

## CHAPTER II.

### PRODUCTION.

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**Production.**

*Minerals.*  
*Diamonds.*

In the latter part of the sixteenth century (1585), two English travellers Fitch and Newberry mentioned Belgaum as a great diamond market.<sup>1</sup> The Belgaum diamonds probably came from the Golkondah and other mines in the Nizám's territories. Still, it is worthy of note that part of the sandstone towards the Kolhápúr side of the district is the same old diamond sandstone which is found at Kadapah in Madras and at other diamond fields.<sup>2</sup>

*Gold.*

The geological conditions necessary for the development of gold are present in much of the Belgaum rock. In 1852, an examination showed that gold occurs in much of the coarse-grained gravel or local drift, so abundant on the sides of hills in many parts of the district. Gold was also found in the valley of the Malprabha near Chikop, about twenty-five miles east of Belgaum. The first basin of Chikop gravel yielded two minute grains of fine gold with much worn corners. After the gravel was washed, there remained a black iron sand with yellow grains of gold standing out clearly from the dark ground. The result of this and of other trials was to show that every basin of gravel contained one or two minute grains or scales of gold. Under black soil, on the left bank of the right branch of the stream, which passes by the village of Markumbi two miles west of Chikop, was gravel and marl, and below the marl was conglomerate limestone resting on disturbed and hardened chlorite slate. The gravel in the bed of the stream contained gold. And gold was also found at Belevádi on the south side of the Malprabha, where the stream flows in a hollow between two parallel ridges of metamorphic rock. In the whole gold-yielding area very few quartz veins occur, and none are found with a north and south course.

In this part of the country were professional gold-washers, some of them settled and others wanderers. The settled gold-washers used a trough about four feet long nine inches high and one foot broad. In washing the gravel this trough was propped on sloping stones on the bank of the stream. One man threw in a basketful of gravel and another stirred the gravel with his hand and poured on water.<sup>3</sup> The larger gravel was thrown out and the sand was again washed in a round shallow dish about eighteen inches across and four inches deep. The gold dust was amalgamated with mercury and the mercury sublimed on charcoal.<sup>4</sup> The greatest proportion of gold, though the amount was small, was found in a small stream to the west of Belevádi.

*Iron.*

Iron,<sup>5</sup> nearly equal to Swedish iron, was formerly made

<sup>1</sup> Hakluyt's Voyages, II. 385.

<sup>2</sup> Bom. Gov. Sel. VIII. 6.

<sup>3</sup> Trans. Bom. Geo. Soc. XI. 2-6.

<sup>4</sup> Mem. Geo. Surv. XII. 259.

<sup>5</sup> This and the remaining mineral sections are from materials supplied by Mr. G. V. Gáyatonde, Assistant Engineer.

near Kánur, Punare, and Pátne in Belgaum; at Kaitnal and Távaj in Gokák; at Kitur in Sampgaon; and near the Rám pass.<sup>1</sup> The ore is generally peroxide of iron with a mixture of clay, quartz, and lime. All the laterite of the district is charged with iron though in too small a proportion to make it worth smelting. In smelting iron the practice was to gather small nodules with iron ore and crush them to powder with iron hammers. The powdered ore was then mixed with charcoal and put into a round upright furnace which was kept at an intense heat by air blown continuously by hand-bellows. No flux was used as the ore contained all that was wanted. As it smelted, the liquid metal flowed into a round hole at the bottom of the furnace. When all the metal had run into the hole the mass of iron was dragged out by a pair of large pincers, placed on an anvil, and beaten by hammers. The metal contained a great deal of foreign matter which was removed by heating it in a common smith's furnace, and, while red hot, by beating it with quick blows of five or six heavy hammers worked by men grouped round the anvil. The hammering was continued till the metal was considered pure. This iron was of first class quality. The chief difficulty in the way of iron-smelting was the large quantity of charcoal it consumed. Brown hæmatite, which forms the matrix in a hornstone-breccia at Basargi, is smelted at Tegihál, both the villages lying on the left bank of the Malprabha, between Manoli and Torgal. The manufacture of iron has now ceased, partly on account of the increased price of fuel and partly because of the fall in the price of iron. Besides iron the only metallic ore which occurs in any quantity is an earthy powdery form of binoxide of manganese which is found among weathered dolomite at Bhimgad.<sup>2</sup>

There are stone quarries at Pátne, Halkarni, Chándgad, Dukurvádi, and Dolgarvádi in Belgaum; at Chikodi and Nipáni in Chikodi; and at Kágvád, Ainápur, Shedbál, Kakmari, and Athni in Athni.<sup>3</sup> The stones are green basalt or trap, gneiss, quartzose sandstone, gray sandstone, reddish gray sandstone, and laterite. Green basalt or trap is found in most parts of the district in hills, in boulders, and in river-beds. With some exceptions it is hard and lasting. It has been used in several bridges and large buildings. The fort of Belgaum is partly of this stone brought from a village named Kanbargi, three miles north-east of Belgaum, and partly of sandstone from hills nine or ten miles to the north. The stone has worn well as the fort is now 400 years old and the masonry is still fresh.

Gneiss is found in the Khánápur sub-division. It is used for rough work and for road-metal, but on account of its hardness it is not

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#### *Iron.*

#### *Stones.*

<sup>1</sup> In 1822, at Nersa, about six miles west of Khánápur, iron was worked by a wandering tribe who came yearly in the fair season from Goa or the Sávantvádi state. Mr. Marshall found common clayey ironstone exposed in abundance about the hills, but it did not yield much metal. The villagers were wholly unacquainted with the nature of the process by which the metal had been extracted. Marshall's Statistical Reports, 98.

<sup>2</sup> Memoirs Geological Survey, XII. 250, 263.

<sup>3</sup> The forts of Kálánadigad, Vallabhgad, Páijargudd, and the temple at Chándgad Kankumbi are built of laterite or iron clay, which, except as road-metal, is now little used. Memoirs Geological Survey, XII. 268.

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generally used in cut-stone work. Quartzose sandstone is found near Sutgati in the valley of the Ghatprabha at Gokák and at Saundatti. It is gray in colour, very hard, gritty, porous, and lasting, and is used where great strength is required as in the arch stones of bridges. At Gokák and Saundatti it is made into millstones from one to three feet in diameter. Gray and reddish-gray sandstone is found in Parasgad. Though very soft and absorbent, it may be used in inferior kinds of work instead of brick. The hones that used to be quarried in a bed of very hard clay schist at Kákati north of Belgaum are not now in demand. Laterite of varying quality is found in the west near the Sahyádris range. Near Belgaum is a claystone enriched with iron in the form of red and yellow ochres, with a perforated and cellular structure. The heavier claystone with more iron is generally harder and more lasting than the claystone with less iron. Near where it occurs this stone has been used for many buildings and a few bridges. The cost of laterite bricks varies from 10s. to 12s. (Rs. 5-6) the hundred cubic feet. It is quarried in rectangular blocks. Magnesian limestones or dolomites occur in the gneissic series on the slopes of the Sahyádris east of Goa. The beds exposed in Bhimgad hill are unfit for polishing, as numerous thin folia of granular quartz permeate the rock.

In making and repairing roads three kinds of metal are used, trap, quartzose sandstone, and laterite. The price of trap and quartzose sandstone varies from 10s. to 11s. (Rs. 5-5½), and of laterite from 3s. to 6s. (Rs. 1½-3) the hundred cubic feet. For fair weather and cross country roads hard red gravel is used which costs about 2s. (Re. 1) the hundred cubic feet. Good sand or gravel is found in the beds of most streams and rivers. The rates vary from 3s. to 8s. (Rs. 1½-4) the hundred cubic feet. The metallic sand which is used instead of blotting paper is found in several rivers at places where they pass through black soil. The best is the Krishna sand. A very good white clay for earthenware, which burns gray and hard, is found near Khánápur.

Lime.

The lime in general use is made from calcined nodules or *kankar* of limestone which are found on the surface in detached patches throughout the district, and at some places in quarries. The lime nodules contain a mixture of sand and clay, and so do not want much sand or *surki*, to make good hydraulic mortar. Calcined lime costs £3 16s. to £4 (Rs. 38-40) the hundred cubic feet. At Yádvád in Gokák a bed of bluish-gray limestone is quarried for lime. These stones, when calcined, yield lime which is too pure or fat but makes good mortar when freely mixed with sand. This is the best lime for whitewashing. Crystalline limestone is also found in south Khánápur.

Bricks and  
Tiles.

Good brick-earth is found in several places, the best at Kákati, Yamkanmardi, Sankeshvar, and Nipáni in Chikodi. Burnt bricks measuring 10" × 4" × 3" cost 17s. 9d. (Rs. 8½) the thousand; half round tiles 16" × 6" cost £1 1s. 6d. (Rs. 10½) the thousand; and ridge tiles cost 6s. (Rs. 3) the hundred.

Forests.

In 1863 Dr. Gibson described the forest towards the Sahyádris as all inferior or jungle timber, but much of it of superior quality. In

the thirteen previous years the forest had suffered greatly by fires and from other causes. Teak and blackwood forest began about six miles east of the Sahyádris and stretched through Ghotgali and Kakkeri. The teak had formerly stretched to Dhárwár. Deep woody valleys under the hill of Sidh on the North Kánara border, about five miles south of Ghatgalli, had suffered much from the spread of tillage. Of young growing teak there was still a respectable quantity in the west of the forest abutting on Sidh hill. Further east the trees, though numerous, were stunted and would probably never yield more than rafters and small posts. One kind of timber, which was of great account for building and occurred both on Sidh hill and in the neighbouring forests, was the *hasan* or *hone* *Pterocarpus marsupium*, a beautiful tree of easy growth. The only forest to the north of Belgaum was in Páchápúr. It contained *ain* *Terminalia glabra*, satin wood or *halda* *Chloroxylon swietenia*, *nirmali* *Strychnos potatorum*, and other trees too stunted to be of use except for firewood and tent pegs. A *bábhul* preserve was also set apart in Athni.<sup>1</sup>

Besides<sup>2</sup> a few square miles of private forest the present (1883) area of Government forest is 819 square miles. Of these 688 square miles, chiefly in Khánápúr, have, under the Forest Act VII. of 1878, been declared reserved, and 131 square miles protected.<sup>3</sup> The forest is very unevenly distributed, the large sub-divisions of Athni and Parasgad having till lately little or no forest, while Khánápúr has twice as much forest as tillage.

The Belgaum forests<sup>4</sup> may be roughly divided into moist and dry, the dry lying east of the Poona-Dhárwár road and including the forests of Chikodi, Sampgaon, and Gokák; and the moist lying west of the Poona-Dhárwár road, including the forests of Belgaum and Khánápúr. The Poona-Dhárwár road runs nearly north and south, skirting the Sahyádris range and its outliers from Nipáni to Belgaum, and then bending slightly east into the more level country. In the moist forest the rainfall is heavy, varying from fifty inches to an unknown quantity, probably not less than 200 inches. About one-half of the moist area belongs to the Sahyádris, a mass of laterite-covered mountains, cut by deep densely wooded ravines and open to the full force of the south-west monsoon. Except an occasional patch of rice or *rági* the forest is unbroken. Here the population is scanty and the area fit for plough cultivation

<sup>1</sup> Handbook to the Forests of the Bombay Presidency, 74.

<sup>2</sup> The sections on Forests, Animals, and Birds are from materials supplied by Mr. J. L. Laird-Macgregor, District Forest Officer.

<sup>3</sup> The sub-divisional forest details are :

Belgaum Forests, 1883.

SUB-DIVISION.	Square Miles.		SUB-DIVISION.	Square Miles.	
	Reserv- ed.	Protect- ed.		Reserv- ed.	Protect- ed.
Belgaum ...	150	62	Chikodi ...	96	18
Khánápúr ...	308	...	Athni ...	2	...
Gokák ...	101	51	Parasgad ...	65	...
Sampgaon ...	28			688	131

<sup>4</sup> Mr. W. H. Horsley, C.S.

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is small. In those villages which lie actually along the crest of the Sahyádris these conditions are most marked. The area culturable with the plough is insufficient even for the small population, and from time immemorial they have chiefly lived on the proceeds of what is known as *kumri* or wood-ash tillage. The steep slopes of the Sahyádris are suitable for this form of cultivation. The dense coppice growing on such slopes is cut down, allowed to dry, and then burnt. The ashes are hoed into the soil and *náchni* or *vági* *Elcusine coracana* is sown. If the patch chosen has had its due period of fallow, a very abundant crop results. During the second season a crop of *sáva* *Panicum miliare* is grown on the same ground. The field is then relinquished and requires a long period of fallow. If left alone for about twenty years it will be found to be again densely covered with coppice. In fact the practice of *kumri* under proper conditions is eminently favourable to the growth of dense coppice. At the introduction of the revenue survey nearly thirty years ago an attempt was made to put a stop to *kumri* under the impression that it must result in denudation. The consequent distress became so marked that in 1875 further allotments were granted in Khánápur and in 1879 similar arrangements were made in Belgaum. These arrangements were inadequate as they did not allow a sufficiently long period of fallow. It has lately been suggested by the Conservator of Forests, Southern Division, that *kumri* allotments should be granted on condition that the people plant with useful trees an area equal to one-third of the area held for *kumri* cultivation. This suggestion has been approved by Government and arrangements are in progress for carrying it out.

The commonest trees are the *jámbul* *Eugenia jambolana*, *kumba* *Careya arborea*, *máti* *Terminalia tomentosa*, *harda* *T. chebula*, *hela* *T. bellerica*, *páiri* *Ficus cordifolia*, *kel* *Ficus infectoria*, *umar* *F. glomerata*, *kindali* *Terminalia paniculata*, *báva* *Cassia fistula*, *karanj* *Pongamia glabra*, *anjan* *Memecylon edule*, *nána* *Lagerstræmia lanceolata*, *áva* *Phyllanthus emblica*, small bamboo, and *kárví* *Strobilanthus grahamianus*. There is a sprinkling of *jámbe* *Xylia dolabriformis*, *sisva* *Dalbergia latifolia*, *shemba* *Acacia concinna*, and other acacias, *hasan* *Pterocarpus marsupium*, *ápta* *Bauhinia racemosa*, *palas* *Butea frondosa*, and *pángerá* *Erythrina indica*, but no teak. Of these trees *máti*, *jámbul*, *nána*, *harda*, *sisva*, and *hasan* are valuable timber trees; *kárví* and small bamboos are useful only for fencing and roofing; and *kumba* is chiefly used for field tools. *Anjan*, a useful wood, is confined to very moist places on the crest-line of the Sahyádris where it forms unmixed woods of considerable extent. Here and there, dense *ráis* or groves of huge evergreen tree, sometimes covering more than a hundred acres, stand out like dark islands in the grey sea of withered grass and leafless coppice. The commonest trees in these evergreen hill groves are soft woods, *nánás*, jacks, and mangoes with a sprinkling of *nári* palms *Phoenix sylvestris*, whose sap is drawn for liquor, and of cinnamon trees whose bark is used as a spice. Along the Sahyádris there is comparatively little large timber, though large *mátis*, *nánás*, and other valuable trees are by no means uncommon in ravines and remote places.

Of minor produce, the *harda* and *hela* furnish myrobalans, the *shemba* supplies the *ritha* or soapnut which is used in cleaning clothes, and the large stretches of bare or thinly wooded slopes furnish grazing for thousands of cattle, which flock to them every year from the grassless eastern plains. As already remarked this western tract is badly wooded. Probably not more than one-twelfth of the whole forest area is stocked with trees. But the moist climate and heavy rainfall cause a free growth wherever there is soil enough for plants to take root. There is little doubt that, when fully guarded from fire, the forest will gradually spread upwards from the lower slopes and watercourses and clothe much that is now bare and useless.

The eastern parts of the moist forest, though not cut off by any natural line of demarcation from the more western parts, may, for convenience, be considered separately. The country is less hilly and is partially sheltered from the south-west monsoon by the crests of the main range of the Sahyádris. The rainfall varies roughly from forty-five to sixty inches, enough to ensure vigorous vegetation. Besides the trees mentioned in the purely Sahyádrí forest the timber includes *dhámin* *Grewia asiatica*, *honangi* *Adina cordifolia*, *kalam* *Stephegyne parvifolia*, *siris* *Albizia* spp., teak, and large bamboos. The commonest trees are *kumba*, *jámbe*, *harda*, the dwarf date-palm *Phoenix farinifera*, *palas*, *ávla*, *jámbul*, bamboo, *kindali*, *máti*, *áná*, and in the south a good sprinkling of teak and blackwood. The produce is chiefly superior firewood poles from fifteen to thirty feet long, with here and there large standards of *sávari* *Bombax malabaricum*, *hela*, *pánjera*, *karambál*, and other soft woods, and less often of *máti*, *kindali*, *jámbul*, and other hard woods. The forest increases in heaviness towards the south where are some fifty square miles of good timber, including much clean straight-stemmed teak, *máti*, and blackwood. These tracts are much better wooded than the main range. Probably one-fourth of the forest area is stocked. Teak occurs only in the south and is commonest on the granite hills south of Nandgad. It is generally mixed with *jámbe* and bamboo. But between Tavarkatti and Bidi there is much pure teak of vigorous growth.

The forests of the dry tract east of the Poona-Dhárwár road are on the trap and sandstone hills of Chikodi, Gokák, and Samppaon. They stretch east as far as the town of Gokák, north to Hukeri, south to Deshnur, and west to the moist forest. These dry forests are about the same height (2000 feet above the sea) as the moist forests, but being further inland, the rainfall is much less, probably on an average not more than thirty inches. Cultivation is confined to the valleys and some of the flat-topped trap-hills. The forest-land, about one-eighth of which is stocked with useful wood, is very poor and stony, yielding only firewood scrub with a sprinkling of small poles, fit for hut-building, and of an average height of about ten feet. The produce is chiefly cactus, four or five kinds of fig, *dándal* *Anogeissus latifolia*, *mashvál* *Chloroxylon swietenia*, *bandurgi*, *ávla*, *gorvi* *Ixora parvifolia*, *tarcár* *Cassia auriculata*, *máti* *Terminalia tomentosa*, *kindali*, as *Hardwickia binata*, sandal, bamboo, and numberless thorns. Near Nipáni and Degaon there is a little outlying

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forest-land, and near Suldhál and Yamkanmardi teak-scrub also occurs. *Dindal* is perhaps the commonest tree and is useful for firewood but is generally too small for building purposes. *Tarvár* bark is much prized for tanning and *gorvi* bark for making torches. There is also a good deal of small and a little large bamboo. The most widespread shrub is the cactus. Fully half the forest area is covered with cactus. It is rapidly creeping from the cultivated valleys to the tops of the hills, threatening, as has already happened in Mamdápur and other parts of Gokák, to choke all other vegetation. The rapid spread of the cactus appears to be mainly owing to two kinds of thrush, *Malacocercus griseus* and *Argya malcolmi*, which live on the fruit and scatter the seeds far and wide. In this part of the Belgaum reserves, the putting down of cactus is the problem of the future. Its eradication is not easy. No ill-treatment short of burning both roots and branches kills it. An attempt is being made to dig it up and burn it, but the result is still doubtful.

The forests of the main Sahyádrí range are not at present worked. Most of their valuable firewood and small timber could easily be worked and is sure to improve. Acre for acre, their present value cannot be less than that of the forest tract east of the Poona road, for, though not nearly so regularly stocked, the vigour and quality of the timber make them a far more valuable property. Experiments seem to show that, exclusive of the value of the land, the present net value of the dry forest is not less than £123,634 (Rs. 12,36,340) or £1 4s. (Rs. 12) an acre, and that the yearly yield of firewood available without trenching on the capital stock, is about 46,000 cartloads, or 1,150,000 cubic feet, a quantity which more than meets the present firewood demand for the whole district.<sup>1</sup> The eastern part of the Sahyádrí forest tract is roughly

<sup>1</sup> This estimate is based on the results of clean cuttings on 439 acres of the Biranhóli forest. The details are :

*Biranhóli Forest Cuttings.*

RECEIPTS.

POLES.		BAMBOOS.		FIREWOOD.				ACRE YIELD.						MONEY YIELD.			
Number.	Value.	Number.	Value.	Stems.		Branches.		Poles.	Bamboos.	Firewood.				Total.	Acre.		
				Number.	Value.	Number.	Value.			Number.	Value.	Stems.				Branches.	
												Number.	Value.			Number.	Value.
5034	Rs. 926	36,860	Rs. 490	Carts. 7046	Rs. 10,569	Carts. 909	Rs. 909	11	Rs. 2'1	84	Rs. 1'1	Carts. 16	Rs. 24	Carts. 2	Rs. 2	Rs. 12,894	Rs. 29'2

EXPENDITURE.

Cutting and stacking 5034 poles at Rs. 1 the hundred ... ..	50
Ditto ditto 36,860 bamboos at 4 annas the hundred ... ..	92
Ditto ditto 7046 cartloads of (stem) firewood at 4 annas each ... ..	1762
Establishment : two guards at Rs. 7 each, one clerk at Rs. 12 a month, for twelve months ... ..	312

Total £221 12s. or Rs. 2216

That is, total receipts of Rs. 12,894 minus Rs. 2216, or Rs. 10,678, and acre receipts of Rs. 29 less Rs. 5 that is Rs. 24. The Biranhóli forest is somewhat above the average of the dry forest, but if the average is taken at one-half the above yield, the error is not likely to lie on the side of exaggeration. On the

estimated as equal to the western Sahyádrí forests, or 150,000 acres that is about 234 square miles. It supplies the Khánápur store with timber, of which the following statement gives the details for the two years ending 1880 :

SAHYÁDRÍ TIMBER SALES, 1878-1880.

TIMBER.	No.	Cubic Feet.	Realized.	Cost.	Net.	The cubic foot.
			£	£	£	s. d.
Teak Logs ... ..	1074	26,850	3625	1102	2523	1 10.
Blackwood Logs ...	106	2875	352	121	231	1 7
Miscellaneous Logs ...	303	8712	773	364	409	1 0
Teak Pieces ... ..	418	3312	337	56	281	1 8
Blackwood Pieces ...	27	250	18	4	14	1 1
Miscellaneous Pieces ...	56	625	35	10	25	0 9
Teak Poles (superior) ...	11,689	42,862	2103	608	1595	0 9
Do. (inferior) ... ..	1363	...	71	28	43	0 7
Blackwood Poles... ..	28	162	4	2	2	0 4
Miscellaneous Poles ...	163	550	20	6	14	0 6
Sandal ... ..	9	12½	2	...	1½	3 0
Total ... ..	...	85,710½	7340	2201½	5138½	...
Yearly Average ... ..	...	42,856	3670	1101	2569	...

The immediate supply of large timber is nearly exhausted, but fifty or sixty years hence there ought to be no difficulty in securing a constant yield fully equal to the above, as length is more sought than girth and as there is a good stock of young growth. In 1882-83, 115,908 bamboos worth £1222 (Rs. 12,220) were cut.

Firewood forests are worked partly on the toll-house or *náka* system, partly by departmental cuttings. *Nákás*, or forest toll-houses, for collecting fees levied on loads cut and gathered by the buyers, are posted at Nandgad, Gokák, Suldhál, Biranhóli, Chinchani, Piranvádi, and Kanburgi. The foresters in charge of the three wood-stores also issue permits for collecting revenue in this way. In 1882-83 the receipts for wood so collected amounted to £2411 (Rs. 24,110). The fees are 1s. (8 as.) for each cartload drawn by two bullocks, 6d. (4 as.) for each beastload, 1½d. (¾ *anna*) for a man's, ¾d. (½ *anna*) for a woman's, and ¾d. (¼ *anna*) for a child's headload.

Departmental cuttings were begun in 1879-80. The practice is to fell all trees within certain limits and to stack the wood in heaps 5' x 4' x 10', equal when air-dried to about one cartload or twenty-five cubic feet solid measure. In the 1879-80 auction sales of 6000 stacks, the average stack rate was 3s. (Rs. 1½) and the net proceeds of all departmental cuttings came to £1030 (Rs. 10,300). In 1882-83, 17,813 stacks of firewood were sold for £1068 (Rs. 10,680) net. The system of departmental cuttings has so many advantages that it may

basis of half the Biranhóli yield, or Rs. 12 an acre, the net value of the 103,028 acres of dry forest reserves in Sampgaon, Gokák, and Chikodi would amount to Rs. 12,36,336. This represents the estimated value of the crop as it now stands, with only about one-eighth of the ground stocked with useful wood; it will increase as the forest land becomes better stocked. Taking the cartload, or stack, of firewood at 25 cubic feet solid measure and the cartload of branches at twenty-three cubic feet, the average acre yield of stems would amount to 200 cubic feet and the yield of the whole forest area would be 20,505,600 cubic feet of stem wood and 2,869,644 cubic feet of branches. Coppice will renew itself in fifteen years or at twenty years at most. Taking the revolution, as it is called, at twenty years, the area yearly available for cutting would be 103,028 by twenty years, or 5153 acres, yielding 46,377 cartloads or 1,149,119 cubic feet of firewood, that is, at five per cent, or twenty years' purchase, a total value, excluding minor produce, of £159,132 (Rs. 15,91,820).



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seem strange that the toll system should be continued.<sup>1</sup> The objection to stopping the tolls is that a number of people who live near the larger towns depend for their daily bread on gathering wood. It is hoped that by degrees they will find some other means of subsistence as the toll system is wasteful and incompatible with good forest management.

The chief minor produce is the myrobalan-nut or *harda*, which is sent in large quantities to Bombay. From Bombay the best find their way to Europe and the rest are kept for Indian use. Up to 1876-77 the right to gather myrobalans in each sub-division was every year publicly sold by the *mámlatdárs* to the highest bidders. In 1877-78 the Conservator of Forests, Colonel Peyton, determined to try departmental collection. The nuts were gathered at twenty-nine stores dotted over the myrobalan tracts, and sold to merchants.<sup>2</sup> The result was satisfactory; £4587 (Rs. 45,870) were netted, or more than half as much again as the previous season, though the returns for that year had been higher than those of any former season. The revenue has never again been so high as it was in 1877-78. Still the average for the three years since 1877-78 has been £3275 (Rs. 32,750) compared with an average of £1850 (Rs. 18,500) for the eight preceding years. In 1882-83 the net receipts amounted to £2718 (Rs. 27,180). The receipts vary greatly because both the market and the crop are uncertain, and the last two seasons have not been favourable. A full myrobalan crop is estimated at 1000 tons in Khánápúr and at 375 tons in Belgaum.

Other minor products are honey, *fungi*, *tarvár* and other bark for tanning, corinda, *hela*, *ávla*, *ritha*, and other fruits, and grass. Of these grass alone brings in (1882) an appreciable net revenue of about £100 (Rs. 1000) a year. Up to 1881 grass was sold by the *mámlatdárs* at yearly auctions. In 1881-82 the management of the grazing was undertaken by the forest officers. The receipts for the first year came to over £1200 (Rs. 12,000). After deducting twenty-five per cent which are credited as land revenue, there remained nearly three times as much as the largest sum ever obtained under the old system. The increase would have been more than threefold if the number of cattle had not been greatly reduced by disease immediately before the new system came into practice. The rates charged for one year are: for every head of horned cattle *3d.* (*2 as.*), and for each goat or sheep  $\frac{3}{4}d.$  ( $\frac{1}{2}$  *anna*).

During the eighteen years ending 1882-83 forest receipts have risen from £3094 (Rs. 30,940) in 1865-66 to £14,215 (Rs. 1,42,150) in 1882-83, and the average has risen from £2667 in the five years

<sup>1</sup> The chief advantages are: It admits of organized management and the determination of the sustained yield of the different forest tracts. As the cuttings are confined to a small area, they can be easily watched, easily renewed, and easily guarded from fire and theft. And as the wood is air-dried before it is moved, it is more easily carried. Finally, as no work is carried on in it, the rest of the forest is safer from fire and theft.

<sup>2</sup> In Khánápúr there are eleven stores, at Khánápúr, Homádgi, Shitavade, Gunji, Vátre, Shirolí, Ghotgáli, Chápólí, Jámbotí, Kankumbí, and Konglé, the whole yielding on an average about 4000 *khandis* of 560 lbs. each; in Belgaum there are sixteen stores, Kátgálí, Vághavade, Kinie, Báilur, Hajgólí, Mahálungí, Kitavríle, Pátne, Kalasgade, Gulavde, Vághotre, Umgaon, Bhogólí, Chandgad, Sundi, and Chinchani, with a total average yield of about 1500 *khandis* of 560 lbs. each.

ending 1870 to £11,766 in the five years ending 1882. During the same period, from increase of staff and from the introduction of departmental cuttings and myrobalan gatherings, charges have risen from £966 (Rs. 9660) in 1866 to £4361 (Rs. 43,610) in 1882. Profits have risen from an average of £756 in the five years ending 1870 to an average of £6739 in the five years ending 1882. The following statement gives the details :

*BELGAUM FOREST FINANCES, 1865-66 - 1882-83.*

YEAR.	Receipts.	Charges.	Profit.	YEAR.	Receipts.	Charges.	Profit.
	£	£	£		£	£	£
1865-66 ...	3094	966	2128	1874-75 ...	7589	4837	2752
1866-67 ...	1079	1194	...	1875-76 ...	8169	4040	4129
1867-68 ...	2520	1164	1365	1876-77 ...	7976	3696	4280
1868-69 ...	4347	989	3408	1877-78 ...	9534	4687	4867
1869-70 ...	2288	408	1880	1878-79 ...	10,778	6739	5039
1870-71 ...	5132	1435	3697	1879-80 ...	11,579	4438	7061
1871-72 ...	6287	2236	4051	1880-81 ...	9587	3692	5895
1872-73 ...	8428	4759	3669	1881-82 ...	12,720	6945	5775
1873-74 ...	9295	2640	6655	1882-83 ...	14,215	4361	9854

These increased profits are due not to larger timber cuttings, for less timber is now cut than was formerly cut. The increase is due to better prices, to a greater demand for bamboos and firewood, and to improved methods of working the myrobalan and firewood forests.

The permanent staff consists of one deputy conservator of forests on £50 (Rs. 500) a month and his personal establishment, one head-clerk on £3 10s. (Rs. 35), one vernacular clerk on £2 (Rs. 20), and three messengers on 16s. (Rs. 8) each. The rest of the staff is one ranger on £10 (Rs. 100) a month; five foresters, one on £4 (Rs. 40), two on £3 (Rs. 30) each, and two on £2 (Rs. 20) each; six sub-foresters, three on £1 4s. (Rs. 12) each, and three on £1 (Rs. 10) each; and twenty-one guards, eight on 16s. (Rs. 8) each, and thirteen on 14s. (Rs. 7) each, at a yearly cost of £1248 (Rs. 12,480). During the working season which lasts from November to June the permanent staff is strengthened by thirty-six myrobalan and firewood clerks on £1 4s. (Rs. 12) a month; one clerk in the deputy conservator's office on £2 (Rs. 20) a month; nineteen sub-foresters, one on £2 (Rs. 20), three on £1 10s. (Rs. 15), and fifteen on £1 (Rs. 10); and seventy-one forest-guards, fifteen on 16s. (Rs. 8), and fifty-six on 14s. (Rs. 7), at a total cost of £825 (Rs. 8250). The deputy conservator has general charge of the Belgaum forests. Under him are three executive officers, rangers, and foresters, one in charge of Khánápur, one of Belgaum and Sampgaon, and one of Chikodi and Gokák, who keep sub-divisional accounts and carry out cuttings, plantings, and other executive work. Under them the sub-foresters patrol sub-ranges, see that each guard is on his beat, and that he does his work properly. The guard patrols his beat, catches thieves, puts out fires, and guards the forest from harm, a heavy task as a guard's beat averages twenty square miles of forest mixed with tillage.

Near Pátne in Belgaum a plantation which was begun in 1879 numbered in 1881, 2393 seedlings from one to three years old. The plants are nearly all myrobalans which grow well and yield valuable fruit. In starting this plantation the land was given for tillage for two or three years, free of rent, the husbandmen

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undertaking to plant the seedlings and guard them from fire for two or three years without charge. The only outlay has been the cost of raising the plants in the nursery. This has hitherto averaged 30s. (Rs. 15) an acre, a high rate owing to the difficulty of getting the seeds to sprout. The seed is sown in January, and in June and July, when four to eight inches high, the seedlings are planted twelve feet apart.

## Trees.

<sup>1</sup>All forest trees occasionally occur in the open country. Some trees, such as figs, chiefly *pairi* *Ficus cordifolia*, banian *Ficus indica*, and *umbar* *Ficus glomerata*, *báva* *Cassia fistula*, *ápta* *Bauhinia racemosa*, *siris* *Albizia* spp., *bor* *Zizyphus jujuba*, *pándre máti* *Terminalia arjuna*, *karanj* *Pongamia glabra*, *jámbul* *Eugenia jambolana*, *nána* *Lagerstræmia lanceolata*, and *sávri* *Bombax malabaricum* are found far from forest tracts. Others, such as *kála máti* *Terminalia tomentosa*, sandal *Santalum album*, *mashvâl* *Chloroxylon swietenia*, *ávla* *Phyllanthus emblica*, *dindal* *Anogeissus latifolia*, and teak are seldom seen far from forests. Many trees are grown for their fruit, timber, or shade. Cultivated trees are most often found in the east of the district. Many trees such as the guava, lime, mango, and tamarind, which require care in the east, grow wild in the damp western forests. The *karanj*, the willow *Salix tetrasperma*, the *pándre máti*, and the *jámbul*, grow best in moist places generally on river and pond banks and in rice fields. The well-to-do are fond of planting groves or *râis*, an acre or two in area, generally mango or jack trees.

## Field Trees.

The chief field trees are the *pipal* *Ficus religiosa*, *umbar* *Ficus glomerata*, *vad* *Ficus indica*, *pimpri* *Ficus wightiana* or *Urostigma pseudo-tjiela*, and *nândruk* *Urostigma retusum* or *Ficus benjamina*. These are generally planted along roadsides and near temples. The following ornamental and flowering trees are also planted along roadsides and in gardens: *Albizia procera* and *Albizia lebbek*, the large *gulmohr* *Poinciana regia*, and the small *gulmohr* *Poinciana pulcherrima*, known locally as *sankeshvari*; the silk cotton tree, *simul* or *sávri* *Bombax* or *Salmalia malabaricum*, whose wood is used for making Gokák figures; the sandalwood tree, *shrigandh* or *chandan* *Santalum album*; the Belgaum walnut, *jangli akrot* *Aleurites triloba*; *saru* *Casuarina muricata*, and the cypress also called *saru*, *Cupressus glauca*; the *ápta* *Bauhinia racemosa*; the *kánchan*, *Bauhinia variegata* of two varieties, the *B. purpurescens* and the *B. candida*, yielding beautiful purple and yellow and green flowers; the Bengal almond, *badám* *Terminalia catappa*; the *asoka* *Guatteria* or *Polyalthia longifolia*; the *pila chámpha* *Michelia champaca*; the *nág chámpha* *Messua ferrea*, and the *son chámpha* *Plumeria acuminata*, are grown near houses and roadsides. The *nág chámpha* is very rare.

## Fruit Trees.

Among fruit trees are the Mango *ámba* *Mangifera indica*; the Jack *phanas* *Artocarpus integrifolia*; the Loquat *Eriobotrya japonica*, which is quite naturalised; the Custard-apple *sítáphal*

<sup>1</sup> The paragraphs on Trees, Plants, Shrubs, Creepers, Grasses, and Exotics have been contributed by Surgeon-Major C. T. Peters, M.B.

Anona squamosa; the Bullock's-heart *rámphal* Anona reticulata; the Cashewnut *káju* Anacardium occidentale; the *jámbul* Eugenia jambolana; the Bael *bilva* *Ægle* marmelos; the Woodapple *kavit* Feronia elephantum; the Pummalo *popnas* Citrus decumana; the Sweet Lime *mitha nimbu* Citrus limetta; the Citron Citrus medica; the Lime *nimbu* Citrus bergamia; the Orange *nárangí* Citrus aurantium; the *kokam* Garcinia purpurea; the *ávla* or *ámbla* Phyllanthus emblica; the *bor* Zizyphus jujuba; the *turan* Zizyphus rugosa; the *guti* Zizyphus xylopyra; the *chinch* Tamarindus indicus; the *agasti* Agati grandiflora, the flowers of which, with wheat salt and chillies, are cooked into a kind of cake, and the pods and leaves are eaten as curries; the Horse Radish Tree *shenga* or *shegva*, Moringa pterygosperma, whose leaf, flower, and pod are eaten as curries, whose bark is used as a poultice, and by Europeans instead of the horse-radish; an inferior kind of peach, Amygdalus persica; the Guava *jám* Psidium pyriferum and P. pomiferum; a superior kind of Pomegranate *ánár* Punica granatum is grown in Bál Hongal; the *papav* or *pápya* Carica papaya, is grown largely as a dessert fruit; *karanda* Carissa carandas, grows wild about the hill sides and hedges; *kamrak*, Averrhoa carambola and A. bilimbi, bear acid fruit; the Fig *anjir* Ficus carica, is found but the fruit is not so good as the Poona fig; the Mulberry *tut* or *shetut* Morus indica, is grown but not to any large extent; there are different kinds of Plantains *kole* Musa paradisiaca, the fruit of which is used as a dessert fruit, and some varieties, along with the pith and blossoms of the different kinds of plantains, are cooked as curries; and the Pineapple *ananás* Bromelia ananasa.<sup>1</sup>

Among other useful plants are the Soapnut *ritha* or *aritha* Sapiudus emarginatus, and the Markingnut *bilva* or *bhilávan* Semocarpus anacardium; the frankincense tree, *dhupsáái* Boswellia thurifera, found on Shendur hill in Chikodi; the Givotia rottleriformis, also called *ritha*, whose light wood is used for making Gokák figures; and the Wild Nutmeg *juji kai* Tyrrhosia horsfieldii, whose scentless fruit is a little larger than the true nutmeg. Among palms are the Wild Sago Palm *bherli nád* Caryota urens, whose pith yields a coarse sago and is cooked as gruel and the trunk is used as water conduits; the Betelnut *phophal* or *supári* Areca catechu, which is rarely grown; the Wild Date *shendi* Phoenix sylvestris, which is common in Khánápur and Belgaum and on the banks of streams in the east; the Cocoa Palm *náriel* Cocos nucifera, which is grown only in the east in the gardens of the rich; and the Brab or Palmyra *tól* Borassus flabelliformis, which is not very common.

Many miles of roadside have been planted with trees and bamboos. The trees chiefly used are the banian, *páiri*, *umbar*, *ápta*, *siris*, *bábul*, mango, tamarind, *nim*, and bamboo. These trees are useful either as timber or for fences. The figs are the hardiest class of tree and grow well on rocky soil where nothing else thrives.

Many exotics have been introduced near the Belgaum cantonment. Some of them, as the Casuarina, India-rubber, and Pithe-

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<sup>1</sup> In 1791 the neighbourhood of Chikodi was famed for producing grapes of extraordinary size and flavour. Moor's Narrative, 14.

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**Trees.**

colobium dulce, are apparently hardy trees. Others, as the logwood, the Australian Eucalypti or blue gums, and the acacias have been less successful. Coffee has been lately introduced and grows well in evergreen clumps on or near the Sahyádris.

**Hedge Plants.**

The chief hedge plants are the *adhalsa* Adhatoda vasica, the *nirgundi* Vitex negundo, the *lantana* Lantana indica, the Mexican aloe Agave americana, the Aloe *kuar* Aloe perfoliata, and the *mendi* Lawsonia alba. The Prickly Pear Opuntia dillenii, is used as a hedge-plant about gardens, but harbours rats and snakes; hedges of the Milk Bush *sher* Euphorbia tirucalli, are also common. The *bor* Zizyphus jujuba, the *bábhul* Acacia arabica, and the Physic Nut *erunde* Jatropha curcas, are used for field enclosures, while the quick-growing Indian Coral Tree *pángcra* Erythrina indica, and *shevri* Sesbania ægyptica, are used to support the Betel vine *pán* Piper or Chavica betel.

**Water and  
Marsh Plants.**

Of water plants there are the Lotus, *kamal*, of three kinds, Nymphœa stellata, N. rubia, and N. pubescens, the Ipomia reptans, growing in ponds and used in some places as a pot-herb, and the *sola* Æschynomene aspera, growing in marshes and used for making wedding garlands and coronets. The roots of some of the Polygonums which are found on the banks of rivulets were used as food during the 1876-77 famine.

**Shrubs and  
Weeds.**

Among the Shrubs and Weeds that grow in waste lands and on hill sides are the *vágáti* Capparis roxburghii with large white showy flowers, the Nettle *bichuti* Urtica or Fleurya interrupta, the Thorn-apple *datura* Datura alba and D. fastuosa, the *supti* Tephrosia suberosa growing on rocky hills, the *tarvár* Cassia auriculata and C. tora, the *kanguni* Solanum incerta and S. jacquinii, a diffuse plant armed with prickles bearing yellow berries of the size of a plum, the Mexican Thistle *pila dhotra* Argemone mexicana, the Swallow Wort *mádár* or *ruí* Calotropis gigantea, the *iumba* Leucas linifolia, the *agáda* Achyranthes aspera, and different kinds of Coleus grow as weeds in waste ground. The *ghols* Portulaca quadrifida and P. oleracea are found in moist shady places, while the Lepidagathis cristata and *káli musli* or *musli khund* Curculigo brevifolia and C. graminifolia, prefer more rocky grounds.

**Creepers.**

Of Creepers there are several convolvuluses, among them the Argyreia; some of the Cucurbitaceæ, such as the Citrullus colocynthis *indráyan*, which grows in hedges along with the milk bush; *tendla* Coccinia indica which bears a beautiful red oblong fruit; and the *gulvel* Cocculus cordifolius a twining shrub found among hedges.

**Grasses.**

The chief Grasses are: spear grass *kántha gavat* which is not used as fodder for horses, *chirkýáche gavat* which looks like a variety of *kántha gavat*, *kánta márvel* or *mákcunche gavat* Andropogon scandens which grows during the rains and is considered good fodder, *madhádche gavat* or *kátgod mandí*, a kind of Eleusine, is eaten by cattle, *jangli rala* Panicum italicum is eaten by horses and cattle, *kutta phanda* is not good for horses, *sipi* is considered good fodder, *hariyáli* Cynodon dactylon is excellent fodder for horses and sheep but not for cattle, *phanda* is also not good for cattle, *mol munda*

bears large seeds which were used as food during the 1877 famine, *lohora* a kind of *Andropogon*, is not used as fodder, *bimba* is supposed to be a variety of *lohora*, *gávti náchni* or wild *náchni* is a variety of Eleusine, *kavdyáche phombi* also called *bhojráche gavat* and *kolya* or *janglí rála* is a kind of *Panicum*, and *kusliche gavat* or *gávti sáva* whose seeds are eaten is probably the *Panicum frumentaceum*.

Besides the above, there are the Lemon grass *cha gavat* *Andropogon schenanthus*, which with ginger sugar and milk is used as a drink in fevers and colds, and the scented *Andropogon muricatus* which is used in making wind screens and fans.

The chief Ferns are: *Adiantum lunulatum* and *A. cappillus-veneris*, two varieties of maiden hair, growing in moist shady places, the Silver Fern *Cheilanthes farinosa* and *C. tenuifolia* found chiefly in the western hills, two brackens *Pteris cretica* and *P. pellucida* found at a height of more than 2000 feet, the Oak Leaf Fern *Aspidium cicutarium*, *Lastrea bergiana*, *Hemionitis arifolia*, *Gymnopteris contaminans*, and the Royal Fern *Osmonda regalis*. The Tree Fern is occasionally found and a shrubby *Alsophila* occurs among the western hills; so also do a few varieties of the *Trichomanes* and *Ophioglossum*. The *Pleopeltis membranacea* is found growing on trees.

Of the Club Moss family, or *Lycopodiaceæ*, *L. selaginella* is seen in shady hill sides and *L. clavatum* in marshes. Beautiful mosses are found in the hills near Jámboti and the Ámboli pass.

With care many European fruits and vegetables can be grown in Belgaum. The Reverend J. Smith, of the London Missionary Society, has grown English apple and pear trees, but the pear trees do not bear. Peaches and strawberries succeed with care, while the raspberry and Cape gooseberry *Physalis peruviana*, grow of their own accord after they have been once planted.

A very large number of English flowers have been grown from seeds or from cuttings. Among the most successful are *Achimenes*, *Amaranthus*, *Aralias*, *Arbutilons*, *Arums*, *Caladiums*, *China Asters*, *Balsams*, *Begonias*, *Bignonias*, *Bonganuvillias*, *Camellias*, *Cannas*, *Coryopsis*, *Coleus*, *Crotons*, *Dahlias*, *Fuschias*, *Gardenias*, *Geraniums*, *Gloxinias*, *Heliotropes*, *Hoyas*, *Iresines*, *Maurandyas*, *Mignonette*, the *Marvel of Peru*, *Nasturtiums*, *Passion Flowers*, *Phloxes*, *Pinks*, *Poinsettias*, *Roses*, *Sweet Peas*, *Violets*, and *Zinnias*. Of European vegetables, cabbages are grown all the year round, but thrive best during the cold weather. Cauliflowers are fair but never very large. A continual supply of peas may be kept up but during the dry months they want much care. Nolkohl and turnips are good if carefully grown. French beans, beet, lettuce, carrots, Jerusalem artichokes, asparagus, celery, persnips, radishes, small onions, tomatoes, cucumber, and water-cresses all thrive.

Cattle are mostly bred by the Dhangars, who live chiefly in the forest tracts of the Khánápur and Belgaum sub-divisions. A large number of cattle are brought for sale from Maisur and other distant places. The principal cattle marts are Nipáni, Báil Hongal, Gokák, Belgaum, Kitur, and Nandgad.

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Grasses.

Mosses and  
Lichens.

Exotics.

Domestic  
Animals.

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Of MAMMALS, Elephants are used by the Commissariat Department for transport purposes, and by a few rich natives for show.

Domestic  
Animals.  
*Donkeys.*

Donkeys are used chiefly by Vadars for carrying their camp-gear and stones, and their charcoal, of which they are the sole makers. Beldárs or stone-masons and potters also keep asses for carrying their wares and washermen keep asses for carrying their clothes. The price of a good four-year old donkey is about £2 (Rs. 20).

*Dogs.*

Dogs are chiefly kept by Bedars and Vadars, who use them for hunting, and most villages have generally some ownerless pariah dogs. The dogs kept for sport are of the pariah breed but are better fed and larger than the ordinary village dogs. They have good noses, and sufficient pace and endurance to run down pig, the chief object of the chase, and keep them at bay until the hunters come up. They are unable to run down deer in a fair course. But by surrounding them and letting the dogs in from all sides, *sámbar*, *chital*, and other deer are sometimes brought to bay and killed.

*Horses.*

Besides by European residents, among natives, Government officials, merchants, and others of the rich and well-to-do classes keep horses for riding, driving, and carrying loads. They are fed on gram, *kadbi*, grass, *masála*, and *báji*. Country-bred or *deshi* animals are seldom over fourteen hands and generally under thirteen. They are wiry little animals able to do a great deal of work on very poor food and to stand exposure; but they are ugly, vicious, and obstinate. Their price varies from £2 to £20 (Rs. 20-200).

*Mules.*

Mules are used almost exclusively by the Commissariat. They have lately been employed in the coaches which run between Belgaum and Dhárwár.

*Camels.*

Camels are used almost solely by the Commissariat. A few are kept by rich families for carrying loads. They are fed on shrubs, grass, gram, and *kulthi*, and cost £5 to £20 (Rs. 50-200).

*Pig.*

Pig of a lighter-coloured smaller breed than the wild pig are reared by Native Christians, and by Vadars and other low-caste Hindus. They are dirty feeders and are generally the only village scavengers.

*Buffaloes.*

Buffaloes do not thrive on the Sahyádris though a few are kept in most villages. The best buffaloes come from Sampgaon and Gokák and the country to the east. She-buffaloes, which are bred by cultivators and milkmen, have their first calf at the age of five and go on bearing till they are about sixteen. They are of four breeds, *gavli* or *hanbari* so called because they are reared by milkmen of the Gavli and Hanbar castes, *nagdi*, *javári* or *deshi* that is local, and *dhangari* so called because they are kept by shepherds or Dhangars. The *gavli* breed, which is weaker and smaller than the *nagdi*, have slender bent horns, and the *nagdi* breed have long straight horns. Except that it is taller and stronger the *dhangari* breed differs little from the country breed. When in full milk a good she-buffalo gives five to ten quarts (5-10 *shers*) of milk a day and keeps in milk for ten months at a time. The price of a milch buffalo, which has just calved, is about £2 10s. (Rs. 25) if she gives three quarts (3 *shers*) of milk a day, and £1 (Rs. 10) more for every quart above three. He-buffaloes begin to work when

four years old and are used for ploughing, draught, and burden. For heavy work a pair of he-buffaloes are often kept and are most useful on account of their great strength and, when well broken, on account of their steadiness. Though slower than oxen they are much more powerful, being able to pull nearly double the weight on heavy ground. Their great defect is that they cannot stand the sun; they must be worked in the early morning or evening and are so useless when the sun is high that the husbandmen sometimes plough by moonlight. The trade between Sávantvádi, Goa, and Belgaum is carried on almost entirely by pack bullocks and buffaloes, which take down grain, fruit, and tobacco, and bring back salt, cocoannts, and dried fish. The price of a draught-buffalo varies from £3 to £5 (Rs. 30-50).

Cows are found all over the district. Those living on the Sahyádris are smaller than those of the more level country and give little milk. The breed further inland is on the whole better fed and larger; but in all parts of the district small cattle always far outnumber the large. Cows first calve when three to four years old, and go on bearing till they are about fifteen. They feed on grass, millet stalks, cotton seeds, and oil-cakes. A good cow when in full milk gives about four quarts (4 *shers*) of milk and continues in milk about six months. The price of a young full grown cow varies from £1 10s. to £4 (Rs. 15-40). There are eight breeds of bullocks: *sorti*, *mudla*, *kundalvari*, *nagdi*, *dhangari*, *khillári*, *hanabari*, and *chilhar*. Of the first four the *sorti* or South Káthiáwár bullocks are the strongest and largest, about 13½ hands at the shoulder. They have thick black horns, large ears, and long thick tails. Though they are slow, no team for ploughing is considered complete without one or more pairs of *sortis*. The *mudla* bullocks are strong, active, and of middle size, and have straight long horns, slender tails, and small ears. The *nagdi* bullocks are short, about ten hands at the shoulder, stout, and active. They are found in numbers both in the plain and hilly country. Though useful and hardy they are not so strong as the *sortis* or *mudlás*. The *kundalvari* bullocks, the weakest of the four breeds, have large ears, long tails, thick hair, and bent horns. The *dhangari* and *khillári* bullocks differ from the *hanabari* and *chilhar* bullocks by having longer faces, and being stouter, taller, and larger. Bullocks are generally reared by the cultivating classes and are put to work when they are three years old. A pair of *mudla* or *nagdi* bullocks ploughs four acres of land in six days, while three or four pairs of *sorti* and *kundalvari* bullocks, working together at one plough, take ten days to plough an equal area of land. A pair of bullocks of the *sorti* breed costs £6 to £20 (Rs. 60-200), of the *mudla* breed £5 to £20 (Rs. 50-200), of the *kundalvari* breed £3 to £10 (Rs. 30-100), and of the *nagdi* breed £2 10s. to £8 (Rs. 25-80). On a fair level road, a pair of good well-fed oxen can, as an ordinary day's work, draw a load of half a ton sixteen miles a day. For carriages, or *dhamanis*, fast trotting bullocks of the Maisr breed are often used, which sometimes cost as much as £30 (Rs. 300) a pair. Pack-bullocks owned by peddlers and traders

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## Production.

Domestic  
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*Buffaloes.*

*Cows.*



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*Goats.*

carry about 200 pounds (8 *mans*) of grain or cloth packed in gunny bags.

Goats are kept by all classes except Bráhmans, Lingáyats, and Jains. They are of four breeds, local, *kumyadu*, *kui sheli*, and *dhangari*. The country breed has longer legs than the *kumyadu*, and the *kui sheli* goats are short and white, and yield specially good milk. Goats are chiefly kept in villages near bushlands and are most numerous in Gokák. The price of a full-sized she-goat varies from 6s. to 16s. (Rs. 3-8) and averages about 8s. (Rs. 4) for one in full milk which gives about a quart (1 *sher*) of milk a day. Some goats give as much as two quarts, but most do not give more than three quarters of a pint to a pint and a half.

*Sheep.*

Dhangars breed three kinds of Sheep, country, *kenguri*, and *yelga*. Country sheep are either white or black, and their wool is somewhat stronger than the *kenguri*'s wool. The *kenguri* sheep have red soft wool. The *yelga* sheep is either white or red. Sheep are reared solely in the east, the climate of the west being too damp for them. They are sheared twice a year, in June and in December, and their wool is made into blankets. The price of a full-sized sheep weighing about twenty-five pounds is about 4s. (Rs. 2).

*Fowls.*

Hens, reared chiefly by Maráthás, Musalmáns, and Christians, are of two breeds, large and small. Hens of the smaller breed cost 6d. to 1s. (4-8 *as.*) and hens of the large breed 4s. to 16s. (Rs. 2-8). Eggs of the smaller breed cost 3d. (2 *as.*) and of the large breed 6d. (4 *as.*) a dozen. Ducks, turkeys, and guineafowls are reared by Christians and Musalmáns. A duck costs 2s. to 4s. (Re. 1-Rs. 2), and a duck's egg  $\frac{3}{4}$ d. ( $\frac{1}{2}$  *anna*); a turkey costs 4s. to £1 (Rs. 2-10), and a turkey's egg  $1\frac{1}{2}$ d. (1 *anna*); a guineafowl costs 1s. to 4s. (8 *as.*-Rs. 2), and a guineafowl's egg  $\frac{3}{4}$ d. ( $\frac{1}{2}$  *anna*).

Especially in the west of the district cattle suffer much from epidemic disease. The worst time is at the opening of the south-west rains in the first fortnight in June, when they are reduced by bad and scanty fodder and are unable to stand the sudden change from heat to damp cold. One of the commonest and most fatal diseases is derangement of the liver. Other common complaints are foot-rot and inflammation of the lungs.

Wild Animals.

Among *WILD ANIMALS*, of *QUADEUMANA*, the *BLACKFACED MONKEY*, *kari mangia* or *vánar*, *Presbytis entellus*, is common all over the country, frequenting groves, river banks, and woodlands. The *REDFACED MONKEY*, *kempu mangia* or *mákad*, *Macacus radiatus*, is not nearly so common as the blackfaced variety, but is generally distributed.

Of *CHIROPTERA* or *Bats*, the *FLYING FOX*, *gádal*, *Pteropus edwardsii*, is common all over the district wherever there are tamarinds, figs, or other trees with edible fruit. Its fat is used as a cure for rheumatism and its flesh is eaten by Musalmáns and Hindus as a medicine. *Cynopterus marginatus* is very common. *Hipposideros murinus* occurs, but is rather rare. *Nycticejus heathii* is common.

Of *CARNIVORA* or *Flesh-eaters*, the *COMMON MUSK-SHREW*, *chuchundri*, *Sorex ocerulescens*, frequents most buildings though it is not

very numerous. The BLACK BEAR, *asval* or *kardi*; *Ursus labiatus*, is common on the Sahyádrí range and occurs also in the heavy forest on the Kánara border. Bears are much less numerous than they formerly were. Between 1840 and 1880 no less than 223 bears were killed. Of these 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. The INDIAN BADGER, *Mellivora indica*, is common in woodland and open country. It is said to dig up and eat dead bodies. The COMMON INDIAN OTTER, *niranái*, *Lutra nair*, is common on the banks of the larger streams. The TIGER, *K. huli*, *M. vágh*, *Felis tigris*, is not very common. It is confined to the Sahyádrí range and the strip of heavy forest in the extreme south. When the crops are on the ground tigers sometimes wander far from the forest and one was lately shot near Kitur. The people distinguish two kinds *dhánia* and *patáit*, but the only difference seems to be in size. Man-eating tigers, if they do occur, are rare, though man-eating panthers have been reported. Tiger's flesh is sometimes eaten by the depressed castes. In Belgaum during the thirty-seven years ending 1877, 372 tigers were killed. Arranging these thirty-seven years into three terms of nine years and one term of ten years the returns show a marked fall in the number slain, 128, 121, fifty-four, and sixty-nine, or a yearly average of fourteen, thirteen, six, and seven. The following statement shows the details of the five years ending 1882:

BELGAUM TIGERS, 1878-1882.

YEAR.	Tigers killed.	Rewards	= Loss of Life.	
			Persons	Cattle.
1878 ... ..	3	£. s. d.	1	89
1879 ... ..	2	5 8	0	9
1880 ... ..	1	4 16	4	10
1881 ... ..	2	2 8	4	22
1882 ... ..	5	4 16	1	27
		7 4		

The LARGER PANTHER, *K. yemme kerkál*, *Felis pardus*, does not often occur east of the Pooná-Dhárwár road, but is common all along the Sahyádris, in the Belgaum and Khánápur sub-divisions, and in the heavier forests of Khánápur bordering on Kánara. People have been wounded and killed by panthers, but there is no certain case on record in which a panther has attacked a man with the object of eating him. *Felis Panthera*, *K. kerkal*, the smaller darker and bolder panther, is found in all forest tracts. To the north of Belgaum and in the hilly parts of the Gokák and Chikodi sub-divisions they frequent the dense thickets of prickly-pear *Opuntia dilenii* in which they find a secure retreat. There is no way of driving or cutting them out of these thickets. The only plan to circumvent them is either to watch over their kills, or to picket out goats near to some thicket into which they are known to have gone, and then await their approach from a tree or rock. It is useless to sit down behind a bush or in a hole to await their coming. Panthers are much feared at Gokák, for they have hurt and killed many people. In Gokák their flesh is sometimes eaten by Mhárs and

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Mángs. Between 1840 and 1877, 830 panthers were killed. The rewards paid and the number of cattle killed are not mentioned. The details for the five years ending 1882 are :

*BELGAUM PANTHERS, 1878-1882.*

YEAR.	Killed.	Rewards.	Loss of Life.	
			PERSONS.	CATTLE.
1878 ... ..	12	£. s.	9	80
1879 ... ..	11	12 12	6	71
1880 ... ..	10	10 10	2	31
1881 ... ..	16	11 8	18	22
1882 ... ..	16	16 10	3	52
		15 0		

The LEOPARD-CAT, *M. vágat*, is rare, occurring only on the Sahyádris and in the south Khánápur forests. Though scarcely bigger than a full-grown cat, the people say that it sometimes kills the largest buffaloes. It climbs trees, pounces on the back of its prey, and kills it by tearing its throat. The Common Jungle Cat, *K. arive bekku*, *M. rán mángjar*, *Felis chaus*, is common all over the district. Some years ago when antelope were common in the Belgaum plains, HUNTING LEOPARDS, *chíta* or *chircha*, *Felis jubata*, were kept by the Mudhol chief. The STRIPED HYÆNA, *K. katta kiráb*, *M. taras*, *Hyæna striata*, is common all over the country. It is commonest in open hilly woodlands. Since 1840 seventy-nine hyænas have been killed. The CIVET CAT, *K. punagala bekku*, *M. kasturi mángjar*, *Viverrina malaccensis*, is common in the woodlands at Khánápur, Belgaum, and Gokák. The Common Tree or Toddy Cat, *K. matta bekku*, *M. hejjat*, *Paradoxurus musanga*, is common everywhere. The MADRAS MONGOOSE, *K. mungali*, *M. mungus*, *Herpestes griseus*, is common all over the district. *Herpestes smittii* occurs on the Sahyádris, and probably in the Gokák and Chikodi forests. *Herpestes monticolus* has been noticed in the Gokák forest land. *Herpestes vitticollis*, a much larger mongoose than *H. griseus* or *H. smittii*, occurs on the Sahyádris. The INDIAN WOLF, *K. tola*, *Canis pallipes*, is not uncommon in the open east but is seldom seen in the forest tracts. Since 1840 ten wolves have been killed. The COMMON INDIAN JACKAL, *K. kapalnari*, *M. kola*, *Canis aureus*, abounds everywhere. The JUNGLE DOG, *K. arive nai*, *M. jangali kutra*, *Cuon rutilans*, is very common in the southern forests but rare in the east. The INDIAN FOX, *K. chandak nari*, *Vulpes bengalensis*, is common in the open east, but is seldom seen in well-wooded tracts.

Of GLIRES or GNAWERS, the COMMON PORCUPINE, *M. salindar*, *Hystrix lencura*, is found in all forest tracts, especially on and near the Sahyádris. The BOMBAY RED SQUIRREL, *M. shekra*, *Sciurus indicus*, the *S. elphinstonii* of Jerdon, is common in the tall Sahyádris and south Khánápur forests, but does not occur further inland. The COMMON STRIPED SQUIRREL, *K. yenchi*, *Sciurus palmarum* abounds everywhere. The BROWN FLYING SQUIRREL, *Pteromys petaurista*, is rare and is confined to the south Khánápur forests. The JERBOA RAT, *Gerbillus indicus*, is common, and *Gerbillus speciosus* somewhat darker and about an inch smaller than *G. indicus*, is common in the thin wooded parts of Khánápur. The MOLE RAT, *Nesokia indica*, is found

in the eastern sub-divisions. The BANDICOOT, *ghus*; *Mus bandicota*, is common in houses and granaries. The MIGRATORY RAT, *Mus decumanus*, is the common house-rat found everywhere. The LONG-TAILED TREE MOUSE, *Mus oleraceus*, is found in wooded parts of the district, living in trees. The COMMON INDIAN HOUSE MOUSE, *Mus urbanus*, from two to three inches long, may be seen in most houses, but is not very numerous. Animals of this genus are eaten by Vadars and other low-caste men. *Mus terricolor* is common in the more open parts of Khánápur. *Leggada lepida* is common in the thinly wooded parts of Khánápur. The BROWN SPINY MOUSE, *Leggada platythrix*, is found in Gokák. The FIELD RAT, *Golunda meltada*, is found in the open parts of the country, and is said to appear without any explainable cause, sometimes in great numbers, and to do much damage to crops as happened in the eastern sub-divisions in 1878, the year after the famine. The BLACKNAPED HARE, *K. mala*, *M. sasa*, *Lepus nigricollis*, is rare in the Sahyádris and does not frequent tall timber forests. It is common in the open country and in the scrub forests of Chikodi and Gokák.

Of MULTUNGULA, or animals whose hoof is divided into more than two parts, the WILD PIG, *K. handi*, *M. dukar*, *Sus indicus*, is common in all forest tracts and is eaten by Maráthás and by several of the early or depressed castes. It is a dirty feeder and will even eat carrion and cows which have died of disease, and in this way sometimes becomes infected with cattle-disease and falls a victim to its gluttony.

Of BISULCA or CUD-CHEWERS there are, the SÁMBHAR, *K. kadivi*, *M. sambar*, *Rusa aristotelis*, which is rare, occurring almost solely on the Sahyádris and in the Khánápur forests. One or two live in the scrub forest near Gokák, but east of Belgaum they are almost extinct. It never leaves the cover of the forests and keeps to the thickest parts. The SPOTTED DEER, *K. sárang*, *M. chítal*, *Axis maculatus*, is common in the south Khánápur forests but rarely further north. In Gokák it has been almost exterminated by the villagers, who beat the forests regularly once a week and kill large quantities of game. It never leaves the forest tract, but unlike the *sámbar* prefers low open bushland to tall timber. The BARKING DEER, *K. kondákuri*, *M. bekar*, *Cervulus anreus*, is not uncommon in most forests, especially on the Sahyádris and in south Khánápur. It never leaves the forest tract. The MOUSE DEER, *M. písáq*, *Meminna indica*, is common in the Khánápur forests and is also met with on the Sahyádris. It does not occur east of Belgaum. The FOURHORNED ANTELOPE, *K. kondákuri*, *M. bekar*, *Tetracerus quadricornis*, has the same Kánarese and Maráthi name as the Barking Deer. Their general appearance is much the same and they frequent the same tracts. *T. quadricornis* is commonest in the open Sahyádris forests which it never leaves. The BLACK BUCK, *K. chiggari*, *M. haram*, *Antelope bezoartica*, was common thirty years ago in the fields about Belgaum. Now it is scarcely found west of Gokák, and even in the open east it is not numerous. It avoids woodlands, though it is sometimes found in low scrub on the borders of cultivated land. The INDIAN GAZELLE, *K. and M. madar*,

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*Gazella bennettii*, is not uncommon in the east. It frequents the low bushland east of Belgaum, but is not found further west.

The Bison, *M. gava*, *Gavæus gaurus*, is rare occurring only in one or two places on the Sahyádris and in the heavy forest in the extreme south. It is very shy. When in herds it seems never to attack the patches of *rági* and *sáva* which are grown in the centre of its haunts; but solitary bison do sometimes graze on the crops and cause much annoyance to the hillmen, who often find it difficult to drive them away. It is said that many years ago a large bull was shot by Mr., now Sir Frank Souter near One Tree Hill\* about a mile and a half to the north of Belgaum.

Of EDENTATA or Toothless Animals, the INDIAN ANT-EATER, *K. hanch bekku*, *M. khápar mánjar*, *Pholidotus indicus*, is fairly common in the forest tracts both east and west of Belgaum.

Bees.

There are no tame bees. The wild bees are of six classes: *Narajenu* (K.) or *Murkut* (M.) are small, scarcely the size of the small house-fly; the honey is pale yellow and is used in medicine. *Sunna nonajenu* (K.) or *Pove* (M.) is like the *Murkut* in many respects. Both *murkut* and *pove* make their nests round small twigs in bushes and also in the ground. *Nonajenu* (K.) or *Katyali* (M.) is of the size of an ordinary English bee. It builds its nests in trees and its honey is pale yellow and good. *Kondge* (M.), called variously in Kánarese *Kadujenu*, *Jagrienu*, *Kuddujenu*, *Hebbajenu*, and *Sabarjenu*, is very large. Its honey is coarse and of a golden brown. It makes large combs stretching along large branches and also in rocks. *Sateru* (K.) or *Sátvani* (M.) is of the ordinary size. The honey is good though rather dark in colour. It makes a peculiar nest of seven layers of cells in trees. There is also a bee called *Atak*, but, except that the honey is thin and pale, nothing further is known about it. Besides from bees, honey is made from the *nána Lagerstræmia lanceolata*, mango, tamarind, *bábhul*, and *nim* *Melia azadirachta*, and from the blossoms of the *halli*, *tatta*, *bettavari*, and other creepers. The market price of honey varies from 3*d.* to 6*d.* (2-4 *as.*) the pound. There is no trade in honey.\*

Birds.

Among BIRDS, of RAPTORES, *OTOGYPS CALVUS* (Scop.), the Black Vulture, is common everywhere and most numerous in forest tracts, especially on the Sahyádris and in Khánápur. It is a resident. *PSEUDOGYPS BENGALENSIS* (Gmel.), the Whitebacked Vulture, is a resident and common everywhere. *NEOPHRON GINGINIANUS* (Lath.), the Common Scavenger Vulture, is a resident and common near all large villages, especially towards the east. *FALCO SUBBUTEO* (L.), the European Hobby, has been once procured by Captain Butler. It is a cold-weather visitant and occurs only as a straggler. *CHIQUERA FALCO* (Daud.), the Redheaded Merlin, a cold-weather visitant, is rare, occurring only in the open country. *CERCHNEIS TINNUNCULUS* (L.), the Kestrel, is a very common cold-weather visitant. *CERCHNEIS NAUMAUNII* (Fleisch.), the Lesser Kestrel, is very rare occurring if at all only as a straggler in the cold season. *CERCHNEIS AMURENSIS* (Radde.), the Orangelegged Kestrel, is very rare occurring only as a cold-weather straggler. *ASTUR BADIUS* (Gm.), the Indian

Sparrow Hawk, is very common; it probably leaves before the beginning of the rains. *ACCIPITER NISUS* (L.), the European Sparrow Hawk, is very rare, occurring only as a cold-weather straggler. *ACCIPITER VIRGATUS*, the Besra Sparrow Hawk, occurring in the Khánápur forests, is rare and probably leaves during the rains. *AQUILA MOGILNIK* (S. G. Gm.), the Imperial Eagle, is very rare, found only in the open country east of Belgaum. *AQUILA VINDHIANA* (Frankl.), the Tawny Eagle, is very common, especially in thinly wooded parts. It probably leaves at the beginning of the rains. *HIERAËTUS FENNATUS* (Gm.), the Dwarf Eagle, is rare. It is obtained, recorded by Captain Butler, from Belgaum in the cold season. *NISAËTUS FASCIATUS* (Vieill.), Bonelli's Eagle, is rather rare, but occurs in open forest and in open country near forests. *CIRCAËTUS GALLICUS* (Gm.) is rare, but is a resident. *SPILORNIS MELANOTIS* (Jerd.), the Crested Serpent-Eagle, is a resident, very common on the Sahyádris where only it seems to be found. *BUTASTUR TEESA* (Frankl.), the White-eyed Buzzard, is very common particularly in the Khánápur and Sahyádris forests. It probably leaves at the beginning of the rains. *CIRCUS MACRURUS* (S. G. Gm.), the Pale Harrier, a cold-weather visitant, is common in the open parts. *CIRCUS CINERACEUS* (Mont.) is common in open parts. *CIRCUS ÆRUGINOSUS* (Lin.), the Marsh Harrier, a cold-weather visitant, is very common near ponds and rice-fields in Khánápur but less common further north. *HALIASTUR INDUS* (Bodd.), the Maroon-backed Kite, a resident, is found near almost all large ponds and reservoirs. *MILVUS GOVINDA* (Sykes), the Common Kite, is a resident, very common in the fair weather and less common during the rains. *PERNIS PTILORHYNCHUS* (Tem.), the Crested Honey Buzzard, is very common in all eastern forest tracts and open country. It probably leaves during the rains. *ELANUS CÆRULEUS* (Deel.), the Blackwinged Kite, is very common everywhere, particularly in the forests of Khánápur and on the Sahyádris. It probably leaves during the rains.

*STRIX JAVANICA* (Gm.), the Indian Screech Owl, a resident, is common in the thinly wooded east, but does not occur on the Sahyádris or in other well-timbered parts. *SYRNIUM INDRANEE* (Sykes), the Brown Wood Owl, is rare, probably confined to the Sahyádris. *SYRNIUM OCELLATUM* (Less.), the Mottled Wood Owl, is common in thinly-wooded tracts, especially in Khánápur. *ASIO ACCIPITRINUS* (Pall.), the Shorteared Owl, is rare, occurring only in the cold season in open grass land. *BUBO BENGALENSIS* (Frankl.), the Rockhorned Owl, is a resident occurring in open tracts and in certain thinly wooded parts of the Sahyádris. *KETUPA CRYLONENSIS* (Gm.), the Brown Fish Owl, is common in the south and west forests, and sometimes occurs in open tracts. *SCOPS PENNATUS* (Hodgs.), the Indian Scops Owl, a resident, is often heard but seldom seen, and is probably confined to the Sahyádris and their immediate neighbourhood. *CARINE BRAMA* (Tem.), the *pingala*, is very common in open and thinly wooded parts, but does not occur in thick woods or on the Sahyádris.

*GLAUCIDIUM MALABARICUM* (Bly.), the Malabár Owlet, is a resident,

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common in the Khánápur timber forests, less common on the Sahyádris, and not found outside of the belt of heavy rainfall. *NINOX LUGUBRIS* (Tick.), rare but probably a resident, occurs in the Khánápur forests.

Of *INSESSORES*, *HIRUNDO RUSTICA* (Lin.), the Common Swallow, is a cold-weather visitant found everywhere. *HIRUNDO FILIFERA* (Steph.), the Wiretailed Swallow, a resident, is common everywhere in open country and thin bushlands. *HIRUNDO ERYTHROPYGIA* (Sykes), the Redrumped Swallow, is a resident and common everywhere. *PTYONOPROGNE CONCOLOR* (Sykes), the Dusky Crag Martin, a resident, is common in most parts, especially on the Sahyádris.

*CYPSSELLUS AFFINIS* (J. E. Gr.), the Indian Swift, a resident, is common in most parts, but does not occur everywhere or in the forests. *DENDROCHELIDON CORONATA* (Tick.), the Crested Swift, is very common in all forest tracts west of Belgaum, but does not occur in the open country.

*CAPRIMULGUS INDICUS* (Lath.), the Jungle Nightjar, a resident, is common in Khánápur in the open as well as in the forests. *CAPRIMULGUS ATRIPENNIS* (Jerd.), the Ghát Nightjar, a rather rare bird, occurs on the Sahyádris and in the Khánápur forests. *CAPRIMULGUS ASIATICUS* (Lath.), the Common Indian Nightjar, a resident, occurs in the eastern bushlands. *CAPRIMULGUS MAHRATTENSIS* (Sykes), occurs, but is rare. *CAPRIMULGUS MONTICOLUS* (Frankl.), Franklin's Nightjar, a resident, is common in all forest tracts. *HARPACTES FASCIATUS* (Forst.), the Malabár Trogon, a resident, is found, but rarely in the heavy south Khánápur forest; it occurs nowhere except in the outlying bit of Belgaum forest at the foot of the Rám pass. *MEROPS VIRIDIS* (Lin.), the Common Indian Bee-eater, a resident, occurs everywhere except in heavy forest. *MEROPS SWINHOII* (Hume), the Chestnutheaded Bee-eater, occurs occasionally on and at the foot of the Sahyádris range. *NYCTIORNIS ATHERTONI* (Jard. and Selb.), the Bluenecked Bee-eater, is rather rare on the Sahyádris and in south Khánápur and does not occur anywhere else. *CORACIAS INDICA* (L.), the Indian Roller, a cold-weather visitant, is common all over the district.

*PELAGOPSIS GURIAL* (Pearson), the Brownheaded Kingfisher, a resident, occurs only on the Tillarnádi at the foot of the Rám pass, where it is common. *HALCYON SMYRNENSIS* (Lin.), the Whitebreasted Kingfisher, a resident, is common everywhere. *ALCEDO BENGALENSIS* (Gmel.), the Common Kingfisher, a resident, is common everywhere in suitable places. *ALCEDO BEAVANI* (Wald.), Beavan's Kingfisher, probably a resident, is said to have been shot in the Rám pass. *CERYLE RUDIS* (Lin.), the Pied Kingfisher, a resident, is common near all the larger streams and ponds.

*DICHOCCEROS CAVATUS* (Shaw), the Great Hornbill, a resident, is common on the Sahyádris and in the lofty forests of Khánápur. Stragglers are sometimes found in the open east. *HYDROCISSA CORONATA* (Bodd.), a resident, is very common in all forest tracts. *TOCCUS GRISEUS* (Lath.), the Grey Jungle Hornbill, a resident, is common in the lofty forests of Khánápur and on the Sahyádris.

*PALÆORNIS TORQUATUS* (Bodd.), the Roseringed Paroquet, a resident, is common everywhere. *PALÆORNIS PURPUREUS* (P. 4. S. Müll.), the Roseheaded Paroquet, a resident, is common in the cold and hot weather in the Khánápúr and Sahyádris forests, and during the rains in the east. *PALÆORNIS COLUMBOIDES* (Vig.), the Bluewinged Paroquet, a resident, is common on the crest of the Sahyádris, but occurs nowhere else. *LORICULUS VERNALIS* (Spartm.), the Indian Loriquet, a resident, is found during the cold and hot weather only on the crest of the Sahyádris. During the rains it is common also in the east. *PICUS MAHRATTENSIS* (Lath.), the Yellowfronted Woodpecker, a resident, is very common in all woody parts of the country. *YUNGIPICUS NANUS* (Vig.), the Southern Pigmy Woodpecker, is not uncommon in the heavy Khánápúr forests. It has not been found elsewhere, but probably occurs on the Sahyádris. *YUNGIPICUS GYMNOTHALMUS* (Blyth.), is rare, occurring in the heavy south Khánápúr forests. *HEMICERCUS CORDATUS* (Jerd.), the Heartspotted Woodpecker, a resident, is common in the Khánápúr and Sahyádris forests. *CHRYSOCOLAPTES DELESSETHI* (Malh.), the Southern Large Golden-backed Woodpecker, a resident, is very common in the Khánápúr and Sahyádris forests.

*CHRYSOCOLAPTES FESTIVUS* (Bodd.), the Blackbacked Woodpecker, is rare, occurring in the south of Khánápúr and probably on the Sahyádris. *THRIPONAX HODGSONI* (Jerd.), the Large Black Woodpecker, a resident, is not uncommon in the heavy south Khánápúr forest. *GECCINUS STRIOLATUS* (Blyth.), the Small Green Woodpecker, is rare, occurring in the Khánápúr forests and probably on the Sahyádris. *CHRYSOPHLEGMA CHLORIGASTER* (Jerd.), the Southern Yellownaped Woodpecker, a rather rare resident, occurs in the Khánápúr forests and on the Sahyádris. *MICROPTERNUS GULARIS* (Jerd.), the Madras Rufous Woodpecker, a resident, is common on the Sahyádris and in the low Khánápúr forests. *BRACHYPTERNUS PUNCTICOLLIS* (Malh.), the Lesser Goldenbacked Woodpecker, a resident, is very common on the Sahyádris and in the southern Khánápúr forests. *YUNX TORQUILLA* (L.), the Wry Neck, is a rather rare cold-weather visitant in the open east. It does not occur west of Belgaum. *MEGALÆMA INORNATA* (Wald.), the Western Green Barbet, a resident, is common in the Khánápúr and Sahyádris forests. *MEGALÆMA VIRIDIS* (Bodd.), the Small Green Barbet, a resident, is common in woodlands and tree-clumps throughout the district. *XANTHOLEMA HÆMACEPHALA* (Müll.), the Crimsonbreasted Barbet, a resident, is common everywhere. *XANTHOLEMA MALABARICA* (Blyth.), the Crimsontthroated Barbet, a rare resident, occurs in the Khánápúr forests and at the foot of the Rám pass.

*CUCULUS SONNERATI* (Lath.), the Banded Bay Cuckoo, is not uncommon on and near the Sahyádris during the rainy season. It does not seem to remain during the rest of the year. *CUCULUS MISCROPTERUS* (Gould.), the Indian Cuckoo, occurs on and near the Sahyádris during the rainy season. It is rare, and leaves when the rains are over. *HIEROCOCCYX VARIUS* (Vahl.), the Common Hawk Cuckoo, a resident, is common everywhere west of Belgaum, except in dense forest. *CACOMANTIS PASSEIRINUS* (Vahl.), the Plaintive Cuckoo, a resident, is common in all forest tracts except in the



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lofty forests of the south. *COCCYSTES JACOBINUS* (Bodd.), the Pied Crested Cuckoo, a resident, is common in all scrub forests east of Belgaum and in north Khánápur. It occurs also in the open country during the hot and cold seasons.

*EUDYNAMYS HONORATA* (Lin.), the Koel, a resident, is common in the north and east, but is rare in Khánápur. *RHOPODYTES VIRIDIROSTRIS* (Jerd.), the Small Greenbilled Cuckoo, a resident, is common in the scrub forests of the east and of Khánápur, but seems not to occur on the Sahyádris. *CENTROCOCYX RUFIPENNIS* (Illg.), the Common Crow Pheasant, a resident, is common in open scrub forest and gardens all over the district. It does not frequent tall timber forests. *TACCOCUA LESCHENAULTI* (Less.), the Southern Sirkeer, is probably a resident, but is rare, occurring only in the scrub forests east of Belgaum. *ARACHNOTHERA LONGIROSTRA* (Lath.), the Little Spider Hunter, a resident, is not uncommon in the Khánápur forests. It occurs also at the foot of the Rám pass.

*ÆTHOPHYGA VIGORSI* (Sykes), the Violet-eared Red Honeysucker, a resident, is common on the Sahyádris and in the Khánápur forests. *CINNYRIS ZEYLONICA* (Lin.), the Amethyst-rumped Honeysucker, is a common resident. *CINNYRIS MINIMA* (Sykes), the Tiny Honeysucker, a resident, is common on the Sahyádris and in the Khánápur forests, but does not occur in the eastern bushlands. *CINNYRIS ASIATICA* (Lath.), the Purple Honeysucker, probably a resident, is not uncommon on the Sahyádris and in Khánápur. *DICEÛM ERYTHRO-RHYNCHUS* (Lath.), Tickell's Flowerpecker, a resident, is common in Khánápur and Belgaum. *DICEÛM CONCOLOR* (Jerd.), the Thickbilled Flowerpecker, is a resident of all forests and open forest fringes. *DENDROPHILA FRONTALIS* (Horsf.), the Velvet-fronted Blue Nuthatch, a resident, is very common in the thick forests of the south and near Belgaum.

*UPUPA EPOPS* (Lin.), the European Hoopoe, a cold-weather visitant, is common everywhere. *UPUPA CEYLONENSIS* (Reich.), the Indian Hoopoe, a resident, is found all over the district. It is commonest in thinly-wooded parts during the fair season.

*LANIUS LAHTORA* (Sykes), the Indian Grey Shrike, a resident, is common in the open country to the north and east, but is not found west of Belgaum. *LANIUS ERYTHRONOTUS* (Vig.), the Rufousbacked Shrike, a resident, is very common everywhere west of the Poona road except in dense forests. Towards the east it is replaced by *Lahtora*, the representative species of the open country. *LANIUS VITTATUS* (Valenc.), the Baybacked Shrike, a resident, is common in the low bushlands east of the Poona road, where it almost entirely replaces *L. erythronotus*. *LANIUS CRISTATUS* (L.), the Brown Shrike, a cold-weather visitant, is common throughout the district especially in Khánápur. *TEPHRODORNIS SYLVICOLA* (Jerd.), the Malabár Wood Shrike, a resident, is common in the big forests of Khánápur, but appears not to occur elsewhere. *TEPHRODORNIS PONDICERIANUS* (Gm.), the Common Wood Shrike, a resident, is common in all forest tracts. *HEMIPUS PICATUS* (Sykes), the Little Pied Shrike, probably a resident, is not uncommon in the tall forests of Belgaum and Khánápur; it does not occur further east. *VOLVOCIVORA SYKESI* (Strickl.), the Black-

headed Cuckoo Shrike, probably a resident, is very common in all woodlands. *GRAUCALUS MACTI* (Less.), the Large Cuckoo Shrike, a resident, is common in the Khánápur forests and, generally, in moderate-sized thick forests. It does not occur east of Belgaum. *PERICROCOTUS FLAMMEUS* (Forst.), the Orange Minivet, a resident, is common in the Khánápur and Belgaum forests. *PERICROCOTUS PERIGRINUS* (Lin.), the Small Minivet, a resident, is very common everywhere. *PERICROCOTUS ERYTHROPHYGIUS* (Jerd.), a resident, is occasionally found in the Ghatprabha forests near Sutgatti, but nowhere else. *BUCHANGA ATRA* (Herm.), the Common Drongo Shrike, a resident, is common everywhere except in the Khánápur forests where it is replaced by *BUCHANGA LONGICAUDATA* (Hay.), the Longtailed Drongo, a resident, common in the Khánápur forests and on the Sahyádris and passing to the eastern districts during the rains and cold weather. *BUCHANGA CERULESCENS* (Lin.), the Whitebellied Drongo, a resident, is common on the Sahyádris and in the Khánápur forests, but does not occur further east. *CHAPTIA CENEA* (Vieill.), the Bronzewinged Drongo, a resident, is rather common in the tall forests of Khánápur and extends to the Sahyádris within Belgaum limits. *DISSEMURUS PARADISEUS* (Lin.), the Malabár Racket-tailed Drongo, a resident, is common in the tall Khánápur forests but does not occur elsewhere. *MUSCIPETA PARADISI* (Lin.), the Paradise Flycatcher, a resident, is common in all woodlands, especially in the dense Khánápur forests. *HYPOTHYMIS AZUREA* (Bodd.), the Black-naped Blue Flycatcher, a resident, is not uncommon in the low thick Khánápur woodlands and occurs also on the Sahyádris. *LEUCOCERCA AUREOLA* (Vieill.), the Whitebrowed Fantail, a resident, is common in all forest tracts except those on the crest of the Sahyádris. *LEUCOCERCA LEUCOGASTER* (Cuv.), the Whitespotted Fantail, a resident, is common everywhere. *CULICICAPA CEYLONENSIS* (Swians.), the Gray-headed Flycatcher, a cold-weather visitant, is found in the scrub forest near Gokák. *ALSEONAX LATIROSTRIS* (Raffl.), the Southern Brown Flycatcher, a cold-weather visitant, is not uncommon in the scrub forest east of Belgaum. *ALSEONAX TERRICOLOR* (Hodgs.), found at Belgaum, is rare. *STOPOROLA MELANOPS* (Vig.), the Verditer Flycatcher, probably a resident, is common in the Khánápur and Belgaum forests. *CYORNIS RUBECULOIDES* (Vig.), the Bluethroated Redbreast, is a rare cold-weather straggler. Only two specimens have been procured. *CYORNIS TICKELLI* (Blyth.), Tickell's Blue Redbreast, a resident, is common in all forest tracts. *CYORNIS RUFICAUDUS* (Sws.) may occur as a straggler. In October 1880 a female bird was found in the scrub forest of Belgaum which seemed to belong to this species. *CYORNIS PALLIPES* (Jerd.), the Whitebellied Blue Flycatcher, probably a resident, has been found only on the Sahyádris hills and rarely even there. *ERYTHROSTERNA PARVA* (Bechst.), the Whitetailed Robin Flycatcher, a cold-weather visitant, is common everywhere.

*MYIOPHONUS HORSFIELDI* (Vig.), the Malabár Whistling Thrush, a resident, is common in dense thickets and ravines on the Sahyádris where only it is found. *PITTA BRACHYURA* (Lin.), the Indian Ground Thrush, is found only during the period of migration, on the Sahyádris and at Belgaum in May and June. *CYANOCINCLUS CYANUS* (Lin.), the Blue Rock Thrush, a cold-weather visitant, is common in all the more

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open parts of the country including the Sahyádris. *PETROPHILA CINCLORHYNCHA* (Vig.), the Blueheaded Chat Thrush, a resident, is very common in the Khánápur and Belgaum forests. *GEOCICHLA CYANOTIS* (Jerd. and Selb.), the Whitewinged Ground Thrush, a resident, is common on the Sahyádris and in the Khánápur forests. *GEOCICHLA UNICOLOR* (Tick.), the Dusky Ground Thrush, is rare. One specimen was procured by Captain Butler at Belgaum in April. *MERULA NIGROPILEA* (Laf.), the Blackcapped Blackbird, a resident, is common on the Sahyádris, but is not found east of Belgaum. *PYCTORIS SINENSIS* (Gm.), the Yelloweyed Babbler, a resident, is common throughout the district. *ALCIPPE PODOCEPHALA* (Jerd.), the Nilgiri Quaker Thrush, a resident, is common in the Khánápur and Belgaum forests. *ALCIPPE ATRICEPS* (Jerd.), the Blackheaded Wren Warbler, is common in the west of Khánápur, but is not found elsewhere. *DUMETIA ALBOGULARIS* (Bly.), the Whitethroated Wren Babbler, a resident, is common in all forest tracts. *PELLORNEUM RUFICEPS* (Swains.), the Spotted Wren Warbler, a resident, is found only in the Khánápur forests where it is common. *POMATORHINUS HORSFIELDI* (Sykes), the Southern Scimitar Babbler, a resident, is common on the Sahyádris and rarer in the southern Khánápur forests.

*MALACOCERCUS GRISEUS* (Lath.), the Whiteheaded Babbler, a resident is common in the bushlands of Gokák and Chikodi, but disappears, towards the east. *MALACOCERCUS SOMERVILLII* (Sykes), the Rufous-tailed Babbler, a resident, is common in the Khánápur forests and on the Sahyádris. *ARGYA MALCOLMI* (Sykes), the Large Grey Babbler, a resident, is common in the forests north of the Ghatprabha river and in the open country towards the east; it does not occur further south. *LAYARDIA SUBRUFÁ* (Jerd.), the Rufous Babbler, a resident, is found nowhere except in the forests about Hemadgi and Mendil in south-west Khánápur, and even there it is rare. *CHATARRHÆA CAUDATA* (Dum.), the Striated Bush Babbler, is rare, occurring only in the open country about Belgaum. *SCENICOLA PLATYURUS* (Jerd.), the Broadtailed Reed Warbler, is rare, occurring about Belgaum in the rains and hot weather, and breeding there.

*HYPSIPETES GANEEA* (Sykes), the Black Ghát Bulbul, a resident, is very common on the Sahyádris but is found nowhere else. *CRINIGER ICTERICUS* (Strickl.), the Yellowbrowed Bulbul, a resident, is common in the Khánápur forests and on the Sahyádris. *IXOS LUTEOLUS* (Less.), the Whitebrowed Bulbul, a resident, is common in the low thick forests on the borders of the Sahyádris. *RUBIGULA GULARIS* (Gould.), the Rubythroated Bulbul, a resident, is common at the foot of the Rám pass, but has not been observed elsewhere. *BRACHYPODIUS POLIOCEPHALUS* (Jerd.), the Grayheaded Bulbul, a resident, is not uncommon in the south-west corner of the Khánápur sub-division, but is found nowhere else. *OTOCOMPSA FUSCICAUDATA* (Gould.), the Southern Redwhiskered Bulbul, a resident, is common in all forests west of Suldhál, particularly in Khánápur and on the Sahyádris. *MOLPASTES HÆMORRHOUS* (Gm.), the Common Madras Bulbul, a resident, is very common all over the district. *PHYLLORNIS JERDONI* (Blyth.), the Common Green Bulbul, a resident, is common in Khánápur except in the tall timber forests. It is also common along the Sahyádris. *PHYLLORNIS MALABARICUS* (Gm.), the Malabár Green Bulbul, is a resident,

frequenting the same parts of the district as the last. *IORA TIPHIA* (Lin.), the Blackheaded Green Bulbul, a resident, is common throughout the district. *IRENA PUELLA* (Lath.), the Fairy Blue Bird, a resident, is not uncommon at the foot of the Rám pass; it is also found in the extreme south of Khánápur in tall timber forest but, as a rule, does not occur above the Sahyádris. *ORIOLOUS KUNDUO* (Sykes), the Indian Oriole, probably a resident, is common in the open country and in low bushland but is seldom seen in the Sahyádris. *ORIOLOUS MELANOCEPHALUS* (Lin.), the Blackheaded Oriole, a resident, is common in the Khánápur forests and on the Sahyádris. *COPSYCHUS SAULARIS* (Lin.), a resident, is common in all forests and passes to the open country. *CERCOTRICHAS MACRURA* (Gm.), the Shama, a resident, frequents thick forests; it is common on the Sahyádris, but is seldom found east of Belgaum.

*THAMNOBIA FULICATA* (Lin.), the Indian Black Robin, a resident, is common all over the district. *PRATINCOLA CAPRATUS* (Lin.), the White-winged Bushchat, is common everywhere. *PRATINCOLA INDICUS* (Bly.), the Indian Bushchat, a cold-weather visitant, is common in open and thinly wooded tracts. *RUTICILLA RUFIVENTRIS* (Vieill.), the Indian Redstart, a cold-weather visitant, is common throughout the district, except in thick forest. *LARVIVORA SUPERCILIARIS* (Jerd.), the Blue Woodchat, a rather common resident, is confined to the Sahyádris. *CYANECULA SUECICA* (Lin.), the Redspotted Bluethroat, a cold-weather visitant, is common all over the district except on the Sahyádris and in thick forest. *ACROCEPHALUS STENTORIUS* (Hemp. and Ehr.), the Large Reed Warbler, a cold-weather visitant, occurs occasionally in the more open country but is not found in the forest tracts. *ACROCEPHALUS DUMETORUM* (Bly.), the Lesser Reed Warbler, a cold-weather visitant, is common in the more open country. *ACROCEPHALUS AGRICOLUS* (Jerd.), the Paddyfield Warbler, a cold-weather visitant, has been found by Captain Butler at Belgaum. *LOCUSTELLA HENDERSONI* (Cass.), Henderson's Locustelle, probably only a visitant, is not uncommon about Belgaum during the rains, frequenting rice-fields and high grass. *ORTHOTOMUS SUTORIUS* (Penn.), the Indian Tailor Bird, a resident, is common in the open country, generally near wells, ponds, or streams; it does not occur in forests. *PRINIA SOCIALIS* (Sykes), the Ashy Wren Warbler, a resident, is common in the open country, but is seldom found in thick forest. *PRINIA ADAMSI* (Jerd.), one specimen has been obtained which appears to belong to this 'lost' species. *PRINIA GRACILIS* (Frankl.), Franklin's Wren Warbler, a resident, appears to be not uncommon in the opener forest land near the Sahyádris. *PRINIA HODGSONI* (Bly.), the Malabár Wren Warbler, a resident, is not uncommon in the opener forests near the Sahyádris. *CISTICOLA CURSITANS* (Frankl.), the Rufous Grass Warbler, is common in grass-lands in the open country. *DRYMCEA INORNATA* (Sykes), the Earthbrown Wren Warbler, a resident, is common in the open country. *HYPOLAIS RAMA* (Sykes), the Tree Warbler, is a cold-weather visitant. *HYPOLAIS CALIGATA* (Sicht. Sykes), the Allied Tree Warbler, a cold-weather visitant, is found in the eastern scrub forest. *PHYLLOSCOPUS TRISTIS* (Blyth.), the Brown Warbler, is found at Belgaum. *PHYLLOSCOPUS MAGNIROSTRIS* (Blyth.), the Largebilled Tree Warbler,

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recorded from Belgaum by Captain Butler, appears to be rare. *PHYLLOSCOPUS NITIDUS* (Blyth.), the Bright-green Tree Warbler, recorded from Belgaum, by Captain Butler, appears to be rare. *PHYLLOSCOPUS INDICUS* (Jerd.), the Olivaceous Tree Warbler, a cold-weather visitant, is found in the east. *REGULOIDES OCCIPITALIS* (Jerd.), the Large-crowned Tree Warbler, a cold-weather visitant, seems to be rare. *REGULOIDES HUMII* (Brooks), Hume's Crowned Tree Warbler, found by Captain Butler at Belgaum, appears to be rare. *SYLVIA JERDONI* (Blyth.), the Blackcapped Warbler, a cold-weather visitant, is not uncommon in the east. *SYLVIA AFFINIS* (Blyth.), the Allied Grey Warbler, a rare cold-weather visitant, has been found by Captain Butler at Belgaum. *MOTACILLA MADERASPATENSIS* (Gm.), the Large Pied Wagtail, is common throughout the district. *MOTACILLA PEARSONATA* (Gould.), the Blackfaced Wagtail, is recorded from Belgaum by Captain Butler. *MOTACILLA DUKHUNENSIS* (Sykes), the Whitefaced Wagtail, a cold-weather visitant, is common everywhere. *CALOBATES MELANOPE* (Pall.), the Gray and Yellow Wagtail, is a common cold-weather visitant. *BUDYTES CINEREOCAPILLA* (Savi.), the Slatyheaded Wagtail, a cold-weather visitant, is common everywhere.

*BUDYTES MELANOCEPHALA* (Licht.), the Blackcapped Field Wagtail, a cold-weather visitant, has been found by Captain Butler at Belgaum, where it seems to be common. *BUDYTES FLAVA* (L.), the Grayheaded Yellow Wagtail, has been recorded from Belgaum by Captain Butler. *LIMONIDROMUS INDICUS* (Gm.), the Wood Wagtail, probably a resident, is common in the tall forests in Khánápur but seldom occurs east of Belgaum. *ANTHUS TRIVIALIS* (Lin.), the European Tree Pipit, a cold-weather visitant, is common in the open country. *ANTHUS MACULATUS* (Hodgs.), is common in open wooded tracts. *CORYDALLA RUFULA* (Vieill.), the Indian Titlark, a resident, is common. *ZOSTEROPS PALPEBROSA* (Yem.), the White-eyed Tit, a resident, is common in all forest tracts west of Suldhál. *PARUS NIPALENSIS* (Hodgs.), the Indian Gray Tit, a resident, is common in the Belgaum and Khánápur forests. *MACHLOLOPHUS AFLONOTUS*, (Blyth.), the Southern Yellow Tit, a resident, is common in the Belgaum and Khánápur forests.

*CORVUS MACRORHYNCHUS* (Wagl.), the Carrion Crow, a resident, is common everywhere. *CORVUS SPLENDENS* (Vieill.), the Common Graynecked Crow, a resident, is common everywhere, except on the crest of the Sahyádris and in the heavy Khánápur forest. *DENDROCITTA RUFA* (Scop.), the Common Magpie, a resident, is common in all forests.

*ACRIDOTHERES TRISTIS* (Lin.), the Common Myna, a resident, is common in the open country. *ACRIDOTHERES FUSCUS* (Wagl.), the Dusky Myna, a resident, is common in the better-wooded parts of the country. *STURNIA PAGODARUM* (Gm.), the Blackheaded Myna, a resident, is common in Belgaum and Khánápur, and also occurs in the open country. *STURNIA MALABARICA* (Gm.), the Grayheaded Tree Myna, a resident, is fairly common in Khánápur and Belgaum. *STURNIA BLYTHI* (Jerd.), the Whitebreasted Tree Myna, a resident, is fairly common in the Khánápur forests in the cold and hot weather,

and in the open country during the rains. *PASTOR ROSEUS* (Lin.), the Rosecoloured Starling, a cold-weather visitant, is common everywhere except in thick forests. *PLOCEUS PHILIPPINUS* (Lin.), the common Weaver Bird, a resident, is common everywhere except in forests. *PLOCEUS MANYAR* (Horsf.), the Striated Weaver Bird, a resident, is fairly common in the open country.

*AMADINA MALACCA* (Lin.), the Blackheaded Munia, a resident, is common in the open country. *AMADINA PUNCTULATA* (Lin.), the Spotted Munia, is fairly common in the forests east of Belgaum, and less common in Khánápur. *AMADINA PECTORALIS* (Jerd.), the Rufousbellied Munia, is very rare, found only at Hemádge in the south-west corner of Khánápur. *AMADINA STRIATA* (Lin.), the Whitebacked Munia, common in the Khánápur and Belgaum forests, is not confined to the Sahyádris. *AMADINA MALABARICA* (Lin.), the Plain Brown Munia, is common in the open country and in the Khánápur forests. *ESTRELA AMANDAVA* (Lin.), the Red Waxbill, a resident, is common in the tracts east of Belgaum, being specially fond of sugarcane fields. *PASSER DOMESTICUS* (Linn.), the Common Sparrow, a resident, is common everywhere in towns and large villages. *GYMNORIS FLAVICOLLIS* (Frankl.), the Yellowthroated Sparrow, a resident, is common in all forests passing into the more open country. *EMBERIZA BUCHANANI* (Blyth.), the Graynecked Bunting, found by Captain Butler at Belgaum, seems to be rare. *EUSPIZA MELANOCEPHALA* (Scop.), the Blackheaded Bunting, a cold-weather visitant, is common on tilled lands. *EUSPIZA LUTEOLA* (Sparrrn.), the Redheaded Bunting, a cold-weather visitant, is not uncommon in the open country. *CARPODACUS ERYTHRINUS* (Pall.), the Common Rosefinch, a resident, is common in the open woodlands of Khánápur and Belgaum and in the forest tract in the east.

*MIRAFRA AFFINIS* (Jerd.), the Madras Bushlark, a resident, is common in the eastern scrub forests, but is found nowhere else. *MIRAFRA ERYTHROPTERA* (Jerd.), the Redwinged Bushlark, a resident, is common in the eastern scrub forests. *AMMOMANES PHENICURA*, (Frankl.), the Rufonstailed Finchlark, a resident, is common in the open country east of Belgaum. *PYRRHULAUDA GRISEA* (Scop.), the Blackbellied Finchlark, a resident, is common in the open country west of Belgaum. *CALANDRELLA BRACHYDACTYLA* (Leisl.), the Social Lark, a cold-weather visitant, is common in fields in the open country. *SPIZALAUDA DEVA* (Sykes), the Small Crown-crested Lark, a resident, is common in the open country, but does not occur on the Sahyádris. *SPIZALAUDA MALABARICA* (Scop.), the Large Crown-crested Lark, a resident, is very common in Belgaum and Khánápur. *ALAUDA GULGULA* (Frankl.), the Skylark, a resident, is not found on the Sahyádris but is not uncommon in the open east.

Of *GEMITORÉS*, *CROCOPUS CHLORIGASTER* (Blyth.), the Southern Green Pigeon, is common in the cold and hot weather; it seems to leave the district during the rains. *OSMOTREERON MALABARICA* (Jerd.), the Grayfronted Green Pigeon, probably a resident, is not uncommon in the south Khánápur forests, where only it seems to be found. *PALUMBUS ELPHINSTONII* (Sykes), the Nilgiri Wood Pigeon, is not uncommon on the crest of the Sahyádris to which it is

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confined. *COLUMBA INTERMEDIA* (Strickl.), the Indian Bluerock, a resident, is common in the open country and on the crest of the Sahyádris. *TURTUR PULCHRATUS* (Hodgs.), the Indian Turtle Dove, a cold-weather visitant, is common in the low forests of Khánápur and Belgaum. *TURTUR MEENA* (Sykes), the Rufous Turtle Dove, a cold-weather visitant, is common in the low forests of Khánápur and Belgaum. *TURTUR SENEGALENSIS* (Linn.), the Little Brown Dove, a resident, is very common everywhere except in tall forests. *TURTUR SURATENSIS* (Gm.) the Spotted Dove, a resident, is common in all forest tracts. *TURTUR RISORTUS* (Linn.), the Common Ring Dove, a resident, is very common east of Belgaum both in woodlands and in the open country. *TURTUR TRANQUEBARICUS* (Herm.), the Vinous Ring Dove, is very rare; only one specimen in the open country at Lingaumáth has been recorded. *CHALCOPHAPS INDICA* (Lin.) is rather rare. It has been found in the Khánápur and south Belgaum forests and is probably a resident.

Of *RASORES*, *PTEROCLES FASCIATUS* (Scop.) (A),<sup>1</sup> the Painted Sandgrouse, a resident, is very common in and is confined to the scrub forests of East Belgaum. *PTEROCLES EXUSTUS* (Temm.) (A), the Common Sandgrouse, a resident, is very common in the open east, as a rule frequenting open grass lands. *PAVO CRISTATUS* (Lin.) (A), the Peacock, a resident, is very common in the scrub forests of Gokák and Chikodi, but is comparatively rare in the Sahyádris and in the Khánápur forests. *GALLUS SONNERATI* (Tem.) (A), the Gray Junglefowl, a resident, is common in Khánápur and on the Sahyádris, and is less common in the eastern scrub forest. *GALLOPERDIX SPADICEUS*, (Gm.) (A), the Red Spurfowl, a resident, is found in the same parts of the district as *Gallus sonnerati*, and is equally numerous. *GALLOPERDIX LUNULATUS* (Valenc.) (A), the Painted Spurfowl, a resident, is rare, being found only in the forest near Gokák. *FRANCOLINUS PICTUS* (Jard. and Selby) (A), the Painted Partridge, a resident, is common on most black soil tracts, and is seldom found far from trees. *ORTYGOENIS PONDICERIANUS* (Gm.) (A), the common Gray Partridge, a resident, is very common in the low scrub forests of Gokák and Chikodi; it is less common in the open country.

*PERDICULA ASIATICA* (Lath.) (A), the Jungle Bush Quail, a resident, is common on the Sahyádris and in the eastern scrub forests. *PERDICULA ARGOONDAH* (Sykes) (A), the Rock Bush Quail, a resident, is common in the open east and in bush lands. *MICROPERDIX RHYTHORHYNCHUS* (Sykes) (A), the Painted Bush Quail, a resident, is common but very local, being found only in fields studded with bushes or trees. *COTURNIX COMMUNIS* (Bonn.) (A), the Large Gray Quail, a cold-weather visitant, is common in the open country east of the Sahyádris. *COTURNIX COROMANDELICA* (Gm.) (A), the Blackbreasted Quail, a resident, is common in all grass-lands and fields. *TURNIX TAIGOOE* (Sykes) (A), the Blackbreasted Bustard Quail, a resident, is fairly common in the fields of the scrub forest tracts east of Belgaum. *TURNIX JOUDERA* (Hodgs.) (A), the large Button Quail, is very rare; only one specimen has been obtained. *TURNIX DUSSUMIEFI*

<sup>1</sup> Birds marked (A) are game birds.

(Temm.) (A), the Small Button Quail, a resident, is common but very local in grass-lands near Belgaum.

Of GRALLATORES, EUPODOTIS EDWARDSII (J. E. Gr.) (A), the Indian Bustard, probably a resident, occurs in the east in Parasgad. SYPHEOTIDES AURITA (Lath.) (A), the Lesser Florikin, is common in the hot weather in fields and grass-lands in the open country. Most leave during the rains and cold weather, but a few remain all the year. CURSORIUS COROMANDELICUS (Gm.), the Courier Plover, is common in the eastern scrub tracts and in the open country east of Belgaum. CHARADRIUS FULVUS (Gm.), the Eastern Golden Plover, probably a cold-weather visitant, is common on all grass-lands all over the district, except on the Sahyádris. ÆGIALITIS DUBIA (Scop.), the Common Ring Plover, is common on open grassy expanses generally near ponds, in the plain country. CHETUSIA GREGARIA (Pall.), the Black-sided Lapwing, has been recorded by Captain Butler. LOBIVANELLUS INDICUS (Bodd.), the Redwattled Lapwing, a resident, is very common near water from the crest of the Sahyádris inland. LOBIPLUVIA MALABARICA (Bodd.), the Yellowwattled Lapwing, a resident, is common everywhere, on the Sahyádris it is commoner than *L. indicus*. It chooses drier ground. ŒLICNEMUS SCOLOPAX (S. G. Gm.), the Stone Plover, a resident, does not occur in tall forests, but is otherwise fairly common in the Khánápur and Sahyádris woodlands. SCOLOPAX RUSTICOLA (L.) (A), the Woodcock, is rare, appearing only as a straggler in the season of migration in the forests west of Belgaum. GALLINAGO STHENURA (Kühl.) (A), the Pintailed Snipe, a cold-weather visitant, comes in September and stays till May. It is very common in the cold weather. When in January the open country begins to dry, it retires to the patches of summer rice in the forest tracts where it stays at least till the hot weather rains set in. GALLINAGO CELESTIS (Fren.) (A), the Common Snipe, a cold-weather visitant, chooses the same ground as *G. sthenura* but is not nearly so common. GALLINAGO GALLINULA (Lin.) (A), the Jack Snipe, a cold-weather visitant, occurs everywhere, but is not nearly so common as the common or pintailed variety. RHYNGHEA BENGALENSIS (Lin.) (A), the Painted Snipe, is probably a resident. It is very local as it seems to require much thicker cover than the other snipe and is never found in bare rice-fields. Twenty-five couple of snipe is considered a good bag for one gun in a day.

NUMENIUS LINEATUS (Cuv.) (A), the Curlew, a very rare cold-weather visitant, is recorded by Captain Butler from near Belgaum. MACHETES PUGNAX (Lin.), the Ruff, is recorded by Captain Butler from Belgaum in the cold season. RHYACOPHILA GLAREOLA (Lin.), the Spotted Sandpiper, is common about ponds and rice-fields in the cold season. TOTANUS OCHROPEUS (L.), the Green Sandpiper, is a very common cold-weather visitant. TRINGOIDES HYPOBŒUCUS (Lin.), the Common Sandpiper, is common in the cold season. TOTANUS GLOTTIS (Lin.), the Green Shank, is common in the cold weather. TOTANUS FUSCUS (L.), the Spotted Red Shank, is rare but occurs at Belgaum. HIMANTOPUS CANDIDUS (Bonn.), the Stilt, is common near most ponds in the cold weather but is somewhat locally distributed. PARRA INDICA (Lath.), the Bronzewinged Jacana, a resident, is common in Khánápur.



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*HYDROPHASIANUS CHIRURGUS* (Scop.), the Pheasant-tailed Jacana, probably leaves in the cold weather. It is rarely found in the rains in Khánápur and Belgaum. *PORPHYRIO POLIOCEPHALUS* (Lath.) (A), the Purple Coot, probably a resident, is very locally distributed but is common in the reedy ponds in Khánápur. *FULICA ATRA* (Lin.) (A), the Bald Coot, a resident, is very common, found on almost every reedy pond in the cold weather. *GALLINULA CHLOROPUS* (Lin.), the Common Water Hen, a resident common on weed and lily-covered ponds in Khánápur. *ERYTHERA PHŒNICURA* (Penn.), the Whitebreasted Water Hen, a resident, is common in ponds in Khánápur and along river banks. *PORZANA AKOOL* (Sykes), the Brown Rail, one specimen said to have been caught on its nest was found in October at Belgaum. *PORZANA BAILLONI* (Vieill.), Baillon's Crake, a cold-weather visitant, is common all over the district. *HYPOTÆNIDIA STRIATA* (Lin.), the Bluebreasted Rail, occurs in the rains. Captain Butler obtained specimens at Belgaum. *XENORHYNCHUS ASIATICUS* (Lath.), the Black-necked Stork, a rare bird is recorded by Captain Butler from Hubli. *DISSURA EPISCOPA* (Bodd.), the Whiteneked Stork, a resident, is common in the Khánápur forests and Sahyádris as well as in the more open country.

*ARDEA CINEREA* (Lin.), the Common Blue Heron, is very common in the cold weather in the open country near ponds. *ARDEA PURPUREA* (Lin.), the Purple Heron, is rare; one specimen is recorded from Sampgaon. *HERODIAS TORRA* (B. Ham.), the Large Egret, is common everywhere in the cold weather. *HERODIAS INTERMEDIA* (Hau.), the Little White Heron, is common in the cold weather throughout the district. *HERODIAS GARZETTA* (Lin.), the Little Egret, is common in the cold weather. *DEMIGRETTA GULARIS* (Bosc.), the Ashy Egret, probably a resident, is found on river-banks in the better wooded parts of Belgaum, Khánápur, and Gokák; it is not common.

*BUBULCUS COROMANDUS* (Bodd.), the Cattle Egret, a resident, is common in all forest tracts. *ARDEOLA GRAYI* (Sykes), the Pond Heron, a resident, is common everywhere. *BUTORIDES JAVANICA* (Horsf.), the Little Green Bittern, a resident, is common on woody river banks. *ARDETTA CINNAMOMEA* (Gm.) the Chestnut Bittern, a resident, is rather rare; it is recorded from Belgaum and Khánápur. *GOISAKIUS MELANOLOPHUS* (Raff.), the Malayan Tiger Bittern, is very rare; one specimen is recorded from the foot of the Rám pass. *NYCTICORAX GRISEUS* (Lin.), the Night Heron, a resident, is locally distributed, but is not rare. *TANTALUS LEUCOCEPHALUS* (Forst.), the Pelican Ibis, is found on the Ghatprabha, and probably occurs on all the larger streams in the cold weather. *INOCOTIS PAPILLOSUM* (Temm.) (A), the Wartyheaded Ibis, a cold-weather visitant, is not uncommon in the more open parts in rice fields and along river-banks.

Of *NATATORES*, *SARCIDIORNIS MELANONOTUS* (Penn.) (A), the Nukhta, probably a visitant, is very rare, occurring occasionally near Belgaum. *NETTOPUS COROMANDELIANUS* (Gm.) (A), the Cotton Teal, is fairly common in the cold season in Khánápur and Sampgaon, and is probably generally distributed. *DENDROCYGNA JAVANICA* (Horsf.) (A), the Whistling Teal, probably occurs only in the rainy season when it is not uncommon. *SPATULA CLYPEATA* (Lin.) (A), the Shoveller, is

a common cold-weather visitant. *ANAS BOSCHAS* (L.) (A), the Wild Duck, is recorded by Captain Butler from Hubli; it is rare. *ANAS PŒCILORHYNCHA* (Forst.) (A), the Spotbilled Duck, probably a resident, is not uncommon. *CHAULELASMUS STREPERUS* (Lin.) (A), the Gadwall, is a very common cold-weather visitant. *DAFILA ACUTA* (Lin.) (A), the Pintailed Duck, occurs in the cold weather, but is not rare. *QUERQUEDULA CRECCA* (Lin.) (A), the Common Teal, is a common cold-weather visitant. *QUERQUEDULA CIRCIA* (Lin.), the Bluewinged Teal, is common in the cold-weather. *FULIGULA FERINA* (Lin.) (A), the Redheaded Pochard, a rare cold-weather visitant, is recorded from Hubli by Captain Butler. *FULIGULA NYROCA* (Güld.) (A), the White-eyed Pochard, a rare cold-weather visitant, is recorded by Captain Butler from Belgaum. *FULIGULA CRISTATA* (Lin.) (A), the Tufted Duck, a cold-weather visitant, is recorded by Captain Butler from Belgaum. *PODICEPS MINOR* (Gm.), the Little Grebe, is a common resident. *HYDROCHELIDON HYBRIDA* (Pall.), the Small Marsh Tern, a rare cold weather visitant, is found at Belgaum. *STERNA MELANOGASTRA* (Tem.), the Blackbellied Tern, is a rare cold-weather visitant. *PELECANUS PHILIPPENSIS* (Gm.), the Grey Pelican, is recorded by Captain Butler as shot at Belgaum. *PHALACROCORAX PYGMÆUS* (Pall.), the Little Cormorant, is very common. *PLOTUS MELANOGASTER* (Penn.), the Indian Snakebird, is a common resident.

Snakes are common everywhere, especially on stony ground. The Cobra *Naga tripudians*, and *Phursa Echis carinata*, are perhaps the commonest of poisonous snakes. Pythons are occasionally seen, and little green snakes, scarcely to be known from the blades of grass in which they lie, are numerous.

Crocodiles are common in all the larger streams. They seldom attack men, but frequently kill goats, and sometimes cows, and even the largest buffaloes. The flesh of the crocodile is eaten by people of the Goll caste, who hunt and kill it in the water. When they have seen a crocodile enter the water, the Golls make a great noise and splash some distance above and below the spot where he is supposed to be. This so frightens the beast that he tries to hide under the first cover he can find in the bed or bank of the river. After some minutes of noise and splashing divers go in search, and, when the animal is found, secure it with nets, or, if it is small, despatch it without the use of nets. The Golls have dogs specially trained to help in securing the game.

Fish<sup>1</sup> in abundance, but for the most part small and of little value, are caught in the Malprabha, Támrarni, Ghatprabha, and Márkándeya, as well as in the smaller streams and ponds. Except during the rainy season floods, which is the breeding or spawning time, fish are caught all the year round. In this way the breeding fish and the fry are to some extent spared, though the fishermen never fail to destroy them when they can get them. The chief fresh-water fish caught in rivers and ponds are the *aval*, *bali*, *bam* or *balvi*, *dhoke*, *godach*, *gácháli*, *ghogre*, *harági*, *hánu*, *kute*, *kavli*, *kulogi*, *kavnya malag*, *muluga purgi*, *sannat* and *thunga*.

<sup>1</sup>The fish portion is compiled from Day's Fish and Fisheries, Appendix LII, and LX., and from a contribution from Mr. G. McCorkell, C.S.

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Fish.

The fishery rights of Government and of private persons have never been fixed. The people of the river bank villages net fish for their own use. Besides river-bank villagers there are professional fishers of the Bhoi, Koli, Rajput, and Marátha castes. Except Musalmáns, who fish mostly for home use, these fishers catch in order to sell. In addition to fishing they work as servants, palanquin-bearers, basketmakers, and husbandmen. Breeding and young fish are caught in nets made of cotton thread dyed brown with a mesh of about one-sixth or one-fourth of an inch from knot to knot. In and near Belgaum a net called *jhinginjál*, with even smaller meshes, is used for catching prawns and a small fish called *mori* known to Europeans as whitebait. Nets with minute meshes are used during the rains for small fish, and with larger meshes during the cold and hot seasons. Besides these, there are drag-nets *mahájál*, hand-nets *charejál*, and stake-nets *kundál*. Besides being netted, fish are trapped in irrigated fields. They are carried in by the rush of water, and once inside, they are easily caught. In the hot weather, the rivers brooks and ponds are dammed and poisonous drugs are thrown into the water, so that the fish either die, or, becoming stupefied, float on the top and are easily caught. This practice of poisoning fish to a certain extent has been stopped in Gokák, as the cutting of the poisonous twigs and leaves has been forbidden. Rod fishing and long line fishing are occasionally resorted to where the water is too deep to dam. Bottom fishing by dragging small pools with a piece of cotton cloth is carried on by persons from the banks throughout the year. Of the fish thus caught, the largest are eaten, but many small fry are left on the banks to die. No fishing boats are employed in any part of the district. Except during the heavy rains when fishing is stopped, none of the rivers have water enough to float a boat much larger than a cockle shell. The bait used is either the common earthworm or grubs found in manure.

All classes of people except Bráhmans, Lingáyats, Jains, Márwár Vánis, Bhátíás, Vaishyas, Gujarát Vánis, and Pancháls eat fish. As the markets are well supplied with salt-fish from Goa and the coast, there is little demand for fresh fish, which are dear and bad. The only exception is near Belgaum, where the European demand exceeds the supply. Local opinion differs as to whether the supply of fish is or is not falling off.