a tiger to kill two bullocks at the same time, and to drop them within a few yards of each other. Three or four bullocks are also occasionally killed at the same time, and one case is on record in which, in a space of not more than an acre, two tigers killed seven head of cattle. It is well known that to teach her young a tigress will hamstring, break the leg of, or

Chapter II.  
Production.  
Wild Animals.  
Tigers.

disable one or more cattle in a herd. In eating its prey the tiger as a rule begins on the rump, and less commonly at the breast. People who have seen tigers eat, declare that they tear off pieces with their claws, and that they also lick and rasp the flesh with their rough thorny tongues.

In shooting tigers in Kánara sportsmen take up a position in trees, on ladders placed against trees, or on foot standing behind some tree or bush. When the sportsmen are placed, the part of the forest in which the tiger is supposed to lie is beaten towards them by fifty to a hundred or more beaters. Occasionally when the carcass of a bullock is found, the sportsman has a seat or *mechán* made or a ladder planted against some tree within fifteen or twenty yards of the carcass. The sportsman generally takes his seat in the afternoon and waits till dark or sits up all night on the chance that the tiger may come back to finish his prey. Elephants are never used in Kánara as its high trees and dense scrub are unsuited to elephants. In a long beat a seat in a tree is generally uncomfortable. At the same time it is not only safer but gives a better view, especially when the seat is from ten to fifteen feet from the ground. Standing behind a tree or bush or sitting on a low seat has many disadvantages. It is unsafe except to the most tried and experienced sportsman. A tiger writhing under a broken leg or shoulder is most dangerous, and if the slightest move is made will probably catch sight of and dart on the person who fires or on his attendant. Moreover the tiger is by no means an easy mark for the second barrel. As he spins about he is marvellously quick and ball-like in his movements, and the second shot may not settle him but bring him on to the shooter, whose position is betrayed by the second report if not by the first. An old hand will keep a tiger down by quick and true shooting, using a second or a third gun as rapidly as if they were one gun with four or six barrels, or an old hand will wait till a head or neck shot at very close quarters is certain death. But let the novice beware of running so great a risk. A tiger shot through the body will at times not even speak to the shot, though the shot is mortal, and will dash on his way straight in front without showing a sign of being hit. This is not the case when a bone is broken. Then the tiger stops for a moment and makes a startling uproar. Another objection to a position on the ground is that the view is confined to a short distance, in evergreen forests or among *kárví* or *Strobilanthus* stalks to less than ten yards. A third objection to a position on the ground is that in the excitement of the moment a man stationed on the ground is liable to be shot, or in firing in front may himself wound one of the beaters.

The best and most comfortable position is on a light bamboo ladder fifteen to sixteen feet long. This when placed against a tree or bush gives the sportsman a choice of views from a few feet to eleven feet from the ground. A light bamboo ladder with nine or ten flat rungs is extremely useful, not only for tiger shooting but in beating for deer and other large game. It is easily carried by two men and can be placed in position without noise. The higher rungs of a ladder are generally safe. But in

Chapter II.  
Production.  
Wild Animals.  
*Tigers.*

several cases tigers have charged up ladders in the most determined manner and had to be stopped. The commanding position exposes the whole body of the tiger as he comes. This great advantage is lost on foot when the rush is made in thick cover and the head and chest are alone exposed. When a ladder is placed on a slope, facing the high ground, and the tiger is beaten down towards it, there is a considerable chance that the tiger will charge. A recently retired police officer of seventeen years' grand experience in Kánara, whose good fellowship and love of sport made him a welcome and dear companion in many an adventure, twice rolled over a charging tiger at the very foot of his ladder.

In driving for tigers, in fact in driving for any large game, the general management of the beat and the positions to be taken by the guns is mostly left to the local *shikáris* or native hunters. In Kánara each village or cluster of villages has its leader or leaders in matters of sport, and whether the villagers drive on their own account or on behalf of a European sportsman, they look to their leaders for direction.

These local sportsmen have a marvellous knowledge of their own runs or hunting grounds. They know, far better than any European sportsman can hope to know, where the game is likely to lie; they know its ways; where it will make for when it is roused, and where it can be cut off. In arranging a beat the first thing is to choose a dozen or more of the most intelligent beaters for stops or watchers, to be placed in trees at different parts of the ground so as to guide the game towards the guns. The rest of the beaters are sent to some well known spot close to where the beat begins, but not so near as to risk disturbing the game. Their orders are not to leave the spot till they get a signal to begin to beat. When the head beaters are set in their trees and the rest are sent to some well known spot to wait, the head native *shikári*, in the most careful silence, leads off the sportsmen and points out what positions they should take. At each post the sportsman silently chooses the nearest suitable tree, sets his ladder against it, and takes his seat. On the way, on both sides of the ground to be driven, some natives are set on trees as stop-men. They are told to keep still unless the tiger tries to break and should he try to break to make a noise and turn him back into the beat. As a rule when roused from his lair by the shouts of the beaters behind him the tiger moves forward, feeling his way at every step. He moves by the shortest road, always through cover, to some other haunt. He shrinks from any strange sound. The least noise is enough to turn him back. If he sees the stop-man who makes the noise, the chances are that he will dash past him with a deep 'wouf' or subdued roar. The success of the drive greatly depends on the skill of the stops in making suitable noises and on their keeping hid and perfectly still.

When the head of the beat has placed his guns and his stops, he goes back to the beaters or sends them word to begin to beat. In carrying on the beat the moment a shot is fired and the signal is passed that the tiger has gone back wounded, all the beaters either clear out of the beat or get into trees. If a shot is fired but no

**Chapter II.**  
**Production.**  
 Wild Animals.  
*Tigers.*

signal is passed back the beat goes on as if no shot had been fired. Cunning old tigers, who have been driven before and know the danger ahead, try to break back. In case this should happen, it is the invariable custom to send with the beaters a trustworthy gun-bearer to fire one or more shots if the tiger refuses to be driven. The gun-bearer is also expected to fire in case the forest is very thick and it is likely that the tiger should keep to his lair till the beaters come close to him. Every care is taken and every effort is made to keep the tiger well in advance of the line of beaters. When the ground that is driven is thin, and there is a likely place for the tiger to lie in near at hand, the line of beaters simply passes through the thin part exchanging a word with one another here and there, but quietly, so that the sound may not reach the parts which are next to be driven.

During the whole beat the gunners who are in position should be careful to keep perfectly still and alert. The tiger often steals forward noiselessly and is ever quick to detect danger in front. The slightest sound may make him dash forward, giving only a snap shot, or it may send him back to the line of beaters, which is always dangerous. Tigers coming from a distance should be patiently awaited. It is well to remember this. If a long shot is taken and the tiger is missed or wounded, he is almost sure to go back, and the beaters have no time to clear out or get up trees before the tiger is on them.

With care accidents seldom happen in tiger shooting. Six have occurred in Kánara, three from wounded tigers, when on each occasion a man was killed; one, when a man was taken some twelve feet out of a tree by an unwounded tiger going back and breaking through the line after having been fired at; and two by panthers.

On one occasion a panther which was being followed up was shot dead off a beater he had knocked down, and on whom he sprang from the shoulders of a sportsman who himself escaped with some scratches only on the face and shoulders by firing at and hitting the brute as he rose at him. The panther was literally blown from the muzzle of the sportsman's second barrel, and without a moment's loss of time. This adventure occurred to Colonel McGillivray, the late well known Superintendent of Police in Kánara, and was as sudden and unexpected as it was well met.

When a tiger is wounded and dashing to one side it is by no means safe for a stop in a tree, unless he is well out of reach, to try and turn him. A few years ago near Mundgod an English sportsman's personal servant, unseen by his master, climbed into a tree behind him and by clapping his hands tried to turn a badly wounded tiger towards his master. In a moment the tiger had hold of him and bit him so badly that the poor boy died. The sportsman killed the tiger soon after, but the accident remained though he was in no way responsible.

It is by no means uncommon for a wounded and angry tiger to dash up a tree and lay hold of the inmate several feet from the ground. Near Dándeli a stop on a low headless tree, near a ford in a river, tried to turn a wounded tiger. The tiger was heard to give a

succession of savage roars and was seen to dash at the tree from some distance. He was in the tree with his cruel paws on the branch just below the man, who could climb no higher, when an express bullet brought him down with a broken back. On another occasion a wounded tiger tried to pull down a boy from a sapling fourteen or fifteen feet from the ground. He must have succeeded had not the sportsmen who were five in number run up together. On seeing them the tiger retired to a thicket, but charged the moment a shot was fired and was dropped within a few paces of the party. The boy was taken down terribly frightened and exhausted. Sportsmen should insist on their followers always getting into high trees safe out of reach.

On one occasion a wounded tiger got terribly enraged and went at the beaters from tree to tree, tearing a slipper to pieces which was thrown at him. At last he lay down, and the sportsman, who had gone in after him, was guided to him by the people on the trees and killed him with a single shot between the eyes, not always a safe shot either, but there was no help as the brute was lying on a narrow pathway about thirty yards off, and had just raised his head preparatory to a charge. Great was the rejoicing over this tiger. He had caused much trouble, and in truth was downright vicious.

When a tiger is wounded the beaters are sent to some safe place and the trail is taken up by the sportsmen helped by the local and personal *shikáris* who follow the track under protection of the guns. On no account are the marks of blood or the foot-mark left on the chance of accidentally coming across the tiger. If accidents are to be guarded against, the party must keep together and on the trail. So long as a sharp watch is kept ahead and the tiger is seen before he makes his rush, the danger is small compared to a sudden charge made unexpectedly from one side.

If a tiger is not found within a short distance from where he was fired at, it may be assumed that he is not badly hurt. He may have to lie down but he moves on when his pursuers come near. In such cases the usual plan is to send one or more guns ahead and post them in trees where the forest narrows, to cut off the tiger from the cover he seems to be making for. If no European sportsmen are available native *shikáris* should be sent with their own or with a spare gun. On no account are beaters used after a wounded tiger, but a few are very useful to take up positions in trees as stops to the guns who are sent ahead. The best gun, or the most experienced of the sportsmen, and another of the party, if there are many out, should remain with a couple or more sharp native trackers on the trail, which must be steadily kept to. This is perhaps the most successful way to hunt down a wounded tiger, for he is brought to book either by the sportsman on his track or by the party ahead. If it is found that the tiger is making for another cover than was at first supposed the positions of the front guns can be quickly changed.

An amusing incident occurred near Yellápur a couple of years ago during the rains. A tiger was wounded and in following him up was seen to be down and move on as he was approached.

Chapter II.  
Production.  
Wild Animals.  
*Tigers.*

**Chapter II.****Production.****Wild Animals.***Tigers.*

One of the two guns was sent ahead to a narrow part of the forest with cultivation on each side, where there was a pathway, and a well known tree into which he was told to climb. This pathway lay between two rather steep hills covered with dense undergrowth. After a pause the tracking was resumed. It happened to be raining hard and the sportsman found the tree so uncomfortable that he came down. When the tracking party drew near voices were heard below and not more than fifty yards off, which seemed strange as the tiger's foot-marks were very fresh. The position was soon explained. Only a few yards in front of the tracker was the tiger crouching, looking down, and listening to the voices below, which came from some of the beaters who were making their way to a hut in the open close by. In a moment, but too late, the tiger became aware of the party behind him. A shot from an eight-bore went smashing into his shoulder. He made a tremendous row, and struggled hard, but he was never allowed to get on his legs, and was smashed up with five other shots which rained in on him in quick succession. The moment the first shot and the answering roar of the tiger were heard, the beaters, who had no right to be there, made off. The second sportsman manfully held to his place though he could see nothing and was right in the line of fire.

A wounded tiger who lies up within a short distance is badly disabled. On such occasions the chances are that if not floored in time he will charge.

Charges may often be averted by the sportsman's quickness of eye and resource in taking advantage of any hesitation shown by the tiger. There certainly are times when there is no averting a charge, as when the tiger is being approached and cannot be seen. At such moments it is well to bear in mind that the first shot is everything. This is especially the case when the cover is at all thick and damp, for then the smoke hangs. It may be said that at the last moment a tiger is often turned by a shot fired into his face. No trust can be placed on this off-chance. If the sportsman is not confident that he can knock down the tiger and keep it down he had better leave the tiger alone.

In following tigers in thick and difficult cover it is well to send a couple of active young fellows up trees to examine from above the thicket into which the foot-marks lead. In this way the densest cover is searched without losing the trail and with a minimum of danger.

On two or three occasions, when other means had failed, tigers have been killed by one of the guns climbing into a tree. A rifle and plenty of cartridges are handed to the person on the tree, and the other guns either stand at the foot or are sent back out of danger. A few years ago a couple of young sportsmen tracked a wounded tigress into a very difficult place, into which it would have been next to madness for them to creep. They tried every means to drive her out, but to no purpose. At last a man who had been sent up a tree close by declared he could see the tigress, and, as a last resource, it was agreed that one of the two should clamber up and shoot while the other stayed below. As the climber was

struggling up the tree, out-rushed the tigress and was gallantly dropped within a few yards by his companion below.

In numerous cases tigers have been known to charge, some with little provocation and others after much provocation. Occasionally tigers will not charge at all. Why they do not charge is not known. But a young sportsman should not trust to the chance that a tiger will not charge, and follow a tiger as he follows a deer. As a rule, if not taken in time, a wounded tiger will charge. As he charges the tiger utters a startling roar which is apt to throw the sportsman off his guard. The effect of the roar on the best and staunchest men is often shown by a step back, but this is only for the moment till the beast is fairly seen. When a tiger continues to struggle on the ground or lies breathing heavily, cartridges should not be spared. Several tigers have been lost by too great a tenderness for the skin. Great care should be taken in coming near a tiger lying to all appearance dead or dying. The beast may be only stunned. A few years ago on the Yellápur hills a tiger was driven from the top of a hill towards a young sportsman on a ladder. From the slope of the hill, the tiger was almost on a level with the top of the ladder, and in the surprise of the moment was missed. The tiger then went galloping across a small bit of open about sixty yards in rear of the next gun. He was missed with the first barrel, but as he got the second he was seen to pitch forward behind a bush. The large double muzzle-loading eight-bore with which he was fired at, was then changed for a 500 express, and the sportsman getting down the ladder ran to within twenty yards of the tiger, which was lying stretched at full length breathing heavily. On seeing this, first one, and then, after putting in a fresh cartridge, another barrel was fired into the beast. He did not show the slightest sign of being hit by either, though both bullets were seen to strike him in the flank, their course being towards the chest. On the second shot being fired, as the tiger lay stretched at full length with his head away from the sportsman, a man on a tree almost immediately over him called out that he was dead. The sportsman carelessly walked up to the tiger. In another moment his hand would have been on the body of the beast, when the tiger opened his eyes, and, with a roar, reared on his hind legs, his face close to the sportsman and his forepaws stretched over his head. To push the muzzle of the express into the brute's chest, pull the trigger of the second barrel, and fly down the hill was the work of a second. The whole affair, the roar of the tiger as he got on his legs, the shot, and the sportsman's flight was of startling suddenness. There was a general stampede of beaters. After a run of about thirty yards the sportsman joined his young companion. The tiger was heard to growl several times, and the stop in the tree above him called out that he had moved and lain down in a small dip or hollow hard by. Just then also the sportsman's personal *shikári* came up with the eight-bore gun which had been first fired and with spare cartridges for the express. He had been left to undo the ladder and the whole affair was so sudden that neither he nor the other sportsman had time to give any assistance.

## Chapter II.

### Production.

#### Wild Animals.

##### *Tigers.*

Chapter II.  
Production.  
Wild Animals.  
Tigers.

Both guns now went up together, and the tiger, though fired into before he had time to move, shortened the distance between himself and the guns by several yards in his endeavours to come on.

On examining the body, it was found that the first shot from the eight-bore had struck the tiger where the neck joins the head. It had cut through the flesh and grazing the bone had given a shock to the spine without breaking it. But for the two flank shots and the chest shot from the express the tiger would have gone away and have been little or none the worse.

For a successful season's tiger shooting the sportsman cannot depend on the chance of cattle being carried off near his camp. He must take with him a number of cattle to be tied up and used as baits. As villagers will not part with their cattle to be tied up as baits, thirty or forty head must be bought in some large market town and taken about with the camp. The cattle cost to buy from 12s. to 14s. (Rs. 6 - Rs. 7) a head and their keep comes to about 3d. (2 as.) a day each. It may seem cruel to tie up an animal to be killed by a tiger. But every tiger at large destroys not less than thirty to fifty head of cattle a year, and among the victims are choice milch and draught animals worth from £2 to £6 (Rs. 20 - Rs. 60). It is the custom to bait such places only as tigers frequent during their midnight prowls and where thick cover is near into which the tiger is likely to drag his kill.

The bait remains tied from four in the evening to seven in the morning. The people entrusted with the work are induced by a reward of 10s. (Rs. 5) for every kill to tie in the best places. If the bait is taken, the person who has tied it up either himself brings the news or sends some one to the camp. On his way the messenger tells the people of the villages he passes, who gladly turn out with the local *shikáris* and await the sportsman somewhere on the way to the kill. When the news reaches the camp one or two hours law is given for the beaters to meet and for the guns to go ahead. Then the sportsman rides to the place and the beat is arranged.

Beating for tigers or other game is popular in Kánara. The difficulty is to keep too many people from coming. When there are two or more guns it is usual to let anyone come who chooses, and to pay them all, men and boys, 6d. (4 as.) each. If the beat is successful each of the local *shikáris* gets from £1 to £2 (Rs. 10 - Rs. 20), and the personal *shikári* who makes all the sporting arrangements gets 30s. (Rs. 15) for each large tiger, 12s. (Rs. 6) for each half-grown tiger, and 6s. (Rs. 3) for each cub. If nothing is killed the personal *shikári* gets nothing, but under no circumstances do the local *shikáris* ever get less than 4s. to 8s. (Rs. 2 - Rs. 4) each. The person who brings the news of the kill gets 4s. (Rs. 2). As the Government reward is £2 8s. (Rs. 24) for a full-grown tiger, £1 4s. (Rs. 12) for a half-grown tiger, and 12s. (Rs. 6) for a cub, it is needless to say that tiger shooting is expensive. But to be successful the sportsman must be liberal and kind and jolly with the people, whether they are beaters or *shikáris*. Both undoubtedly earn all that a sportsman can give them. They are marvels of patience and endurance throughout the heat and



fatigue of the day, and of great good humour at its close. Driving is in no way against the inclination of the people of Kánara. It is a pleasurable excitement which they enjoy as much as the sportsman. They will leave almost any work to join in a beat. Of most of the local *shikáris* it is not too much to say that though cautious at first, their confidence is easily gained, and that when they know a sportsman they will face any danger with him and are thoroughly to be trusted.

Besides in a regular beat tigers are sometimes found when stalking other game. When a tiger is found in stalking other game the sportsman goes a short distance ahead leaving a few men who move towards him making no noise beyond exchanging a word or two and here and there throwing a stone.

Tigers are also shot when coming to drink, or when returning at night to feed on a carcass. Shooting over water is seldom practised except by natives; but Europeans sometimes sit over a kill on the chance that the tiger will come back. A place is built in a tree some ten or twelve feet from the ground and about fifteen yards from the carcass. This though a tiresome and rather disappointing form of sport is not without attractions and difficulties. A tiger is very shy and cautious. He walks round his kill and watches it for some time before he approaches. The slightest noise frightens him and if frightened he either will not return at all or will wait till late in the night beyond the patience of a European.

Monkeys betray a tiger when he is on foot in a beat, or when he moves in the forests in search of food, or when he is coming to his kill in the evening. So also peafowl, junglefowl, and spurfowl all rise before a tiger with a scared cry not to be mistaken by those who know it. In Kánara, when a sportsman is stalking other game and hears monkeys swearing, he takes it as a sign that a tiger or a panther is near. By moving quickly and without noise towards the monkeys and by carefully watching their movements and the direction in which they are looking, he may often be rewarded by a shot. But noisy monkeys are not always a safe guide as they also swear at jungle-dogs and jackals.

Tigers hunting together or a tigress with cubs, when one of them is shot, often remain in the same place calling for two or more days. This is a good opportunity for putting out a few baits, one of them is sure to be taken. The call of a tiger to his mate is different from his *wouf* or his angry roar. It is soft and loud in a tone which is perhaps most nearly represented by a long-drawn *ahum*. The sound seems to roll along the ground, and on a clear night and in favourable country may be heard more than two miles. It is made as the animal is moving and is repeated every two or three minutes round a considerable area at odd times of the night or morning. Sometimes a tigress, when away from small cubs, will make this call even during the day as if to assure them she is near. It is not difficult to cut her off and shoot her when she is heard calling in this way during the day time.

As regards the number of cattle killed by tigers, returns are available only for the eight years ending 1882. During these eight

Chapter II.  
Production.  
Wild Animals.  
*Tigers.*

## DISTRICTS.

Chapter II.  
Production.Wild Animals.  
*Tigers.*

years 6527 cattle are returned as killed by tigers, that is, an average yearly loss of 816 head.

Returns of the number of tigers killed are available for a considerably longer period. During the twenty-two years ending 1877, 510 tigers were killed and £360 (Rs. 8597) paid in rewards. Between 1856 and 1866, 158 tigers, or a yearly average of fourteen, were killed and between 1867 and 1877, 352 tigers, or a yearly average of thirty-two, were killed. The number of persons killed during the whole period of twenty-two years was, one European officer, Lieutenant Power of the 35th Madras Native Infantry, and forty-three of the natives of the district.

The details of the five years ending 1882 are as follows ;

*Kánara Tigers, 1878-1882.*

YEAR.	Tigers killed.	Reward.	Persons killed.	Cattle killed.
1878 ... ..	23	£ 51	2	1153
1879 ... ..	18	44	2	850
1880 ... ..	39	105	2	677
1881 ... ..	28	77	3	494
1882 ... ..	22	46	1	867
Total ... ..	130	323	10	4041
Average ... ..	26	65	2	808

*Panthers.*

In Kánara panthers are especially common. There are no large caves or prickly-pear thickets, but there is the splendid cover of some 3500 square miles of almost unbroken forest in which they can choose homes and hunting grounds. Naturalists say and most sportsmen agree that there are two or more varieties of the panther. There is a larger animal six feet to seven feet eleven inches which is called the panther; and a smaller animal five feet six inches to six feet which is called the leopard. The panther is also supposed to be lighter in colour than the leopard, and unlike the leopard to keep aloof from villages and frequent low rocky hills in open ground rather than in forests. The black panther is also thought to be a distinct species. To the ordinary observer there does not appear to be any difference between the panther and the leopard; and there is nothing in the appearance or habits of the pard to induce the belief that there are two or more varieties. Pards of both sizes are found equally often near villages in Kánara; and all alike prey on cattle, ponies, pig, donkeys, goats, deer, monkeys, and dogs. A panther over seven feet eight inches in length is considered an unusually fine specimen. One measuring eight feet is said to have been killed near Siddápur a couple of years ago (1880), and several of seven feet nine inches have been killed. On the other hand anything under five feet eight inches is thought small. Three black panthers have been shot in Kánara and a fourth has been seen. The colour of these animals can be due only to the accident of birth. If they are of a different variety from the ordinary panther, it is almost certain that others like them would have been seen during the last seventeen or eighteen years. The panther

**Chapter II.**  
**Production.**  
 Wild Animals.  
*Panthers.*

like the tiger has no particular pairing season. Cubs have been taken at different periods of the year. The female, who has from two to four at a birth, deposits her young in the hollow of some large tree on the ground, or below some projecting rock, and they remain with her till they are fully as large as herself. The call of the panther is altogether unlike the tiger's call. It is a succession of short grunts as nearly as possible represented by the sounds 'Goorka-Goorka-Goorka' repeated at short intervals, as he travels no doubt looking for his mate. This call is unlike the low angry grunt with which a panther delivers his charge, and it is worthy of note that a panther will sometimes charge without making any sound. Like the tiger the panther is roaming in his habits, and like him he has favourite haunts to which he returns time after time and where he stays for days. Some say that the panther dislikes water and hates even to wet his feet. But instances can be given of panthers dragging their prey or even swimming through water. They eat carrion or any rotten carcass.

The panther is hunted in the same way as the tiger. But he is far more cunning, and will sometimes lie in a small thicket or climb into some wide-spreading tree and let the beaters pass him. On two occasions in Kánara panthers have been shot out of trees. The panther, though he has nothing like the power of the tiger, is when wounded far braver and quicker in attack. Many cases have been known of most dashing charges in the thicket, in high tree forest, and in open ground. On three occasions panthers have been doubled up at the sportsman's feet, when in another second they would have seized. Even when unprovoked a panther will sometimes dash out and maul a single person or one of a party of three or four. Recently near Sámbrani, between Yellápur and Haliyál, a panther sprang at a man and his wife who were walking along a forest pathway. The man was knocked over and the panther was on the top of him when the wife seized the axe which had fallen from her husband's hand and brained the panther, though unluckily too late to save her husband's life. In other cases panthers have been known to wound two or three men one after the other. A few months ago a wounded panther badly mauled three men who were following him up.

Wounds received from tigers and panthers are very dangerous and difficult to heal. Between the shock and the poison from their foul-feeding fangs few recover.

The Government reward is £1 4s. (Rs. 12) for a full-grown panther, 12s. (Rs. 6) for one half-grown, and 6s. (Rs. 3) for a cub. The returns of the wild animals killed in Kánara between 1856 and 1877 show that 591 panthers were slain, and £684 (Rs. 6840) paid in rewards. During this period eighteen people were killed. In the first of the two periods of eleven years, that is between 1856 and 1866, 253 panthers or a yearly average of twenty-three were killed, and, in the second period, between 1867 and 1877, 338 panthers, or a yearly average of thirty-one, were killed.

The following statement gives details for the five years ending 1882 :

Chapter II.  
Production.  
Wild Animals,  
Panthers.

## Kánara Panthers, 1878-1882.

YEAR.	Panthers killed.	Rewards.	Persons killed.	Cattle killed.
1878 ... ..	32	£ 45	...	472
1879 ... ..	40	76	...	278
1880 ... ..	48	58	...	889
1881 ... ..	57	73	1	255
1882 ... ..	42	36	3	278
Total ...	214	288	4	1617
Average ...	42	71	...	323

## Leopard Cat.

The Leopard Cat, *Felis bengalensis, vagati*, is rarely seen in Kánara. It is a beautiful little animal, about three feet long and not unlike the panther in colour. One was shot out of a tree near Tinai in 1875. Unfortunately the specimen was spoiled by the express bullet breaking and tearing the skin almost to pieces. The natives say that this little animal is very fierce and lives on small deer, hares, peafowl, and jungle-fowl.

Hunting Leopard  
and Lynx.

The Hunting Leopard, *Felis jubata, chita* or *chircha*, and the Lynx, *Felis caracal, shira-nái* or *chira-nái*, are unknown in Kánara. They are said to be found in parts of Kaládgi and in the Kod and Gadag hill ranges of Dhárwár, but they have not been recorded by any officer whose authority can be quoted. Some years ago when the antelope was common in the Belgaum and Dhárwár plains, hunting *chitás* were kept by the Nawáb of Sávanur and the chiefs of Mudhol.

## Hyena.

The Hyena, *Hyæna striata, taras* (H.), *kattegirbu* (K.), is common in Belgaum, Kaládgi, Dhárwár, and Kánara. Though considered cowardly it kills donkeys goats and dogs. The hyena is often ridden down and speared, and in spite of its ungainly and apparently slow movements it often gives an excellent run. Since 1840 seventy-nine hyenas have been killed in Belgaum and seventeen in Kaládgi. The reward varies from 6s. to 10s. (Rs. 3 - Rs. 5).

## Wolf.

The Wolf, *Canis pallipes, landgah* (H.), or *tola* (K.), is not known in Kánara. At one time it was numerous, and it is still found in some numbers in Dhárwár, Kaládgi, and Belgaum. The wolf chiefly preys on donkeys, sheep, goats, and antelope. But it is a bold animal, and three or four of them will lie out close to a herd of cattle and at once attack any that separates from the rest. They also sometimes kill human beings. The wolf has been ridden down and speared. This is justly considered a great feat. Many sportsmen contend that on such occasions the wolf must have been gorged. But at least one instance can be given in which an ungorged wolf was ridden down and speared. The returns show that since 1840 ten wolves have been killed in Belgaum and 1505 in Kaládgi.

## Wild Dog.

The Wild Dog, *Kuon rutilans, kolsunda* (M.) *káda-nái* (K.), or *jangli kutta* (H.), is not found in Kaládgi, but is common in Dhárwár, Belgaum, and Kánara, especially in Kánara, where packs of twenty and upwards have been often seen. They grew very bold in the 1876-77 famine and killed great numbers of the half-starved cattle which were driven into the Kánara forests to graze. Since then a reward of 10s. (Rs. 5) has been paid for each full-grown animal

brought to the head-quarters of sub-divisions. Wild dogs are very destructive to deer of all kinds and to pig, which they regularly hunt. They are also said to attack tigers, but no instance of their having killed a tiger is known. At the same time it is a fact that the tiger will give up his kill to wild dogs and will leave a place in which there is any large number of wild dogs. It is also true that panthers will take to trees to escape from wild dogs. The people fear packs of wild dogs as much as they fear almost any animal. Cases of packs snarling and yapping round sportsmen and others when disturbed at their prey are well known.

The Jackal, *kolha*, *Canis aureus*, is numerous everywhere, even in the very heart of the forests. But the Fox, *lomri* or *sannakempnari* (K.), *Vulpes bengalensis*, is found only in the open country outside of Kánara.

The Porcupine, *Histrix leucura*, *sáler* or *mul-handi* (K.), is also found everywhere, especially in Kánara.

The Crocodile, *Crocodylus indicus*, *maggar* or *mosale*, and the Otter, *Lutra nair*, *panni kutta* or *nirnáí* (K.), are occasionally found in rivers and large ponds. In the Kánara rivers they are especially common.

The Black Bear, *Ursus labiatus*, *karádi* or *asval*, was at one time found in great numbers in Kánara and Belgaum. It is fast becoming rare, except near the Sahyádris, and even there it is no longer numerous. Between 1840 and 1880 no fewer than 223 bears were killed in Belgaum. Of the whole number 137 were killed between 1840 and 1850; fifty-one between 1850 and 1860; thirty-two between 1860 and 1870; and three between 1870 and 1880. In Kánara fifty-one bears were slain between 1856 and 1882, and during that time twenty-two persons were killed by bears. Among the persons killed by bears in Kánara was Lord Edward Percy St. Muir, second son of the Duke of Somerset. This happened at Lálguli on the Kálinadi, on the 20th of December 1865. For Dhárwár there are no returns, but bears were formerly found in the Kod and Gadag hills, which are now almost bare even of scrub; they are still occasionally met in Bankápur and Hángal into which they no doubt stray from Kánara. Between 1844 and 1861 the bear was also found in Bágalkot, Hungund and Badámi in Kaládgi, twenty-five bears having been slain during those years. As far as the returns show no bear has been killed in Kaládgi since 1861. The bear is more feared in Kánara than almost any other animal. At least in Kánara it is a mistake to think that bears do not attack without provocation. In several cases both wounded and untouched bears have been known to charge in the bravest manner and with a startling grunt or roar. The bear is about six feet long and three feet high. It has two or three young at a birth, and, from an early age, the mother takes or carries the cubs on her back. No case of bears eating flesh has been recorded in Kánara though elsewhere bears have been known to eat flesh. Their chief food is the white-ant and larvæ of beetles, which they scratch out and suck from their nests. Bears also feed on many wild berries and are most partial to the jack fruit (*Artocarpus integrifolia*) and to *kakai* pods (*Cassia Fistula*). They are also said to be particularly fond of palm-juice and to

## Chapter II. Production.

Wild Animals.  
*Wild Dog.*

*Jackal.*

*Porcupine.*

*Crocodile.*  
*Otter.*

*Black Bear.*

Chapter II.  
Production.

Wild Animals. ✓  
Black Bear. ✓

climb into palm trees and empty the toddy jars. Bears, like tigers, are hunted by driving, or by sitting over their caves, though in Kánara bears rarely live in caves except during the rains. The time to sit over a cave-mouth is either in the very early morning when they return from feeding or about sunset when they come out. The best sport with bears is to track them in the early morning when the dew lies heavy on the long grass and the track is easily followed.

The Hog.

The Hog, *Sus indicus*, *dukar* or *handi*, is general everywhere. Immense boars are often found in the forests which would delight the hog hunter in anything like a riding country. In Bankápur in Dhárwár and from Lakshmeshvar and Shirhatti belonging to the Miraj and Sánгли states west of the Kappatgudd hill, the country is perfectly rideable and first-rate sport may be got in the cold weather. Hog might also be ridden in parts of the Kod sub-division in Dhárwár. In Kaládgi wild hog have greatly increased since 1873 when the forests began to be conserved. The wild boar is found up to forty inches high and about six feet long. He is perhaps the pluckiest of animals. As a rule he dies game to the last, and whether it is made at the hog-hunter spear in hand, or at the sportsman from a thicket on foot, his rush is all that is mighty and gallant. His flesh is much esteemed by low class Hindus.

The Bison.

The Bison, *Gavæus Gaurus*, *káda-kona* or *gava*, is found over the greater part of Kánara, but from being so much shot at and from being subject to the diseases which prevail among domestic cattle in Kánara, it is disappearing from many parts where it abounded fifteen or sixteen years ago. Formerly the bison was also found in considerable numbers about the Rámghát and Chorlághát, and in the south-west corner of the Bidi sub-division of Belgaum. Now it is rare everywhere, except in parts of Bidi where small herds are still found. Odd bison find their way into the Nágargáli and Kirpoli forests under the Sid pagoda during the rains, but only to return to Kánara as the season dries. It is said that many years ago a large bull was shot by the present Sir Frank Souter near to One Tree Hill about a mile and a half to the north of Belgaum. Stray bison from Kánara are also occasionally seen during the rains in the western limits of the Kalghatgi sub-division of Dhárwár; but except strangers, the bison is not found either in Dhárwár or in Kaládgi.

Bison are most numerous in Kánara along the Sahyádris and in the forests through which the Kálinadi, Bedtihalla, Gangávali, and Tadri pass. They were especially common about sixteen years ago in the Gund forests, and between Gund and Anshi, as well as along the Káni river which rises in the Kundal hills and joins the Kálinadi opposite Nirsol in Yellápur. Two outbreaks of the cattle disease which is now prevalent in the Ankola forests, destroyed great numbers of them.

The bison is generally a rich dark brown, gradually changing to a dirty white underneath. But the old bulls, which are magnificent animals, much larger and more massively built than the cows, grow almost black, and lose most of the hair on the upper part of the body. The older a bull-bison grows the blacker and balder he

becomes; and the skin gives out a nasty oily sweat. Below the knees and hocks the legs both of bulls and cows are white, four dirty white stockings, while the shape and pointing of the hoof is so well marked and so unlike the hoof of the tame cow or buffalo as to make it easy for the initiated to track a bison through a herd of tame cattle. The bison has no hump. The dorsal ridge rises gradually backwards some five inches above the shoulder and then falls suddenly about the middle of the back. This gives the animal the appearance of enormous strength in front and of weak and drooping hind-quarters, though when closely examined his hind-quarters are found to be free from this defect.

The head of the bull is much broader and more massive than the cow's head. The forehead in both is grey approaching a dirty white and in both the lower part of the face is black to near the muzzle which is grey or light lavender. Among the older animals the bull's horns are very much larger than the cow's horns. The bull's horns, which are massive throughout, are broad, rugged, and ringed to about one-third of their length from the base, and have a wide sweep and broken or blunted points. The horns of the cow are smooth and ringless, slenderer and more upright with an inward curve towards the tips. Some very old bulls have rather upright, short, rugged, and massive horns curving in more or less, and ringed from the base nearly up to the curve. Others have very horizontal horns like the arms of a man raised to the level of his shoulders and bending slightly at the elbows, the hand at the wrist being turned up and the fingers forming a curve from the knuckles pointing inwards. Horns of this kind are also very flat particularly in front. A good bull varies in height from five feet eight inches to six feet two inches, and the width across the widest sweep of the horns is from thirty-two to forty inches.

Bison are seldom seen in herds of more than ten or fifteen, and, except during the rutting season between October and December, no really large bulls are found with the herds. Except at the pairing season most large bulls do not stay with the cows but prefer either a lonely life or the society of one or more other bulls. It is the general belief in Kánara that the solitary bulls found in the fair season and the earlier rains have not been driven from the herd by the younger bulls, but that they leave of their own accord and meet the cows at pleasure or when the breeding season begins. Some solitary bulls are no doubt aged animals which have been driven away by younger rivals. But experience in stalking herds supports the belief that most solitary bulls are solitary from choice. The bulls found with herds of cows are so rarely of full size and vigour that it is difficult to believe that they really are the lords and masters of the cows to the exclusion of the magnificent bulls of noble proportions and full vigour of life who are met alone. If the sportsman wants a prize let him look to the solitary bull, not to a herd which may end in his shooting some young beast or a cow. When disturbed, bison are particularly shy and difficult to approach, and the extreme acuteness of their sense of smell often prevents surprise. They are also quick

**Chapter II.**  
**Production.**  
**Wild Animals.**  
*Bison.*

Chapter II.  
 Production.  
 Wild Animals.  
 Bison.

in finding that they are followed. This is shown by their taking down wind and breaking away time after time just out of sight of the sportsman simply from scenting danger in the currents of air brought to them from their pursuers. On the other hand, where they are seldom molested, on any sudden alarm they will crowd together in the utmost confusion, and if the sportsman is so inclined will give him the chance of shooting down three or four of them before they have time to recover and make off. When suddenly alarmed bison give one short hissing kind of snort and then turn and dash away. Bison feed chiefly on grasses and creepers. During the hot months they also eat many leaves and berries, the fruit of the *aula*, *Phyllanthus Emblica*, and the *karmal*, *Dillenia pentagyna*, being especial favourites. They are also very fond of hot weather rice, which has to be carefully guarded against them. During the rains juicy young bamboo shoots are their favourite food. About this time they frequent the salt licks which are common in every part of Kánara, the natron and soda of the salt licks being, as Jerdon says, as essential to the well-doing of the bison as common salt is to domestic cattle when kept in hilly tracts. A salt lick is about the best place to which a sportsman can go in the early morning to find and take up the fresh foot-mark of some old bull.

Bison are hunted either by being driven towards the sportsman by a number of beaters, or by the sportsman with a couple of good guides looking for them in their haunts in the early morning, and if not found there, taking up the foot-prints of some herd or of a solitary bull and tracking them to where they lie for the day. They are also shot in the evening when coming to drink or to feed. Bison are seldom driven except where the cover is so close and thorny that they cannot be got at in any other way. A drive for bison is managed in much the same way as a drive for tiger, only bison are not driven to the guns so easily as tigers. When aroused by shouts bison as a rule feel their way quietly to the front. In doing so they make short rushes backwards or to one side as they scent danger in the air. When their suspicions that there is danger in front or to one side are fairly roused, nothing will induce them to go in that direction. They will stand still and await the near approach of the beaters and then break right through the shouting mob rather than face the unseen danger in front. Bison would not be driven at all if they did not sometimes break to the front and give a shot, but as a rule, owing to the sagacity of the animal, beats for bison are unsuccessful. In a forest and among hills the wind is never steady. The air eddies and circles, and this is the secret why the bison is able to outwit the best sportsman. In beating for bison the sportsman should be prepared for disappointment and should not lay the blame on the local *shikáris* who will always do their best.

The sport of all sports is tracking the bison in their native wilds, either finding them feeding in the early morning or lying in their midday lairs. When the track takes over and round hills and across jolly valleys and streams the tracking is always pleasant, and pleasure passes to the keenest excitement and joy when a tuft of newly eaten grass or fresh warm droppings show that the



bison is near. If in luck, the sportsman may win his trophy early and be back in camp in good time, fresh and full of hope for the next day. Sometimes he may have to track on to a late hour, but even then the trophy sweetens the toil and the miles back to camp are walked with a light heart. It also sometimes happens that the deep shades of the evening stop further tracking and leave a dark walk home of many weary miles. The only consolation is that all was done that could be done, and admiration for the quickness and sagacity of the noble bison. In spite of blank weary days such fascinations has bison tracking that the sportsman will toil day after day. When a bison is reached and seen it is well not to be in a hurry. If the animal tracked proves to be one of a herd, it is usual to work about the herd to find out the bull whose large foot-prints have been followed. If the animal tracked proves to be a solitary bull, look for a good shot, the centre of the forehead if he happens to be facing the gun, and the neck or behind the shoulder if he is broadside on. A bison will at once drop to the head or neck shot, and if hit properly behind the shoulder, will not go far before he pulls up and gives another chance. Nine inches below the top of the dorsal ridge over the shoulder will also at once drop a bison when he can be despatched with the second shot. Bison have been dropped right and left with a 500 express to this shot. When not mortally wounded a bull will travel a long way and give great trouble. He will take to the very closest thickets and have to be followed through them, and after he is well worried and perhaps once or twice hit, he will lie very close and probably charge. As it is difficult to stop a charging bull or cow, for when provoked a cow will charge as readily as a bull, the protection of a tree or however small a clump of bamboos should be sought. There is abundant proof of bison charging in Kánara. On three occasions sportsmen have been knocked down, and five instances are known in which *shikáris* and trackers were knocked over and hurt. Dozens of instances can also be given of most deliberate and well delivered charges which were avoided by stepping behind a tree.

The *Sámbar*, *Rusa Aristotelis*, *kadavi* or *meru*, is common over most of Kánara, especially near the Sahyádris. It is also found in the Belgaum Sahyádris and a few probably stray animals from Kánara occur in Kalghatgi in Dhárwár; it is not known in Kaládgi. The *sámbar* is nowhere so numerous as it was ten or fifteen years ago. The cause of this is the great increase in the number of guns. There is scarcely a village that has not its one or more guns licensed or unlicensed. During the dry season, especially in moonlight nights, from almost any camp in the district shots may be heard.

The native way of shooting *sámbar*, spotted deer, small deer, and pig is to dig a hole close to some forest pool and screening the edge with thorn, to sit in the hole, and shoot. Natives do not venture to shoot at tigers, panthers, or bears except from trees. If there is a chance of these larger animals coming to drink, the hole is protected by laying logs of wood across the mouth leaving a small opening from which to shoot. When the fruit of the *aula* *Phyllan-*

## Chapter II.

### Production.

#### Wild Animals,

##### *Bison.*

##### *Sámbar.*

Chapter II.  
Production.  
Wild Animals.  
Sámbar.

thus Emblica, the *karmal* *Dillenia pentagyna*, the *goting* *Terminalia bellerica*, and the *ambára* *Spondias Mangifera*, ripens and begins to fall, natives make seats or *mecháns* in the tree and from them shoot sámbar and other deer as they come to eat. This is deadly work. With the increase in the number of guns and the use of percussion guns instead of flint and matchlocks it must end in the destruction of deer.

The people of one or more villages often join and beat their forests for sámbar, deer, and pig. This is fair sport and is not discouraged. But during the dry season pot-hunting loafers from other districts come into the forests and make it a business to shoot deer and pig from holes and trees, making money from the sale of the flesh. Sámbar are hunted by sportsmen in much the same way as bison. They are either stalked or looked for in the forests in the grey of the morning or evening, or they are driven by beaters. When driven by beaters sámbar show all the sagacity and instinct of the bison. They will dash through the line of howling beaters rather than face the unseen danger in front or to one side which they have scented in the air. The sámbar stag is all over a noble-looking beast standing thirteen to fourteen hands high at the shoulder. In colour he is a dark slate or grayish black, and like the old bull bison the upper part of the body is sometimes nearly bald. The female or hind is much lighter in colour. The Kánara rutting season is believed to begin in the middle or towards the close of the cold season. But young are met with in most months of the year. It is thought that sámbar begin to shed their horns early in April, but it is not believed that stags shed their horns every year, only once in two if not three years. An instance of a stag shedding its horns occurred at Barchi near Supa in April 1871. A sportsman out stalking came upon a large stag with fine horns. The animal was lying down and looking towards him. On receiving the shot the stag jumped on his legs and made off, but the sportsman's dogs raced him into a pool of water within 200 yards. To his amazement the sportsman found the stag with a bullet in his chest but with no horns. The trail was taken up and after a run of about eighty yards one horn was found and then the other, where he was shot at and scrambled on his legs. Kánara and Belgaum sámbar horns as a rule are not large. The following are the measurements of the finest pair that can be produced: Length of horn 34"; round the horn 9"; above the horn 8"; widest sweep of horn 30"; between points 24"; upper tine 13"; lower tine 10". Two larger heads have been seen, but the measurements are not available. They were heavier and perhaps two or three inches longer. One of them belonged to a particularly fine and noble-looking stag which was killed by Lieutenant Hughes, of the 2nd Queen's (Royal), in April or May 1876.

Spotted Deer.

The Spotted Deer, *Axis maculatus*, best known under the native name of *chittal*, was at one time numerous over the whole of Kánara. From the destruction caused by pot-hunting *shikáris* shooting at drinking pools and from fruit trees it is now scarce. Ten or fifteen years ago the spotted deer was most abundant throughout the

valleys of the Kálinadi, Bedtihalla, Gangávali, and Tadri, as well as all along the east of the district, and at most places two to three stags could be shot in a morning stalk.

At Dandeli in 1867 from a herd of not less than 150 to 200, three splendid stags were picked out and shot in a few moments. Now, about the same place, the sportsman has had a lucky morning if he sees a small herd or two and gets one stag. Spotted deer were at one time numerous in the Dhárwár forests along the Kánara frontier, but, as in Kánara, they are now scarce. The same may be said of the Belgaum *chittal*. The pot-hunting native *shikáris* with licensed or unlicensed guns, and some of the Government armed servants at posts throughout the district are responsible for the disappearance of the *chittal*. Both alike shoot over water and from trees, and both alike kill for the purpose of selling the flesh. A spotted deer or a large boar fetches 10s. to 16s. (Rs. 5-Rs. 8). If fairly stalked the spotted deer can take care of itself. But if some check is not put on shooting does at certain seasons, this beautiful animal, to the real grief of the forest people, will soon be killed off. This is Jerdon's first-rate description of the spotted deer: 'The general colour is yellow or rufous-fawn with numerous white spots, and a dark dorsal streak from the nape to the tail. The head is brownish and the muzzle dark. The chin, throat, and neck in front are white; the lower parts and the inside of the thighs are whitish; the outside of the ears is brown and the inside white; the tail is longish and white beneath. The basal tine is directed forwards, and in old animals has often one or two points near the base. The length is about four and a half to nearly five feet; the height at the shoulder is from thirty-six to thirty-eight inches.'

Like the sámbar the spotted deer is difficult to drive, though not so difficult as the bison or sámbar. But the charm of deer-shooting is stalking the stags through the beautiful glades and forest openings in the gray of the morning. The rutting season is believed to begin towards the close of the cold season and to go on till the end of May. About the end of May 1881 a male and female were specially noticed. Still many stags shed their horns and are found in velvet in the period between March and May. It is believed that like the sámbar the *chittal* stag does not shed its horns oftener than once in three years. The flesh of the spotted deer is very dry, but the head and feet are worthy of a place on the table. The greatest known length of a Kánara spotted deer's antlers is thirty-five inches. Any heads of thirty inches and over are considered good. The spotted deer's antlers have rarely fewer than six points, nine have been frequently seen, and one is recorded of eleven.

The Rib-faced or Barking Deer, *Cervulus aureus*, *bakra* (M.), or *advikuri* (K), gets its name of rib-faced from two curious dark lines down the face, and its name of barking deer from its hoarse loud cry when disturbed or alarmed. It is found all over Kánara, its favourite haunt being the dark groves of high evergreen forests and the thick patches of *kárví* (*Strobilanthus*) that cover the Sahyádrí slopes.

The barking deer is also found in the hills of western Belgaum ;

## Chapter II.

### Production.

#### Wild Animals.

##### *Spotted Deer.*

##### *Rib-faced or Barking Deer.*

## Chapter II.

## Production.

## Wild Animals.

*Barking Deer.*

it is rare in Dhárwár, and is not known in Kaládgi. Jerdon describes the barking deer as in colour a bright rufous bay, the inside of the limbs and below the tail white, and the chin and lower jaws whitish. In front of the fetlocks of all four legs are some white spots. The facial creases are dark-brown. The average length of body is three and a half feet and of tail is seven inches. The height is twenty-six to twenty-eight inches and the horns are from eight to ten inches long. The doe is a little smaller and has tufts of bristly hair on a knob in the spot where the buck has his horns. To this description it may be added that the three inches of horn next the head are covered with bristly red hair, and that the points form a hook backwards; also that there is a small tine just above the red hair. The barking deer is not difficult to drive, and it may be met with grazing in the morning and evening close outside of the deep forest or thicket which it makes its home. It is almost always alone even two being rarely seen together. Whether stealing silently through the cover, or bounding across some open glade, the head and neck are carried singularly low and the hind quarters raised. The flesh is dark and thought better than the flesh of the spotted deer.

*Mouse Deer.*

The Mouse Deer, *Memimna indica*, *pisai*, is very common in Kánara and in the western Belgaum forests. It has not been noticed in Dhárwár and does not occur in Kaládgi. Like the barking deer it is seldom seen except alone, and the dark evergreen forests and the *kárvi* (*Strobilanthus*) cover of the Sahyádris are its favourite resorts. Jerdon's description correctly applies to the Kánara mouse deer. The colour above is olive mixed with yellow gray; below it is white. On the sides of the body are yellowish white lines formed of interrupted spots, whose upper rows are joined by some transverse spots to rows on the opposite side; the ears are reddish brown; the length of body is from twenty-two to twenty-three inches; and the length of tail one and a half inches; the height varies from ten to twelve inches; and the weight from five to six pounds. The flesh is very white and is seldom eaten except by Hindus. Musalmáns do not eat it; they say it is too like the pig. It is said to rut in June and July and to have two young at a birth.

*Four-horned Antelope.*

The Four-horned Antelope, *Tetraceros quadricornis*, *kurunj* or *charusingha*, is sparingly met in Kánara, Belgaum, and Dhárwár; it has not been noticed in Kaládgi. Unlike the barking deer it does not live in heavy forests, being seen only in the more open and bushy parts. Its gait or manner of bounding, with its head and neck low, is very like that of the barking deer. The flesh is also similar. Jerdon describes it as of a uniform brownish colour, bay above, lighter beneath, and whitish inside the limbs, and in the middle of the belly. The fore-legs are dark, also the muzzle and edge of the ears which are white within with long hairs. The fetlocks are dark within with more or less distinct whitish rings. The length of body is from forty to forty-two inches; and the tail is five inches long; the ears are four and a half inches long; the height at the shoulder is two feet to twenty-six inches, and a little more at the croup. The anterior horns are one and a half inches long and the posterior horns from four to five.

The Indian Gazelle, *Gazella Bennettii*, *chinkára*, is not found in Kánara. It occurs, though sparingly, in the open hilly parts of Belgaum, Dhárwár, and Kaládgi, and where there is brushwood and small trees. It is not a forest-loving animal. In the Kod and Gadag hill ranges of Dhárwár herds of seven and eight have been seen, but they are shy and difficult to get at if they once see the sportsman. Jerdon describes the Indian gazelle as of a deep fawn, brown above and darker where it joins the white on the sides and buttocks; the chin, breast, lower parts, and buttocks are white. The tail, knee, tufts, and fetlocks are black. There is a dark brown spot on the nose, and a dark line from the eyes to the mouth, bordered by a light line above. The length of a buck is three and half a feet; and the tail eight and a half inches; and the height twenty-six inches at the shoulder and twenty-eight inches at the croup. The ears are six inches long, the head nine inches, and the horns from twelve to thirteen. The horns of the female are small, rarely more than six inches and usually between four and five. They are slender, slightly wrinkled at the base, and incline backwards with the tip bent forwards.

The Indian Antelope, *Antelope bezoartica*, *haran* or *chigri*, is common in the plains but does not occur in Kánara. At one time antelopes were found in great numbers from one end to the other of the Dhárwár plains and to a less extent in Kaládgi and the north of Belgaum. It is now scarce everywhere, but is commoner in the south of Dhárwár than elsewhere. The black buck is a beautiful animal, and it is not difficult to get within 120 or 130 yards of him so long as he is approached in an in-and-out sort of way. With patience this way of approach rarely fails. The does as a rule are the first to take alarm, and when a doe is noticed stamping her foot or showing any other sign of disturbance, the sportsman should gradually draw away in such a manner that the herd will at once understand that the object of their alarm is going from, not coming towards them. The black buck's horns are seldom more than twenty inches long. Perhaps the largest pair ever seen in Kánara belonged to the late Mr. Sharkey of the Civil Service. They were good twenty seven inches, but they were brought from Gujarát not killed in the Kánarese districts. When black buck are fighting they are easily approached, and it is sometimes also easy to get near them, when the buck is intent on keeping the does from going to join some rival's herd. It is curious to notice this and also to see how does are allowed to join a herd while the buck is driven off. Such domestic changes and disorders are the sportsman's opportunity.

Jerdon describes the Indian antelope as with long horns diverging, with five flexures in old individuals, with strong rings at the base and smooth tips. The colour of the grown male, above and on the sides, is a rich dark glossy brown; beneath and inside of the limbs they are white; the hindhead, nape, and back of the neck are a hoary yellow; the nose and lips and a large mark round the eyes are white; the length of the body is about four feet and of the tail seven inches. The height at the shoulder is thirty-two inches, and the ear is five and a half inches long; the horns are twenty to

## Chapter II.

## Production.

## Wild Animals.

*Indian Gazelle.**Indian Antelope.*

## Chapter II.

## Production.

Wild Animals.

*Indian Antelope.*

twenty-seven inches long, and diverge at the tip from nine to eighteen inches. The female is somewhat smaller, and is a pale yellowish fawn colour above, white beneath and inside the limbs, and with a pale streak from the shoulder to the haunch. Between Pánchgaon and Kaládgi, on the road from Belgaum, a white doe was reported some eight or ten years ago, but not seen, and a couple of years ago in Kod in Dhárwár an officer of the Southern Marátha Survey shot a doe antelope with horns of an irregular shape.

Bees.

Kánara Bees<sup>1</sup> are of four kinds, *togar-jeinu* or *totte-jeinu*, *tudabi-jeinu*, *kol-jeinu* or *katti-hulla*, and *nusarri-jeinu* or *misri*. Of these four kinds of bees the *togar-jeinu* is the largest, being three-fourths of an inch in length. It has a black fore and hind part, and is of a dull red about the centre. It is particularly fierce and will often attack people even when not molested, and once fairly roused a swarm becomes dangerous and difficult to shake off. The *togar-jeinu* fastens its combs to the upper limbs of the loftiest trees, often 150 feet high, and as many as from twenty to thirty combs may sometimes be seen on a single tree. The combs are also found attached to steep and difficult cliffs and to the sides of high bridges and even to the walls of houses. The swarms generally leave their nests about July, and find their way to the parts of the country where grass and other favourite plants are found. They always return and rebuild in the same place year after year. The size of the comb varies with the size of the swarm, each comb being separate, from a foot and a half to three feet long and from eight inches to two feet deep. The bees gather honey from the blossoms of many timber trees. But their favourite plant is the *kárvi* or *Strobilanthus*, of which there are seven or eight kinds in Kánara. They abound along the Sahyádris and blossom at periods varying from three to nine years. When the *Strobilanthus* is in flower the whole air near the plants seems alive with bees. A full comb of the *togari-jeinu* bee contains from eight to fifteen beer bottles of reddish-brown honey and from one to two and a half pounds of wax. The honey and wax are harvested during dark nights, twice in the year, once just before or after the setting in of the rains in April-May, and again in October-November. The October-November honey is called the grass harvest, and the April-May honey when many trees and shrubs are in flower the main harvest. The combs are taken from the high trees with the help of long bamboos whose side branches are cut short to serve as steps. These bamboos are tied all the way up the trees and right on to the branches to which the combs are fastened. The tree is climbed in a dark night, the climber carrying a flaming torch which he passes across the swarms of bees to drive them off. The combs are taken and either lowered by a rope or put in a basket tied to the climber. The bees are not destroyed, only scared by the glare and smoke of the torch. The climber must show no fear or hesitation, though he seldom comes off scathless, and is often badly stung.

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<sup>1</sup> Conservator of Forests S. D.'s 1862, 22nd June 1882.

Chapter II.  
Production.

## Bees

From high cliffs honey is taken either from below by bamboo ladders, or from above, the honey-gatherer being seated in a basket or net let down over the top of the cliff by a rope.

The second or *tudabi* bee is about half an inch long with a black fore part and a striped black and dirty yellow hind part. It builds its combs in the hollows of trees and in old walls. It is not so fierce as the *togar* bee and its sting is less painful. Its honey also is more esteemed, but the combs are far smaller and do not hold more than from one to three beer bottles. The bees are generally smoked out but they are sometimes blown out by the breath of the honey-taker's mouth. The combs are removed in open day, the honey-taker's hands being often covered with bees.

The third or *kol* bee builds its combs on thorn bushes or small plants. It is smaller than the *tudabi* bee, and produces less honey and wax, though it is of a finer quality than the other two. The comb which holds at the most about a tea-cupful of honey is generally full before the beginning of the hot season, after which the young swarms come out and finish the honey, and the comb is deserted. Where the supply of flowers fails the bees mostly die, though some move to other places where the rains are lighter or flowers less scarce. The insect stings a little, but is easily driven off, and the branch on which the comb is found is cut away with a knife or other sharp instrument.

The fourth or *nusarri* or *misri* bee is not larger than an ordinary black ant. It is found in the hollows of trees and in walls. The honey, which is used as medicine, is whitish, and the wax black. This little insect, or so-called bee, does not sting, but at times is very troublesome in its endeavours to get into the ears, nose, and eyes.

Bees are never thoroughly domesticated. In some small hill villages in a white ant's nest or more rarely in a hole made for the purpose, an earthen pot is placed with its mouth down and a small opening made on one side. This completes the hive. It is left to chance whether bees take up their quarters in it or not. If they do, they are allowed to remain unmolested for some time and then the comb is extracted, care being taken not to disturb the part in which the young bees are lodged. In this way the bees do not get frightened and remain for a year or two. They seldom stay longer as either through carelessness or greed the young bees are disturbed and the old ones fly off. This honey is mostly used for home medicine.

## Tame Bees.

The right to collect honey and wax is yearly farmed, and higher bids are made for the farms in years when the *kárvi* or *Strobilanthus* is in flower. The revenue derived from honey during the four years ending 1880-81 amounted to £1914 (Rs. 19,140) or an average yearly income of about £478 (Rs. 4780).<sup>1</sup>

<sup>1</sup> The details were: £380 12s. 9d. (Rs. 3806½) in 1877-78; £380 7s. (Rs. 3803½) in 1878-79; £657 2s. 9d. (Rs. 6571½) in 1879-80; and £495 18s. 6d. (Rs. 4959½) in 1880-81.

Chapter II.  
Production.

Bees.

The estimated yearly outturn is about 568 cwt. (113 *khandis* and 6 *mans*) of honey, and 290 cwt. (58 *khandis* and 1½ *mans*) of wax. The honey sells at 1½*d.* to 6*d.* (1-4 *annas*) the ordinary quart bottle according to quality. There is little local demand for honey, most of it goes to Bombay. The wax is made by separating the honey from the wax by squeezing the comb. This is heated in an open pan over the fire, melted, and made into small black balls. These balls are again heated and strained, and the wax is put into square or round holes in the ground, where it forms hard yellowish cakes from a quarter of a *man* to a *man* in weight. A *man* of wax costs to make about 16*s.* (Rs. 8). Wax meets with a ready sale, most of it being sent to Goa and made into the candles which are burnt there on the altars of the Roman Catholic churches.

Snakes.

The district is everywhere infested with snakes both poisonous and harmless. The cobra, *nág* (M.), *nagada* or *nághavu* (K.), *Naja tripudians*, is found everywhere. The cobra is held sacred by all Hindus and is not killed except by Christians and Musalmáns. Other venomous snakes are killed by all classes especially in the hot season, when they come for air into the open and are easily seen. The number of persons returned as killed by snake bites was twenty-seven in 1871, nineteen in 1872, twenty-seven in 1873, seventeen in 1874, twenty-three in 1875, twenty-six in 1876, twenty-four in 1877, twenty-five in 1878, sixteen in 1879, and thirteen in 1880, thus giving the total of 217 persons killed in ten years or an average of about 21 persons killed in each year. The number of cattle killed by snake bites is returned at twenty-five in 1875, fifteen in 1876, sixteen in 1877, twenty in 1878, three in 1879, and three in 1880, a total of eighty-two deaths in six years, or a yearly average of about 14. In 1875 ninety snakes were killed at a cost of 15*s.* 11½*d.* (Rs. 7-15-6); in 1876, sixty-eight for 11*s.* 9*d.* (Rs. 5½); in 1877, thirty-five for 5*s.* 6½*d.* (Rs. 2-12-6); in 1878, fifty for 8*s.* 10½*d.* (Rs. 4½); in 1879 seventy-six for 13*s.* 9*d.* (Rs. 6½); and in 1880, 113 for £1 9*s.* 4½*d.* (Rs. 14½) giving a total of 432 snakes killed in six years at a cost of £4 5*s.* 3*d.* (Rs. 42½). Government have lately (1879) discontinued the grant of rewards for the destruction of snakes, and municipalities are required to pay rewards for snakes killed within municipal limits. The following is a list of the chief venomous snakes found in the district.

The Cobra, *nág*, *Naja tripudians*, is of two kinds, the black or *kála* and the white or *pándhra*. Mr. E. Mackenzie, Assistant Surgeon, Kumta dispensary, in his report for 1873-74, gives the following details of a fatal case of cobra bite. The patient, a boy, was admitted at 11-40 and died at 2-30. Though more than an hour had passed since he was bitten, when he was brought to the hospital, the symptoms, though urgent, did not seem to point to a fatal issue. The most marked symptom was paroxysms of pain stretching up the limbs. The boy was lively and talkative, but there was an uncontrollable drooping of the upper eyelid. The breathing and circulation were unaffected. From his admission till his death the symptoms became slowly but steadily more serious. The



drooping of the eyelid became more marked, the boy dragging it up when he wanted to use his eye. In the paroxysms he shouted from pain. Next he mumbled in his speech. Then the tongue lost feeling and the speech grew dim till the tongue moved without sound. Breathing became heavy and spasmodic, the throat and tongue dried, he grew drowsy, fell in a swoon, and was dead.

*Echis carinata*, *fursa* or *dulbakra*, found mostly on the coast, is identical with the Ratnágiri *fursa*. *Fursa* bites are not always or even generally fatal. In severe cases the chief symptoms are a rapid swelling, discolouration, ecchymosis, and soddening of the bitten limb. Next comes a constant oozing of dark watery blood from the bitten part, gangrene spreads round the wound, blood comes from the gums, the skin, the bowels, and the stomach; the circulation is depressed, and cold clammy sweats and dizziness end in a swoon. Two species of *Daboia elegans*, *kudrál* or *kusáda mandol*, and *rakta mandol*, are identical with the Ratnágiri *ghonas*. The bite of the first causes a sloughing of the bitten part and that of the second blood vomiting and other symptoms like those of the *fursa* bite. *Náneta* or *Ajimanera*, *Bungarus cœruleus*, also called *pasko* in the Konkan, is identical with the Ratnágiri *manyár*. *Shenyasáp* a dark coloured venomous snake, *sunkpall*, *jogi*, *surgund*, and *ajgar* a species of boa, have not been identified.

*Ar* or *hebbáu*, the Indian python or boa-constrictor is found in the forests sometimes of a very great size. *Malund* or *imadi*, is the Ratnágiri *autonda*. *Divud*, *Ptyas mucosus*, is harmless but is believed to have the power of killing some animals by blows of its tail. It is identical with the Ratnágiri *dháman*. *Hevale* or *vale*, *Ophiophagus elaps*, is the Ratnágiri *ádhela*, and *hasrahan* or *sarpatolla*, *Passerita mycterizans*, is the green tree or whip snake. There are many snakes both venomous and harmless which have not been identified.

Except in Supa and Mundgod, where the rivers are not well stocked with fish, both salt and fresh water fishing is extensively carried on throughout the district. In the Bhávangiri pond, six miles southwest of Siddápur, which is about one-fifth of a square mile in area and lined with stone masonry, the fish are held sacred and some of them have golden rings fastened to their fins.<sup>1</sup> No one ever catches them. Some are said to be of enormous size. In no other river, stream, or pond are the fish held sacred. The coast fishing is carried on with vigour from October to May; but in the four stormy months from June to September few boats go to sea. The chief salt water fish are the *surmai*, mullet, sardine, sole, and pomphlet. In Kárwár the *karcha* is held sacred and brought to stock new wells and ponds. It is never killed. During the stormy months when sea-fishing is stopped large numbers of people throng the rivers and brooks where fish are abundant.

Fresh water fisheries may be roughly divided into pond and stream fisheries. Pond fish are found in large numbers and of great

Chapter II.  
Production.  
Snakes.

Harmless  
Snakes.

Fish.

<sup>1</sup> The fish were probably caught young, and their fins pierced.

**Chapter II.**  
**Production.**

**Fish.**

size, especially above the Sahyádris. Fish are found in all streams, and in large numbers in the Kálinadi, Gangávali, Tadri, and Shirávati. The deep pools and large rocks of the Kálinadi and Shirávati are particularly suited for sheltering fish. Fish are caught by nets in February, March, April, and May. In the hot season when the ponds are low people catch fish by a net-work of slender sticks. From June to September, when the rivers and ponds are full or overflowing, fishers stand at night on the edge of ponds and on river banks with a light and a sickle in their hands and hack the fish with the sickle as they rise to the surface to gaze at the light. During the rains when fish pass through water channels from small to large ponds the fishers either spread nets or set up a net-work of slender sticks in the channel and catch the fish as they pass. In places where small streams join rivers, the people catch fish by narrowing the stream by sticks and matting, leaving small holes to let the flood water in.<sup>1</sup> Fish are rarely caught in nets during October, November, December, and January. In the fair season when the water is low, fish are caught in deep reaches, either by angling or by poisoning the water. Sometimes fish are poisoned by throwing into the pools the bark of the *chápál karu* or the *garuda kurada*. In July and August, when the rivers are swollen, the big fish, which have become impregnated in March and April, run against the flood to the higher parts of the river, where they spawn, and in October, when the waters begin to fall, they drop down to some deep pool or reach where they lie during the hot weather.

**Fishermen.**

Fresh water fishing is carried on by Musalmáns, Halepaiks, Byadars, Kabbars, Holers, and Chámhárs. The regular salt water fishers are Bhois, Gábíts, Darjis, Ámbers, Khárvis, Mogers, and Harikantars. Besides these local fishers, men of the Kulikat caste come from Dhárwár or Maisur in March and April and catch fish in the rivers of Varáda, Sáde, and Supa by diving, and by nets, hooks, and lighted torches.

**Fish.**

Fresh fish are generally sold for local use, either in markets or from door to door, and salt fish are sent to the districts above the Sahyádris. Most fish are paid for in cash and some in grain. The fishermen say that the supply of fish is smaller than it used to be.

The following is a list of the chief fishes<sup>2</sup> found along the Kánara coast. The first number after each name refers to the Plates in Dr. Day's Fishes of India and the second to the figure in the Plate: *Ghur machi*, *Lates calcarifer*, 1, 1, grows about six feet long and is found both in the sea and in rivers. It is considered a well tasted fish. The largest fetch up to 4s. (Rs. 2). *Gobra machi*, *Cromileptes altivelis*, 1, 2, grows about twelve feet long and four feet broad. *Thámbosea*, *Serranus sonnerati*, 7, 1, a salt-water fish grows about eighteen inches long. *Thávi*, *Sennarus boelang*, 7, 2 grows to one foot in length. *Raygond*, *Variola*

<sup>1</sup> Report on Fresh Water Fish and Fisheries, 8596 of 1873.

<sup>2</sup> Contributed by Mr. R. E. Candy, C.S., Acting Collector, Kánara.

## Chapter II.

## Production.

## Fish.

louty, 7, 3; Ditto *Kárel*, *Anthias multidentis*, 7, 4; Ditto *Kondva*, *Grammistes orientalis*, 9, 1, is less than a foot long. *Kumbar* (Hind.), *Ambye* (Kan.), *Diploprion bifasciatum*, 9, 2, less than eighteen inches long. *Kharpha* (Hind.), *Kárai* (Kan.), *Lutianus sebæ*, 9, 3, grows to two feet long. *Palu*, *Lutianus erythropterus* (young), 10, 1, grows to a foot long. *Ghurval*, *Lutianus erythropterus* (adult), does not grow more than two feet long. *Láthri* (Hind.), *Lutianus lineolatus*, 11, 1, does not grow more than three feet long. *Thumbrus* (Hind.), *Lutianus rivulatus*, 11, 4; Ditto *Lása*, *Lutianus lioglossus*, 12, 1; does not grow more than half a foot long. *Kánchuk* (Hind.), *Burata* (Kan.), *Ambassis nama*, 14, 5, never above four inches long, is found both in salt and fresh water. *Khámp* (Hind.), *Ambassis ranga*, 14, 6, about four inches long, is found only in salt water. *Shethuk*, *Gerres setifer*, 25, 1, never more than four inches long is found only in salt water. *Khárai*, *Chætodon plebius*, 26, 4; *Bhárkál*, *Chætodon guttatissimus*, 27, 4, never more than a foot long. *Kánchuk*, *Pempheris mangula*, 42, 3, never more than three inches long. *Daria Ravuns*, *Polynemus paradiseus*, 42, 4, grows six feet long. *Soundala*, *Kurtus indicus* (male), 42, about six inches long. *Jámp Ravuns*, *Polynemus heptadactylus*, 42, 5, grows six feet long. *Mazardore*, *Umbrina sinuata*, 46, seldom more than a foot long. *Thuperu*, *Otolithus maculatus*, 46, 4; within six inches long. *Tharousa*, *Histiophorus brevirostris*, 47, 3, a salt water fish said to grow to twenty feet long. *Balavasa*, *Trichurus savala*, 47, 4, never more than two feet long. *Konkare*, *Caranx crumenophthalmus*, 49, 1, about five feet long. *Vanvasa*, *Caranx gallus*, 51, 3, never more than eighteen inches long. *Sumbidagol*, *Seriolichthys bipinnulatus*, 51A, 1, found in salt water only, grows up to six feet long. *Jampdagol*, *Naucrates ductor*, 51A, 2; Ditto *Shirkal*, *Trachinotus bailloni*, 51A, 4, grows up to three feet long. *Fáni*, *Platax vespertilio*, 51A, 5. *Belda*, a species of Pomphlet, *Psettus falciformis*, 51A, 6. *Sunikap*, *Platax teira*, 51B, 4. *Phatharkáp*, *Equula lineolata*, 51C, 3. *Chandratya*, white Pomphlet, *Stromateus cinereus* (immature), 53, 3. *Halva*, or *Usarga*, black Pomphlet, *Stromateus niger*, 53, 4. *Putiakap*, *Mene maculate*, 53, 5. *Bibia Gedar*, *Scomber microlepidotus* (young), 54, 3. *Kovla Gedar*, *Scomber microlepidotus* (adult), 53, 5. *Surmai* or *Anjara*, *Cybium guttatum* (young), 55, 1. *Morvasa*, *Elacate nigra*, 55, 2. *Mékri*, *Echaneis brachyptera*, 55, 3. *Ghuma*, *Ichthyscopus inermis*, 55, 5. *Pip*, of the *Gedar* species, *Pelamys chilensis*, 56, 1. *Khulkula* of the *Surmai* species, *Cybium interruptum*, 56, 3. *Thamvar*, *Cybium kuhlii*, 56, 2, up to eight feet in length, generally used by the poorer classes. *Sonoula*, *Cybium commersonii*, 56, 5, up to eight feet in length, generally used by the poorer classes. *Luchak*, *Echeneis neucrates*, 57, 1, about four feet in length. *Nugli*, *Sillago sihama*, 57, 3. *Shevta* (Kan.), *Shervi* (Hind.), of four kinds, black, white, *pilas*, and *jáp*; *Mugil speigleri*, 74, 1. *Toli*, *Fistularia serrata*, 76, 3, up to four feet in length. *Sheva kulla*, *Cynoglossus elongatus*, 90, 5, within a foot in length. *Sheva jámp*, *Cynoglossus sindensis*, 90, 6, within a foot in length. *Champti Lep*, *Callyodon viridescens*, 90, 3. *Bakas*, *Psettodes erumel*, 91, 4, within a foot in length. *Jámp Lep*, *Pseudo rhombus*, 91, 5. Ditto *Solda*, *Bregmaceros atripinnis*, 91, 1,

Chapter II.  
Production.  
Fish.

within a foot in length. *Shingala*, with the species (1) *Povra*, (2) *Chuthva*, (3) *Kharpi*, and (4) *Mavas*, *Macrones vittatus*, 98, 3. *Gongava*, *Chaca lophioides*, 112, 2, within two feet in length. *Whál shingla*, *Plotosus canius*, 112, 3, within three feet in length, found both in rivers and in the sea. *Bendki shingala*, *Glyptosternum telchitta*, 116, 3. *Bombeel* (Bombay Ducks), *Harpodon nehereus*, 118, 1, within a foot in length, excellent when dried. *Bokara* (Hind.), *Dindas* (Kan.), *Scopelus indicus*, 118, 2, within three inches in length. *Katal* (Hind.), *Toli* (native), *Belone choram*, 118, 4, within three feet in length. *Sumba* (Hind.), *Toli* (native), *Hemiramphus cantori*, 119, 1; both a fresh and salt water fish, within a foot in length. *Kátál*, *Belone annulata*, 120, 1, a salt water fish, grows about three feet long. *Bhárví*, *Hemiramphus georgii*, 120, 2, a salt water fish. *Papur* (Hind.), *Paka* (native), *Exocoetus pœcilopterus*, 120, 4, up to four feet in length, found along the coast. *Jirai* (Hind.), *Karai* (Kan.), *Exocoetus evolans*, 120, 5; a salt water fish, grows about four feet long. *Heráka* (Hind.), *Homaloptera brucei*, 122, 1, a salt water fish, grows about four feet long. *Gubri*, *Clupea chapra*, 161, 1, both a salt and fresh water fish, grows to about four inches. *Hyedh* (Hind.), *Thárlí* (Kan.), *Clupea longiceps*, 161, 2, within four inches in length, found in great abundance and sometimes sold as cheap as 100 for a pie. *Vánsi* (Hind.), *Pedi* (Kan.), *Clupea fimbriata*, 161, 3, grows up to six inches long, both in rivers and in the sea. *Kosir* (Hind.), *Pálpedi* (Kan.), *Clupea variegata*, 161, 4, grows up to four feet long, is both a salt water and a fresh water fish. *Birza*, *Clupea lile*, 162, 1, grows to three inches long, is a salt water fish. *Pala* (Hind.), *Pálpedi* (Kan.), *Clupea toli*, 162, 2, a salt water fish. *Bhig*, *Clupea kanagurta*, 162, 4, grows to about four feet long, a salt water fish. *Dodla* (Hind.), *Jirai* (native), *Clupea sindensis*, 163, 2, grows to two feet long, a salt water fish. *Patulda* (Hind.), *Bádsha* (Kan.), *Raonda russelliana*, 163, 4, grows to a foot in length; it is generally dried. *Gira* (Hind.), *Pedi* (Kan.), *Clupea brachysoma*, 163, 3, a salt water fish, grows to six inches in length. *Bodai* (Hind.), *Opisthopterus tartoor*, 163, 5, a salt water fish, grows up to two feet long. *Karlí* (Hind.), *Dathuri* (native), *Chirocentrus dorab*, 166, 3, grows to about five feet long. *Ghoda*, *Hippocampus guttulatus*, 174, 6. *Bile*, *Triacanthus brevirostris*, 175, 1, a salt water fish, about a foot long. *Khend* (Hind.), *Kachka* (Kan.), *Tetrodon inermis*, 180, 1, both a salt and a fresh water fish, not used for food. *Dharvát* (Hind.), a species of *Mori*, *Carcharias menisorrhah*, 184, 3, a salt water fish, grows to ten feet in length. *Kaksi* (Hind.), a species of *mori*, *Carcharias limbatus*, 184, 2; Ditto *Zouri* (Hind.), *Khanmusi* (Kan.), *Zygæna blochii*, 184, 4. *Shirát*, a species of *mori*, *Carcharias sorrah*, 185, 1, a salt water fish, grows up to four feet long. *Poumar*, a species of *mori*, a salt water fish, grows up to five feet long. *Khondecha*, a species of *mori*, *Carcharias tricuspidatus*, 186, 1, a salt water fish, grows up to twenty feet in length. *Shivra*, a species of *mori*, *Mustelus manazo*, 186, 3; Ditto *Varaicha*, a species of *mori*, *Zygæna mallens*, 186, 4; Ditto *Thamási*, a species of *mori*, *Carcharias gangeticus*, 187, 1; Ditto *Shivra*, a species of *mori*, *Carcharias dussumieri*, 187, 2; Ditto *Vagál*, *Trygon zugei*, 190, 3,

a salt water fish. *Láng*, *Rhinobatus thouini*, 190, 4, grows to six feet in length. *Náli* (Hind.), *Genaja* (native), *Pristis perotteti*, 191, 1. *Morcha* (Hind.), *Vagala* (Kan.), *Dicerobatis eregoodod*, 193, 1. *Pálva*, *Trygon kuklii*, 193, 2, a salt water fish. *Bátya*, *Trygon narnah*, 194, 1. *Shenvtha*, *Pteroplatea nicrura*, 194, 2. *Bolát*, *Ætobatis narinari*, 194, 4. *Ambla*, (Hind.), *Trygon sephen*, 195, 2. *Mingla*, *Urogymnus asperrimus*, 195, 1.

The chief fresh water fishes are, *Kures* which grows up to three feet in length, *Shivra* up to eight feet, *Thigur* within a foot, *Kharchi Pithli* within a foot, *Mulia* up to four inches. *Vambu* (I) *Butli* within three feet, and (II) *Liambi* up to ten feet, *Khoola* within a foot, *Thambansa* within three feet, *Kána* up to three feet, *Indh* up to eighteen feet, *Sindala* (I) with broad head, up to three feet, (II) *Benduk* up to two feet, (III) *Gudmuga* up to three feet, *Shetuk* within six inches, *Karai* within six inches, *Kanga* within ten inches, *Dondga* within two inches, *Maral* up to three feet, *Keri* within two feet, and *Jithkosi* up to three feet.

The fishermen of Kánara do not, as a rule, venture into the deep seas but keep within two or three miles of the coast. Hence they do not make very large hauls and do not catch fish of any large size. During the fair season large shoals of sardines frequent the bay of Kárwár and are caught in large numbers. The best months for fishing are November, December, January and February. During June, July, August and September boats cease altogether from going out to fish with nets but many persons fish with hand lines in the bays creeks and estuaries and have fair sport.

Angling with the rod and fly or spinning with the phantom winnow and natural bait are not impossible in the Kánara rivers. At the same time it is not the contemplative peaceful sport which the soul of Isaac Walton loved, for great labour and heat must be endured and much patience expended before any success can be expected. The most highly prized of Kánara river fish is the *mahsir* or as it is called in Kánarese *karras* or *herabe minu*. The best season for fishing is immediately after the rains when though the water has cleared the rocks are still well covered and the rapids running strong. The fish are then numerous and take well. Full information regarding the best way of fishing for *mahsir* is to be found in The Rod in India by E. C. Thomas, Madras C.S. All his remarks apply to north Kánara.

The present object is to inform the angler where to go. Embarking at Kodibág pier on a warm October afternoon in a boat with a grass roof to shelter him he will run up with the sea breeze and tide to Kadibág a small village on the Kálánadi eighteen miles from Kárwár. There a comfortable forest bungalow affords shelter. Rising about five in the morning a walk of two miles along the river bank, past the teak plantations brings him to the rapids whose roar directs his footsteps to the spot. Here keeping to the bank or wading carefully he may have over half a mile of good fishing. The fly is not recommended but a small fish on a treble hook should be used on a spinning trace. From Kadara the angler should cross the river and ascend the hills to Barbali. Thence to

Chapter II.  
Production.  
Fish.

Fishing.

Chapter II.  
Production.

Fish.

Ganeshjudi above the Sahyádris and so on to Yellápur. From Yellápur he should go ten miles to Lalguli where he will find two or three miles of very good river, alternate rapids, pools, and waterfalls. Great care must be taken not to get a fall on the rocks. It is also necessary to have a man at hand who can swim and dive as the hook constantly catches in hidden rocks. A net and a gaff should also be kept in readiness as there are often no sandy shelving banks where a fish can be landed but only shallow pools with high rocks all round. From Lalguli the angler may go to the junction of the Tattihal and thence to Vincholi where again there are beautiful falls and plenty of fish. The next place is Bamanhalli where is a small hut constructed by General Anderson, late Survey Commissioner. From Bamanhalli a walk through magnificent forest leads to Dandilli where is a good rapid and a mile lower down at Kervad is fine fishing ground in the right season. From Dandilli the angler should make for Supa where the white and black rivers join. A neat little bungalow stands on the bank and commands a lovely view. In the lake which the rivers make at this point the water is immensely deep and large fish may be caught by trolling from a boat. For two miles below the junction there are good rapids and pools. Very little can be done after Christmas, until the mangoe showers come about mid-January. If at that time the river is in flood and again clears great sport may be had. Another river which is favorable to the angler is the Shirávati which leaps over the Sahyádris at the famous Gairsappa falls. The way to the best fishing ground is to walk about two miles from the bungalow along the Talgupa road and then strike into the forest on the right when the river side is reached. The angler may walk several miles into the Maisur territory fishing carefully. He is liable to be disappointed, for although the water looks perfect fish are scarce owing to the slaughter which goes on among the young fish in the rains and to the poisoning of the pools in the hot weather. A few years ago during the Christmas holidays a young Madras Civilian caught a very fine *mahsir* in this part of the river. It is useless attempting to fish in the magnificent pools below the falls during the cold weather. The rocks are so slippery no one can stand, much less climb with safety; the wind blows with such violence that a rod cannot be held up against it and the spray beats like the monsoon rain so that the too venturesome angler is not likely to catch anything except a fever or a cold, or perhaps a sprained ankle. But in April and May when the river has run low the pools below the falls may be fished with comfort. It is advisable to have a coracle or a collapsible boat which can be carried and launched on the pool.

Shoals of fish may be seen feeding on the bird lime which falls from the rocks above where myriads of swallows and pigeons make their home. A long line is necessary as the fish run large and the pools are immensely deep. A bait which will tempt the largest fish is a young swallow; they sometimes fall into the water and are taken down at a single gulp: only a swirl in the pool shows where the monster silently rose. The fly may be used with success when the wind is favourable.

Another river which affords sport is the Agnáshani or Taddri. Starting from Kumta the angler must make his way about twenty miles to Mankibail at the foot of the Nilkund pass. Then turning to the right he should follow the river till the foot of the Doddamani pass is reached and a camp should be made at a small village called Shamamani. The river comes down the valley between the two passes after dashing over the cliff at the villages of Unchalli and Hosatota in the Lushington Falls. Excellent pools and rapids stretch for several miles, but it is little use trying when the river runs low, for the fish are all crowded in the long reaches of deep still water.

Most of the birds given by Captain E. A. Butler in his Catalogue of the birds of the Deccan and Southern Marátha Country are found in Kánara. The principal game birds are noticed in the Appendix.

**Chapter II.****Production.**

Fish.

Birds.