

## CHAPTER II.

### PRODUCTION.

<sup>1</sup>THE variety of its strata, which gives so much interest to the geology of Bijápur, makes the district rank high in mineral wealth.

Gold is said to have been formerly found in the Malprabha, but the sand of the river-bed is now nowhere washed.

Near Kajádoni, four miles south-west of Kaládgi, are traces of copper. It is not known whether the ore is plentiful enough to repay search.

Iron ore is found in various parts of the district south of the Krishna. Sixty years ago (1820) there was a small manufacture of iron at the village of A'dgal, about four miles north of Bádámi. The ore was found about four miles from the furnace at the base of a range of sandstone hills. It was a greasy hæmatite, somewhat the colour of iron rust, with a purplish tinge, soiling the fingers, and leaving a red chalk-like mark on paper. In a little hut close to the forge, in the form of Shiv's bull, was a rude stone image of Basav, the founder of the Lingáyat religion and the guardian of iron-smelters. Before each melting the image was worshipped by the head blacksmith. The furnace consisted of a clay chimney with a funnel-shaped mouth, the height being about four feet and the external diameter about eighteen inches. The lower part of the furnace from the base to the bottom of the chimney was the place where the burning went on, the solid part at the back, which looked like a flat oven, being nothing more than a buttress or at times a shelf. Supposing the sides of the chimney to have been three inches thick, the diameter of the furnace must have been about one foot. In front, a few inches above the base, was an opening for a bed of powdered charcoal, kneaded with a little clay, which was put on the floor to receive the melted metal, and a small portion of lighted fuel was placed at the opening.<sup>2</sup> Just above the opening was the nozzle

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<sup>1</sup>The mineral section is contributed by Mr. R. B. Joyner, Executive Engineer for Irrigation, Belgaum and Dhárwár.

<sup>2</sup>The process of sifting the charcoal was curiously primitive. In the middle of a hollow, five or six feet in diameter, was placed a cylindrical stone about a foot high and nearly a foot thick with a rounded top. The charcoal was beaten in the outer part of the place with batons and was taken up in double handfuls and allowed to drop on the top of the stone. The finer parts either remained on the stone, or fell close to its base, while the coarser rolled to a greater distance and were taken up and rebeaten. This was continued until there was as much powder as was wanted. Marshall's Belgaum, 148.

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of the bellows.<sup>1</sup> This was a clay cone into which entered two iron pipes each leading from an air-bag or bellows formed of a buffalo's hide and lying on a platform about the same height as the opening. When the aperture was properly fixed the opening was carefully and rather neatly closed by clay tempered with powdered charcoal. A little above the base of the furnace, also closed by clay and charcoal, was a small side opening for the escape of ashes, but all the metal fell to the bottom. From the top of the chimney the whole cavity was filled to the brim with charcoal, the bellowsmen at the same time beginning to blow. Powdered ore was thrown in small shovelfuls on the top of the charcoal, and sank through its seams. Twelve shovelfuls weighing nearly ten pounds formed the first load. Over the ore charcoal was again heaped, and in a little time, as the heat increased, a smoke, apparently inflammable air expelled from the ore, appeared at the top of the pile. The smoke was lighted and remained burning during the whole of the process. As the charcoal sank in the chimney more charcoal was thrown in, and more ore was sprinkled on it. The whole load of the furnace in one working, which lasted from eight in the morning until about three in the afternoon, was about fifty or sixty shovels weighing forty-two to fifty pounds. The charcoal was about twenty-five baskets, each basket containing about one-third of a bushel. When the process was about one-third over, the hole for the melted cinder was opened and a few pounds flowed out. It was again closed, and this was repeated three times in the course of the working. The front of the fire was also frequently stirred by thrusting a small poker through the clay immediately above the nozzle of the bellows, and, towards the end of the melting, this poker was used to test the state of the metal. When the blacksmith thought it sufficiently reduced, the front of the furnace was opened, and the mass of iron was drawn out by an immense pair of iron tongs, in which it was dragged into the air and for some time beaten hard with two clubs to free it from cinder. Before cooling it was cut into two pieces with axes as it was more easily forged in half than whole. There were two smeltings in the twenty-four hours, one in the day and the other at night. The workmen who were not immediately engaged slept near the furnace. All the workmen were husbandmen and made iron during only four months of the year. Fifteen pounds ( $\frac{1}{2}$  man) of iron worth about 4s. (Rs. 2) was reckoned a good outturn for one smelting. The furnace-clearing was taken in turn by each of twenty partners, the blacksmith having a double share

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<sup>1</sup> The bellows were by far the best part of the apparatus. Each bag was a buffalo's hide, whole, and very well prepared; the four leg holes were closed and into the neck hole was thrust from the inside a conical iron pipe, the broader part of which entirely filled the hole. The hinder part of the bag was open and its edges cut straight, one of them overlapping the other two or three inches. A leather thong fastened to the upper part of the bag was tied round the blower's right arm, which he alternately raised and depressed to admit the air by the opening, or expel it through the tube, while with the left he kept the bag steady. As one of the blowers raised his arm when the other lowered his, a tolerably constant stream of air was blown into the furnace. The two pipes were kept in their proper place by being fitted tightly into two iron rings at the opposite ends of a short iron bar. Marshall's Belgaum, 148.

as director of the work and owner of the tools. Eight men were employed in the woods making charcoal, four were stationed at the bellows where they relieved each other by pairs, others made ready the clay for stopping the holes, others pounded and sifted the charcoal or fed the furnace with charcoal and ore. The ore was provided by the man whose turn it was to have the profits of the working. The only labourer who was paid in cash was a woman who pounded the ore on a flat stone with an iron pestle. The iron was forged on the spot into common field tools, chiefly hoes, hatchets, and small ploughshares.<sup>1</sup>

In 1873 iron ore was, and to a limited extent is still (1883) smelted at Siddápur, twelve miles, and at Jainmatti, six miles north of Kaládgi, where it occurs as silicious red hæmatite schist; at Sidanhal, about fifteen miles south-west of Hungund, on the right bank of the Malprabha, the ore being brought from the great hæmatite beds west of Amingad; at Haligeri and Rághápur in Bádámi, the ore being obtained from red and brown hæmatite beds; and at Benkanvádi near the Malprabha about thirteen miles south-west of Hungund, the ore being chosen by a blacksmith at the mine and brought about four miles from a hæmatite bed on the top of a hill between Amin-gad and Rámthal. The ore smelted at Siddápur, Jainmatti, and Sidanhal is dusty, flakey, coarse in grain, and of poor quality. The smelting furnace is made of red clay; and at Sidanhal, where the clay is bad, the chimney is in several places hooped with iron. The furnace is worked with a double skin-bellows with yoked iron nozzles passing into a clay nozzle or tuyere which enters a triangular hole in one of the sides. The daily outturn of two furnace clearings is thirty-six pounds (12 *viss*) which is reduced to thirty after the cinder is hammered out. At Haligeri and Rághápur the smelting process is different. The raw ore is broken into small pieces and put into an earthen crucible with charcoal, limestone, and fuel. Fire is applied, and, when the mass has been well heated, bellows are worked to help to separate the metal from the alloy. At the end of the process the iron is found in a lump at the bottom of the crucible. Iron made in this way is very malleable and can be beaten into shape even when cold. If a husbandman wants a field tool he employs the blacksmith, paying him in grain and helping him by gathering fuel and ore. The cost of making thirty pounds of iron is about 13s. 3d. (Rs. 6½).<sup>2</sup> It is softer and tougher than foreign iron, lasts longer, and is better suited for field tools. At the same time as it is about 2d. the pound dearer than foreign iron, it is never able to command much sale. Since the 1877 famine the smelting industry has almost ceased. With cheap fuel the beds near Benkanvádi are rich enough to pay, but since 1870 a Government duty has raised the price of fuel and all but put a stop to the smelting. In spite of their high price some of the

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<sup>1</sup> Marshall's Belgaum, 147-149.

<sup>2</sup> The details are: Two bellowsmen, 9d. (6 *as.*); one fireman, 4½d. (3 *as.*); one man and two women breaking ore, 10½d. (7 *as.*); blacksmith, 2s. (Re. 1); 32·16 cubic feet of charcoal, 6s. (Rs. 3); 1·68 cubic foot of iron ore, 1s. (8 *as.*); and six men for hammering, 2s. 3d. (Re. 1); total 13s. 3d. (Rs. 6½). Mr. H. F. Silcock, C.S.

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Laterite.

Benkanvádi tools are still in demand at the yearly Bánshankari fair. Iron ore is also found in the hills near Sirur.

There are some laterite or iron-clay hills at Ingleshvar, Mutgi, and Masvinhal in Bágévádi, and at Belkandi and Batkurki in Bádámi; but these are not worked at present. The same formation is found to a small extent at Nágárbetta, Bantánur, and Nagabnál in Muddebihál, while near Bijápur heavy iron-stone gravels and conglomerates occur.

Gneiss.

The various granitoid rocks in the south-east of the district, locally known as *chinchkal*, on account of the cost of working them, are little used except for lintels and slabs. At Bilgi, twelve miles north of Bágalkot, a beautiful rose-coloured granite is quarried, equal in appearance to the best Aberdeen or Mount Sorrel granite. The rough slabs are quarried by Vadars who crack the blocks by burning fuel over them or by chiselling a line of holes and driving in wedges. They then separate the blocks with the help of levers. The rough slabs are dressed by a class of men called Sangtarás. Roughly squared slabs about eight feet long and two feet wide can be had on the spot at 4s. to 6s. (Rs. 2-3). Near Nálátvád in Muddebihál and elsewhere a syenite is found, from which slabs twelve feet long and two and half feet wide can be cut. These fetch about 6s. (Rs. 3), but, though of good quality, they are not much used as a softer stone is found in the neighbourhood. The softer gneissic rocks are often used by villagers in their rough stone and mud walling. Hæmatite schist, though the best stone for roads, is a bad building stone as it does not take mortar well and cannot be given much shape. Still it is very durable and is the only building stone at Hungund. The price of fair-sized rubble is 7s. to 8s. (Rs. 3½-4) the hundred cubic feet. Dark green chlorite schist has been used in a new school-house at Nálátvád in Muddebihál and makes a good workable stone. The extremely beautiful granites and kindred rocks of great variety of colour and capable of taking a high polish will find a market when the district is opened by roads and railways.

In old times these granitoid rocks were much used for forts and temples. Many Jain temples, where the stone must have been carried for miles, have single stone columns, often beautifully cut, and large lintels and slabs of gray and rose granite. These old granite pillars are often seen built into modern fort-walls and used as gate-lintels. A notable instance occurs in Bijápur, thirty miles from the nearest part of the granite region, where there are hundreds of ornamental granite pillars either in old Hindu temples or worked into mosques or Musalmán mansions. One more or less dull gray gneiss does not stand transverse strains on exposure; and the surface of some micaceous schistose stones rapidly peals. With these exceptions the granites in the old buildings are as sharp-edged as when they were tooled 800 to 600 years ago.

Greenstone.

The dioritic greenstone, *hasarka kallu*, apparently cut from the dykes which occur in the granite, has been made into *lings* whose high polish has for centuries remained undimmed. In Bijápur the same stone has been used for grave stones, and, though exposed to the weather for the last 200 years, is often as sharp-edged and

lustrous as if it had just left the stonemason's yard. In the ruins of Bijápur are many large cubical blocks of almost pure quartz with two or three highly polished faces.

Quartzite rocks occur in Bágalkot where they seem to be chiefly a highly silicious limestone; a small patch crosses the Krishna north into Bijápur; in Bádámi they hold a large area and stretch into south-west Hungund; and in Muddebihál they form an irregular band passing through the towns of Muddebihál and Tálíkotí. In Bádámi, Hungund, and Muddebihál they are crystalline sandstone rather than limestone. The quartzites are generally pinky or salmon-coloured, though often gray, whitish, white and green, buff, pearly, or waxy. They are very beautiful, but excessively hard and tough. They are difficult to quarry and tool, and are used generally in the rough, chiefly in the form of slabs which are taken out by wedges and levers. One of the best quarries, near Bilgi in Bágalkot, yields slabs up to ten feet long. The following is the table of prices:

BILGI QUARTZITE, 1883.

Length.	Breadth.	Depth.	Cost.	Length.	Breadth.	Depth.	Cost.
Feet.	Inches.	Inches.	s.	Feet.	Inches.	Inches.	s.
2	12	6	1½	9	18	6	11
3	18	6	2	7	18	4	4
4	24	6	3	8	18	4	5
6	18	6	5	10	18	4	8

These slabs are used for lintels, drains, temples, and wells, and are able to bear a great transverse strain. At Bilgi is an ancient single-stone pillar or *stambha* of a beautiful pinkish quartzite which has been carefully tooled throughout. It is thirty-five feet high and is only eighteen inches square at the base. Some temples in the neighbourhood of Bilgi are also made of quartzite beautifully tooled. A few specimens of the stone may be found in the Bijápur ruins probably taken from old temples.

The crystalline sandstones of a quartzite nature, which may include the hard sandstone grits and conglomerates, are often not clearly separated from the rest of the sandstone series which are also more or less crystalline and which they underlie. They vary in colour from white and yellowish white to red, reddish brown, purple, purplish black, drab, and dark gray. In Muddebihál they are quarried at Basarkhod, Belanturkanti, Gudiál, Jakerál, Jambaldini, Kávdimatti, Machgál, Muddebihál, Murál, Shirulgudd, and Tornál; in Bádámi, at Bádámi, Guledgudd, Jálíhál, and Kerur; in Bágalkot, at Sirur and Vanháli; and in Hungund at Aiholi. It is quarried by a class of Vadars called Bhandi Vadars, and by another class of Vadars called Kalkatakarus, and by ordinary masons or Pátharvats is dressed into querns or *cháki's*, rollers, and troughs. Good slabs can without much difficulty be cut from six to eight feet long and two feet broad. These fetch 1s. 4½d. to 6s. (Rs. 1½-3) in the Muddebihál quarries, and rubble fetches 4s. to 4s. 6d. (Rs. 2-2½) the hundred cubic feet. Guledgudd slabs, eighteen inches broad, have a great local name and fetch the following normal prices:

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### Sandstone.

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GULEDGUDD SANDSTONE, 1883.

Length.	Depth.	Cost.	Length.	Depth.	Cost.
Feet.	Inches.	s.	Feet.	Inches.	s.
4½	4-6	2-4	7-11	6	8-14
5-7	4-6	4-7	6-11	7½	14-18

Beams thirteen to fourteen feet long and ten to fourteen inches thick and wide can be had for 18s. to 20s. (Rs. 9-10) and rubble stone for 5s. (Rs. 2½) the hundred cubic feet. The stone is used for modern buildings as rough rubble and slabs. The new civil buildings at Muddebihal and at a few other places are built of this stone. In old times it was much used for fort-walls and temples. In the walls of Muddebihal, Basarkhod, and Kerur, and in temples at Sirur, Aiholi, and Patadkal it shows no signs of decay. It has also been used for the large wheels of the triumphal cars attached to the different temples. Many of these wheels, finely dressed and five to seven feet in diameter, are each cut out of one homogeneous slab. The crystalline sandstone querns, troughs, and currystones have always been celebrated. Lately, especially in the quarries near Muddebihal, first-class road-rollers have been made, costing 30s. to 60s. (Rs. 15-30) according to size and finish. The Muddebihal querns cost at the quarry 1s. to 6s. (Rs. ½-3) according to size and a trough 8s. to £1 (Rs. 4-10). The Badami querns range through the following prices: 4½d. (2½ as.) for a stone nine inches in diameter, 1s. (8 as.) for a stone twelve inches in diameter, 1s. 6d. (12 as.) for a stone eighteen inches in diameter, and 4s. (Rs. 2) for a stone two feet in diameter. In 1879 rectangular troughs four feet long two feet broad and eighteen inches deep sold for 12s. (Rs. 6), rectangular troughs ten feet long three feet broad and twelve inches deep for £1 4s. (Rs. 12); circular troughs with a diameter of one and a half feet and one foot deep for 2s. (Re. 1), and circular troughs with a diameter of three feet and two feet deep for 7s. (Rs. 3½).

Many of these articles are also made of ordinary sandstone. The crystalline sandstone is more often full of joints and horizontal fissures, which make the quarrying of it comparatively easy, as, except large blocks, the stones can be separated without blasting. For this reason the ordinary rubble made from it is cheap.

The more ordinary sandstones are found chiefly in Badami. They also cross the Malprabha in the east into Hungund at Aiholi, appear in parts of Bagalkot, form an isolated patch north of the Krishna at Mamdapur in Bijapur, and occur to a certain extent in Muddebihal. In Badami this sandstone forms large tabular hills, often bounded by perpendicular scarps 200 to 300 feet high. The rocks vary in texture from fine-grained truly crystalline to shaley coarse and loose-grained or gritty. The colour is often a fine red, but oftener perhaps a whitish or yellowish red and buff changing to brownish and almost purple, very often in bands of different colours, and occasionally in stripes of purple and white like a zebra. Some of the varieties, especially at Guledgudd in Badami and at Aiholi, Hanamsagar, and Guddur in Hungund, are most excellent building stone and have been greatly used in old Jain temples. Especially at Sirur in

Bágalkot, at Bádámi and Pátadkal in Bádámi, at Aiholi and Hungund in Hungund, and in Bijápur, the Musalmáns have used many well carved lintels and jambs. The temples at Aiholi and Pátadkal, in particular, are very richly carved, some of the friezes, figures, and mouldings being most admirable specimens of work, and, though some of them are over 1200 years old, often as clean cut as when fresh.<sup>1</sup>

The curious old fort at Bádámi and many other village fortifications are built of this stone, and in the well-known Bráhmanic (A.D. 579) and Jain (A.D. 650) caves at Bádámi the carvings are clear and well preserved, though more than 1200 years old. Samples at Gudur about fifteen miles south-west of Hungund, and at Párvati about thirteen miles north of Bádámi are considered by Mr. Foote thoroughly suitable for the large millstones used in first-class mills. This sandstone and the sandstone shales are also used for grindstones, for tool-sharpening whittles, and for oil-mills and oil-mortars. Sandstone rubble is used by the natives for their ordinary buildings and at Guledgudd by the German Mission who have lately built a large chapel and mission house. It can be supplied at 4s. to 6s. (Rs. 2-3) the hundred cubic feet. Near Muddebihál is a bed of sandstone which might be cut and sold for loaf-sugar without the fraud being detected except by taste.

At Bilkop, about six miles south-west of Bádámi, a red clayey sandstone, locally known as *sahán*, is dug from caves of some depth and sold in small round pieces varying in diameter from two inches to a foot or a foot and a half and selling at 3d. to 1s. a piece (2-8 *as*.) It is used for grinding sandal and other sweet-scented woods into powder.

Limestones are very interesting and, like the other rocks, irregular and apparently confused in position. Roughly they form an irregular band that runs north-east about sixty miles from Kaládgi to the Nizám's frontier at Tálíkoti and Salvárgi in Muddebihál with a break between Muddebihál and the Krishna river, this being the division between the limestones of what geologists call the Bhima series and the Kaládgi series. These rocks are somewhat difficult to classify as they vary from almost pure quartzites to nearly pure carbonates of lime, and thence, through a somewhat flinty series, back to impure and clayey limestones. The greatest limestone area is in Bágalkot. Limestones also occur in north and north-west Bádámi, and a small patch is seen in Bágevádi just north of the Krishna. In Muddebihál they again occur under the local name of Tálíkoti limestone, which is perhaps better known as Sháhabad limestone. Further north a small patch enters east Sindgi from the Nizám's dominions. They vary much in texture and colour. Near Kaládgi and Bágalkot the rocks are massive and of different shades of gray deepening into blue and almost black, occasionally with black and green or even pink and green bands, and again passing from white to green and from pink to

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#### *Sandstones.*

#### *Limestones.*

<sup>1</sup> Fergusson's Indian and Eastern Architecture, 218.

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Limestones.

brown. They take a high polish and chemical analysis has shown them to be true marbles.<sup>1</sup> Though they are useful for building and would certainly rank high as decorative stones, neither in ancient nor in modern times have they been used either in plain or in ornamental work. The Collector's office at Kaládgi is almost the only building in which they have been used. The price of rubble is from 6s. to 9s. (Rs. 3-4½) the hundred cubic feet. The stone is burnt when a pure lime is wanted for whitewashing.

The Tálikoti limestones locally called *shedikal* are in finer layers from one to fourteen inches thick. They are very flakey near the surface and vary in colour from deep blue to pale buff and cream, creamy pink, or purple. They have been spoken of as lithographic limestones.<sup>2</sup> But search has lately been and is now being made both at Tálikoti and near Bágalkot without finding any specimens soft and bibulous enough for lithographing. Some specimens, locally called *kalthavinkallu* or lichen stone, found in the bed of the Don, on being split, show most beautiful black markings of sea-weed exactly like the so-called moss of moss agates.<sup>3</sup> Besides at Tálikoti limestone is found chiefly at Tumbgi and Menujgi in Muddebihal, and at Kalkerí in Sindgi and other villages in the neighbourhood. It is easily quarried and is often worked by ordinary labourers, as it only requires cutting out and breaking into size by heavy hammers called *sutkis*. It is dressed with broad-headed chisels and light hammers. It is brittle, breaking with a conchoidal fracture, and is ill-suited to carry weight. The price of the stone on the spot is 4s. to 6s. (Rs. 2-3) the hundred cubic feet. It is much used for building, the cream-coloured varieties being most prized close to the quarries. The whole town of Tálikoti, with its fresh-looking and perfect walls, are of this stone. Slab after slab can be built into a wall with hardly any mortar. Houses of this stone are very uniform, the different rows of stones being perfectly even. In some Tálikoti buildings different coloured stones have been used with a very pleasing effect. The thin slabs are used for roofing shop verandas or as paving stones. They also make very good house cisterns by joining six slabs and cutting a hole in the uppermost. The only modern public building in which the stone has been used is the school-house at Tálikoti.

At Honhalli in Sindgi, on the borders of the Nizám's territory, a massive blue-black limestone is found approaching a marble in nature and appearance. The gray and purple stones of Tálikoti were brought fifty miles to Bijápur for decorative purposes, and may be found in different ruins either as praying stones in the mosques, or as ornamental panels as in the face of the Mehtri Palace. In the Mehtri Palace, for the sake of the tints, the most clayey and shaley

<sup>1</sup> The details are : Silica 2·69, ferric oxide 0·45, alumina 0·37, carbonate of magnesia 5·84, and carbonate of lime 90·65.

<sup>2</sup> Some specimens of the Tálikoti limestone sent by Captain Newbold (1842-1846) to the lithographic establishment at St. Thomas' Mount in Madras were found to answer. Geological Papers of Western India, 323-324.

<sup>3</sup> This does not seem to have attracted the attention of any of the geologists who have visited the place. Except in one doubtful case in the sandstone conglomerate Mr. Bruce Foote obtained no organic remains or traces in the Bhima series. Mr. R. B. Joyner.



beds were chosen and have not stood well. The same beds at Sháhahabad have been used for railway stations and buildings and carried far along the line for platform paving and flooring.

The most ancient use of the Kaládgi quartzites was the manufacture of chipped stone tools, many specimens of which were found by Mr. Foote and have been gathered by Mr. R. B. Joyner from all parts of the Bombay Karnátak.

Occasionally associated with the limestone are excellent beds of hard clay slaty rock which is prized as a building stone. It is found almost solely in Bágalkot, at Selikeri four miles south-east of Kaládgi, at Muchkhandi three or four miles south of Bágalkot, and at a few other places. It is very hard and tough of a deep indigo black. The top layers, lighter coloured slates or hard shales, are used for roofing and paving and for writing slates and pencils. The stones are got by blasting by the village people, not by Vadars, and, if for flags or slates, they are split by mining bars and wedges. The stone and slates have been taken long distances the stone for the Kolhápur palace and for some buildings, it is believed, in Belgaum, and for corner-stones in the modern buildings at Kaládgi. The slates were formerly taken in large quantities to Belgaum, Goa, and other places, but of late the demand has almost ceased. They are small, seldom more than six inches square, and in roofing are generally laid under a covering of tiles. Their nominal price at the quarry is £1 (Rs. 10) the thousand. They are also used as paving flags. The more massive stone makes good slates and rollers and takes a fine polish. Large blocks have been used for temple pillars, images, and inscription slabs. To the excellent quality of the slate is due the preservation of some of the ancient inscriptions so frequently found in south Bijápur. Inscriptions are also found on sandstone.

In 1883 at the Selikeri quarry a slab three to five feet long and eighteen inches broad sold for 4s. to 5s. (Rs. 2-2½) if two inches deep, for 5s. to 6s. (Rs. 2½-3) if four inches deep, and for 7s. to 10s. (Rs. 3½-5) if six inches deep. A slab eight to twelve feet long, ten inches broad, and ten inches deep sold for 18s. to £1 8s. (Rs. 9-14).

Rubble stones cost 5s. to 6s. (Rs. 2½-3) the hundred cubic feet. At Khaterki, three miles north of Kaládgi, is found a dark-blue hard clay schist or argillite called *sani-kalu*, which makes excellent hones for sharpening razors and knives. It is found about eight feet below the surface covered by about two feet of hard shales. From its fine jointing, the pieces, though not too small for hones, are never large. They were formerly widely known and greatly prized. Of late the demand has fallen, much of the quarry is filled with black soil, and they are kept for sale only at one house in Kaládgi town. Their price varies from 6d. to 1s. (4-8 as.).<sup>1</sup>

The trap rocks which cover more than four-fifths of the district north of the Krishna, as a rule, are argillaceous near Bijápur and amygdaloid further south. Towards the south and south-east

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*Stone Tools.*

*Clay Slate.*

*Trap.*

<sup>1</sup> Mr. Bruce Foote mentions a black clay slate with delicate green bands occurring at Kaládgi which he recommends as a very beautiful stone for decorative purposes. *Memoirs of Geological Survey of India*, XII, 263.

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MINERALS.

Trap.

the trap is nodular with concentric laminæ surrounding small nuclei of hard basalt which have not weathered to the surface nearly so generally as in the rest of the Deccan. As elsewhere the traps and less crystalline basalt are risky stones to build with and should be very carefully chosen after long experience. It is not enough even to choose a quarry, as the quality of the stone varies much in the same beds. Bijápur is a good example of the uneven quality of trap. In some buildings earthy traps have decayed into utter ruin, while in others the more crystalline basalts, as in the intricate carvings of the Ibráhim Roza, remain as fresh, and in the city walls as strong as when they were cut. The Musalmáns did much to preserve their buildings by whitewash and plaster, but now that all but a few are left unprotected weathering and decay go on rapidly. The price of the rubble at the quarry varies from 10½s. to 11¾s. (Rs. 5¼-5¾) the hundred cubic feet. At Bijápur, where it is taken from the ruins, it costs only 4s. to 6½s. (Rs. 2-3¼). The Bhandi Vadars with their heavy hammers break the basalt into slabs and large rubble. Slabs two to four feet long, nine inches to one foot wide, and six to nine inches thick can be had for about 8d. (5½ as.) a foot. The best places for slabs and quarry-stones are at Nindoni, Bobleshvar, and Hangergi in Bijápur; at Horti, Mainhali, Arjangi, Golsar, and Shirshádh in Indi; at Mangoli, Masvinhal, Nidgundi, and Mulvád in Bágevádi; at Kuntoji in Muddebihál; and at Padganur, Bobleshvar, and Yergal in Sindgi. Blocks four feet long, three feet broad, and one foot thick, can be found at prices varying from 2s. to 4s. (Rs. 1-2). At Shirshádh dressed stones, two feet nine inches in diameter and five feet three inches high, prepared as oil-mills, can be bought for £2 (Rs. 20) at the quarry. At Bobleshvar and Yergal, troughs made by the Bhandi and Kalgotki Vadars can be bought at 12s. to 30s. (Rs. 6-15) according to size. The greenstone and green basalt, used in the Bijápur buildings for slabs, pillars, and doorways, were chiefly brought from the Krishna river where it occurs in large boulders. Laterite caps hills north and north-east of Bágevádi and near Mangoli; it is not used as a building stone.

Lime.

The lime chiefly used for mortar and plaster is the surface nodular and tufaceous concretion, commonly known as *kankar* and in Kánarese called *barli kallu* or *sinna kallu*. It is found throughout the district in all soils. It generally has some and in some cases has marked hydraulic properties. The cost at the pits varies according to the difficulty of getting it from 3s. to 9s. (Rs. 1½ - 4½) the hundred cubic feet. Near the Bánshankari temple in Bádámi a large unused tufaceous deposit is now being worked. Calcareous conglomerates are often seen in river and stream beds, and in parts of Muddebihál there are small hills of tufaceous conglomerate.

Sand.

Sand for building purposes can be had in many streams and river-beds. As a rule it is not of very good quality. In the trap districts it is generally mixed with grains of lime and pieces of soft trap, and in the sandstone districts it is of too fine a grain. In the larger rivers it is full of silt and dust. The price varies from 1s. 3d. to 6s. (Rs. ½ - 3) the hundred cubic feet. Coloured sands for

ornamental purposes and scouring sand are found in the sandstone tracts.

There are no good clay deposits in Bijápur suitable for bricks, jars, tiles, and pots. Tiles and burnt bricks are hardly ever made, except on special occasions by imported labour, and then the silt of rivers and ponds is used. The potters occasionally turn their hands to tile work, half-round tiles costing 8s. to 12s. (Rs. 4-6) the thousand. Burnt bricks cost 12s. to £1 8s. (Rs. 6-14) the thousand according to size and quality. Water pots and jars, holding six to eight gallons are made from silt at many places and cost about 3d. (2 as.) a piece. Specially excellent clay is brought from a place called Mulhálli in the Nizám's country.

One of the most curious features of the district is the river Don and some of its tributaries, chiefly the Little Don near Ukli in Bágevadi, the waters of which are more or less saline according to the season. Those who live on its banks in some cases become used to drinking the water. Salt and saltpetre used to be made by evaporation from the water of the Don and its salt tributary the Little Don near Ukli in Bágevadi, and remains of ancient salt-pans may be seen on the dams of many of the old reservoirs in the south of the district, where, according to the local story, salt was made by washing the earth. This was probably saltpetre which is still made at Gogihal, Kannoli, Kantoji, and many other places by a class called Uppars. Saltpetre is sold at four to five pounds and salt at eight to ten pounds the shilling (Rs. 2½-3 the *man* of 12 *shers*).

White, common yellow, and purple earths and shales, and the rarer red bole are used for colouring.

At Gaddankeri about seven miles east of Bágalkot beautiful specimens of calcspar or *rangoli-kallu* are found, which, when powdered, is used by Bráhmans for strewing in their temples and on the thresholds of their houses.

Agates, but not of a brilliant colour, are found chiefly in the Krishna bed and at Hanmápur, eight miles north-east of Bádámi. Stick sulphur of poor quality is found in quantities in the ruins of Bijápur citadel. This was probably procured from the iron pyrites found in the limestone beds in the Nizám's dominions. Iron pyrites is also found at Tálíkoti, but is not much used. Gravel for road metal as a rule is not sold; a heap 200' × 200' × 1' would cost about £1 (Rs. 10). At Degnal, ten miles south-west of Indi, glass bangles are made in small quantities from old and imported glass, and sold at twenty for a penny.

Of 5757 square miles, the whole area of the district, 245 or 4·2 per cent have been set apart as forest land. On the 31st of March 1883 of the total forest area 155 square miles were reserved and ninety square miles were protected forests. Except small areas of grass-land bearing *bábhul* and *jámbhul* in the bed of or near the bank of the Krishna, the Ghatprabha, and the Malprabha, the forest lands of the Bijápur district are on the hills to the south of the Krishna and between the Krishna and Dhárwár. They stretch east to the Nizám's territories and west to the petty states of Mudhol, Rámdurg, and

## Chapter II. Production.

### MINERALS. *Clays.*

### *Salt and Nitre.*

### *Colouring Earth.*

### *Calc-spar.*

### *Agates.*

### FORESTS.

Chapter II.  
Production.  
FORESTS.

Torgal. That till recent times these hill-sides had an abundance of moderately sized trees and firewood is shown by coppice stools and decayed roots. The present barrenness is due to the recklessness of the people in dealing with forests, and to the drain which the old iron-smelting industry must have caused. The hills about Kaládgi and Bágalkot are bare. North towards Bilgi, south-east about Bádámi and Gudur, and south-west towards Rámdurg and Torgal, there is a large stretch of rough country more or less covered with scrub and such small trees as the *dhávda* (M.) *díndal* (K.) *Anogeissus latifolia*, *báhava* (M.) *kakkai* (K.) *Cassia fistula*, *nim* (M.) *bevina* or *bevu* (K.) *Melia azadirachta*, *timburni* (M.) *balai* (K.) *Diospyros melanoxylon*, *khair* (M.) *khairda* (K.) *Acacia catechu*, *haldá* (M.) *mashvála* (K.) *Chloroxylon swietenia*, some armed and unarmed acacias, and numerous varieties of thorn bushes. The hills best clothed with wood and scrub are those of Bádámi and Hungund. Here many parts have much improved since 1874, when conservancy was enforced, and the bamboo, which in 1870 was all but extinct, now makes a fair show on some of the hill-sides. The Bijápúr forest may be divided into two sections, scrub forests and *bábhul* or *bábli* *Acacia arabica* reserves. The scrub forests, scattered over 238 square miles, are composed chiefly of stunted *mashvála* *Chloroxylon swietenia*, *kakkai* *Cassia fistula*, *nim* *Melia azadirachta*, *aval* *Cassia auriculata*, *hulgal* *Dalbergia arborea*, *khair* *Acacia catechu*, *ippi* *Bassia latifolia*, and *jaune* *Grewia rothii*. These forests at present are valuable only as firewood reserves; wood required for minor building purposes and for field tools can also be obtained from the forests of Bádámi and from part of Hungund. The *bábhul* reserves include the lands which yield *bábhul*, *nim*, bamboo, *jámbhul*, and *bor*. These lie in isolated patches and together do not spread over more than six square miles. Almost all are covered with both old and young trees grown artificially. Among the woods in this district the *nim* and *bábhul*, which do not suffer from the attacks of white ants, are considered very strong and are used by all classes as house beams, posts, ploughs, plough-staves, cart-wheels and cart-staves, and other field purposes. The wood of the *mashvála*, *kakkai*, *hulgal*, and *khair* is used for poles. Large beams, logs, scantlings, and planks of teak and blackwood, for good buildings, are yearly brought from the Kánara forests. As this district is remarkably treeless, and as much has to be done to improve the bare tracts no revenue return can be expected for some years. The average yearly revenue during the five years ending 1882-83 amounted to £1237 (Rs. 12,370); and the charges, including the forest staff, seeds, nurseries, and plantations, to £908 (Rs. 9080). The permanent forest staff includes a sub-assistant conservator on a monthly salary of £15 (Rs. 150), his office clerk and messenger a monthly charge of £2 4s. (Rs. 22), two foresters on monthly salaries of £1 4s. (Rs. 12), and ten forest guards on monthly pay of 18s. (Rs. 9), and nine on monthly pay of 12s. (Rs. 6), the whole representing a yearly cost of £330 (Rs. 3300). The permanent staff is supplemented by seventeen temporary guards at a yearly cost of £130 (Rs. 1300).

Except a few strips of land along river-banks and the heads of reservoirs where there are *bábhul*, *Acacia arabica*, reserves, and on the slopes of the uplands south of Indi, where there are remnants of catechu, *khair*, *Acacia catechu*, north Bijápur is bare of timber.<sup>1</sup>

Besides a sprinkling of cocoa palm, *tengu* (K.) *núriel* (M.), *Cocos nucifera*, and palmyra, *táli* (K.) *mád* (M.), *Borassus flabelliformis*, scattered in gardens, the chief liquor-yielding tree is the wild date *shendi* (M.) *ichalu* (K.), *Phoenix sylvestris*. Occasionally a few seeds are planted in prepared holes, but, as a rule, the date grows wild on the banks of small rivers and in moist hollows. The tree begins to yield juice, the staple intoxicating drink of the district locally known as *henda*, when it is six years old, and continues to yield till it is sixteen. When the time for tapping comes, in the early morning, a triangular hole is cut well into the tree at the base of the leaves and an earthen pot is fastened below the cut to receive the juice. In the evening the pot is taken away and the tree is allowed to rest for a day. On the third day a fresh cut is made and the juice is again drawn. This alternate tapping and resting is carried on for three or four months till all the juice has been drawn. The tree is then given two years' rest, when the same process is repeated. An average well-grown healthy tree yields, in one season, seventy to a hundred pounds of juice, which, when sold at  $\frac{3}{4}d.$  ( $\frac{1}{2}$  *anna*) the pound, brings 4s.  $4\frac{1}{2}d.$  to 6s. 3d. (Rs.  $2\frac{3}{8}$  -  $3\frac{1}{8}$ ). As the tree costs nothing to grow the surplus of 1s. to 1s. 6d. (8-12 *as.*) after meeting the cost of drawing the juice, is clear profit. The right to sell this liquor, which is yearly farmed, yielded to Government in 1881-82 a revenue of £3084 (Rs. 30,840). Besides juice the wild date yields leaves which are plaited into mats and baskets.

Of the trees found in the district north of the Krishna some are round villages, some in gardens, and some along roads. Besides being planted along roads, the mango, *ámba* (M.) *mávu* (K.), *Mangifera indica*, and the tamarind, *chinch* (M.) *hunchi* (K.), *Tamarindus indica*, are found in groups round villages. The mango is planted when young in sandy soils where it flourishes best. The value of the fruit of an average tree, yielding 500 to 1000 mangoes, is about £1 10s. (Rs. 15), though the price varies much according to quality. Close to the old town of Sháhápur, four miles north of Bijápur, is a mango grove, probably grafts from Goa mangoes, brought during the time of the Adil Sháhi kings (1489-1686) as their fruit both in taste and look closely resembles the Goa mango. The produce of a full grown healthy tamarind tree, varying according to age, is, on an average, 144 pounds (6 *mans*) of the value of 8s. (Rs. 4). Among the trees which are fairly plentiful or are planted in private gardens and sites particularly designed for groves, there are the jámbul *jámbe* *Eugenia jambolana*, the jujube *bogri* *Zizyphus jujuba*, the plantain *bále* *Musa sapientum*, the wood-apple *bálva* *Feronia elephantum*, the sour lime, *huli nimbe* *Citrus bergamia*, the guava *perle* *Psidium guava*, the *nelli* or the myrobalan tree *Emblica officinalis*, the papay *pappái* *Carica papaya*, the sandalwood

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### TREES.

<sup>1</sup> The tree portion is contributed by Mr. H. F. Silcock, C.S.

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Production.  
TREES.

*shrigandh* Santalum album, and the monkey-bread tree *báobáb* or *gorakimli* Adansonia digitata. Of these the monkey-bread tree, with its huge stem and short branches, is a relic of Musalmán supremacy.<sup>1</sup> It is a native of Africa and was brought by Sidis or Habshis in the service of Bijápur kings. It yields large hanging fruit and light porous wood used as floats by fishermen. Besides the tamarind and mango the chief roadside trees are the *bevu* or *nim* Melia azadirachta, the bark and leaves of which are used medicinally; the *bábhul* or *bábli* Acacia arabica, from which the ordinary gum sold at 6d. (4 as.) the pound is extracted; the Indian mulberry *maddi* Morinda tinctoria, from which a red dye is extracted; the *aval* Cassia auriculata, the bark of which is used in tanning and the twigs as a tooth-brush; the *dindal* Conocarpus latifolia, which yields gum; the *arále* (K.) Ficus religiosa, and the *basari* (K.) Ficus infectoria. Of these the *nim* and the *bábhul* are the most common. They occur either healthy or stunted almost everywhere throughout the district. The *bábhul* likes black soil and the *nim* red soil. Both grow successfully and reach a considerable size if they are planted on the soil they like, regularly watered during the first two years, kept clean from weeds and other growth-choking creepers, and watched against depredators of all kinds.

DOMESTIC  
ANIMALS.

<sup>2</sup>Though there is no want of fodder, and though the climate is favourable for rearing animals, foreign cattle are generally preferred to the local breeds. The finest district-bred cattle are found in villages bordering the river Krishna where there is always an abundant supply of good fresh water and excellent grazing. The only good market for cattle is held weekly at Amingud, about eight miles west of Hungund, where cattle are brought for sale from parts of the Nizám's territory and Dhárwár.

Oxen.

Of Oxen the 1882-83 returns show a total of 201,752 head. They are of four kinds: Mudalshimi or eastern, Surati or Gujarát, Málvi or Málwa-bred, and Deshi or local. The finest of these, the Mudalshimi, come from Bangalor, Bellári Chitaldrug, and other places in Madras. They stand about five feet high, are very large and muscular, and are useful both for draught and as plough cattle. An ordinary pair costs about £15 (Rs. 150) and a fine pair as much as £40 (Rs. 400). Surat and Málwa oxen sell for about £10 (Rs. 100) a pair or nearly double the price of an ordinary pair of country-bred animals.

Cows.

Of Cows the total is returned at 104,948. Except that there are no Mudalshimi cows and that Málwa cows are rare, the cows are of the same breeds as the oxen. Both the Málwa and Surat cows are considered superior to the Desh cows; they are much larger and stronger and give double the quantity of milk. A pair of Surat cows costs £5 to £15 (Rs. 50-150), while the price of an ordinary pair of the common district breed is not more than £3 (Rs. 30) and a pair of Málwa cows can be had for between £3 and £5 (Rs. 30-50).

<sup>1</sup> One of these trees in the centre of the town of Bijápur near the tomb of Khavás Khán has a girth of nearly forty feet about four feet from the ground.

<sup>2</sup> Contributed by Mr. H. Kennedy, formerly Superintendent of Police, Kaládgi.

Of Buffaloes the returns show a total of 93,213 head, of which 25,790 were males and 67,423 females. They are of two kinds, a better called Gavláru or Gavlis' buffaloes, and the ordinary inferior buffalo known simply as *mhais*. The Gavláru buffalo comes from Nágpur. It has very long horns and is much stouter and gives better milk than the common district buffalo. A pair of common buffaloes costs £5 (Rs. 50), while the Gavláru cost £7 10s. to £15 (Rs. 75-150) a pair. The well-to-do classes prefer buffalo milk to cow's milk as it is richer and more nourishing.<sup>1</sup>

Sheep and Goats are returned at 361,518 head. Of sheep there are three varieties, Muralgini, Patalgini, and Batgini. All parts of the district afford excellent grazing ground for sheep, but perhaps the best sheep are found in Bijápur where they can be had for 8s. (Rs. 4) the pair. Goats costing about £1 (Rs. 10) a pair, are of two kinds, the Kengori which comes from Venkatgiri in Madras, and the Kunyi or Gujarát goat. Kengori goats stand about two and a half feet high. The Kunyi are famous for the quantity and quality of their milk which is particularly good for children.

The district is a poor place for horse-breeding, but in many parts, particularly in the Indi and Sindgi sub-divisions, there are excellent and cheap ponies. The village of Sonkanhalli, about ten miles west of Indi, has a local name for its breed of horses. The best horses are brought from the Jath state in Sátára and from Sangola in Sholápur; very fair animals can also sometimes be found in parts of the Nizám's territories. In Kaládgi itself and a few other large towns horses and ponies are kept for sale and hire by Pendháris, and, though as a rule they are poor, some good animals can occasionally be picked up from these people. In 1882-83 the number of horses was returned at 8505.

Camels are not bred in the district, but are brought from the northern districts and from a place named Ganvad in Sholápur. Besides by some European officers, they are kept by well-to-do Márwár Váni merchants in such large towns as Bágalkot, and are used to carry silk, grain, and other articles. They cost £12 to £20 (Rs. 120-200) a pair and the charges for their feed and keep amount to £1 (Rs. 10) a month. Asses, returned at 4923, are kept for carrying packloads by Vadars, Ghisádis, Dombáris, and other wandering tribes and are left to pick up what grazing they can find.

Pig are very common. They are kept in great numbers by Korvis, Vadars, Mhárs, and Mángs, who consider them good eating. They feed upon nightsoil and are very useful as village scavengers.

<sup>2</sup> Twenty years ago both Tigers *huli* or *hebbhuli* *Felis tigris*, and Bears *karádi* *Ursus labiatus*, were found in the Bádámi and

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## Production.

DOMESTIC  
ANIMALS.*Buffaloes.**Sheep and  
Goats.**Horses.**Camels.*

## WILD ANIMALS.

<sup>1</sup> In 1820 at Mangalgud, a village near Bádámi, Marshall noted a three-yearly fair where about 500 male buffaloes and several thousand sheep were sacrificed. During the eight days the fair lasted the Dhangars, Maráthás, Berads, and Mhárs sated themselves on the carcasses. At the end of the fair they carried off the remnants of the dead bodies and buried them in their fields. Marshall's Belgaum, 126.

<sup>2</sup> The Wild Animal and Bird sections are contributed by Mr. A. H. Spry, C.S.

## DISTRICTS.

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Production.  
WILD ANIMALS.

Hungund hills. In 1847 three tigers were killed in Hungund and in 1856 one was killed in Bádámi. Between 1844 and 1861 twenty-five bears were killed in Bágalkot, Bádámi, and Hungund. Now (1883) there is not a vestige of either the tiger or the bear. The only large game are a few Panthers *kera kalla* *Felis pardus*, and these are growing scarcer year by year. The panther is found almost everywhere south of the Krishna, especially in the sandstone ranges of Bádámi, Guledgudd, and Hungund. At Bádámi panthers are quite a pest. Scarcely a night passes without something being killed and carried off to their dens. They retire to large caverns and clefts in the rocks close to the town from which it is almost impossible to dislodge them. Smoke or fireworks are useless. The best way to get at them is either to take a position commanding the caves which the panthers are known to frequent and to watch for them coming out, which they generally do about dusk, or to strew earth and sand over-night in places on the paths leading to the caves and find out next morning by the foot-marks into which cave the panther has gone. Then towards evening by the promise of a reward, to get the shepherds to feed their flocks near the mouth of the cave and taking a position commanding the mouth wait for the chance of a shot as the panther dashes out to seize one of the goats. Eighty-three panthers were killed between 1844 and 1877 and eleven between 1878 and 1882. During the eight years ending 1882, eleven men and forty animals were killed by panthers. The Wolf *tola* *Canis pallipes*, and the Hyæna *katte gurab* *Hyæna striata*, although not abundant, are pretty generally distributed. Wolves cause great loss to shepherds and a year seldom passes in which children are not carried off by wolves. Since 1840 seventeen hyænas have been killed. The reward varies from 6s. to 10s. (Rs. 3-5). The Jackal *kunni* or *kappalinari* *Canis aureus* is common everywhere. Porcupines *yedu* *Hystrix leucura* abound among the ruins and near Bijápur and are caught by Phánse Párdhis, and despite the prejudice against them, are by no means bad eating. The Fox *chandike* or *sannakempunari* *Vulpes bengalensis* is found in the open undulating plains of Bágévádi and Muddebihál, especially near Mulvád about fifteen miles west of Bágévádi where good coursing may be had. Among the Bádámi and Hungund hills, Wild Pig *kádrú handi* or *kol* *Sus indicus* are pretty plentiful, but the country is not suited for hunting. Since 1874, when forests began to be conserved, pig have greatly increased. Of Monkeys two sorts are found in Bádámi and Hungund, the large Langur, *Presbytis johnii*, and the Small Brown Monkey, *Innus rhesus*; a colony of small brown monkeys infest the town of Káládgi and have become half tame being held in great veneration by the Hindus. Of the Deer tribe there are only two, the Antelope, *Antelope bezoartica*, and the Gazelle, *budari* or *nudari*, *Gazella bennettii*, commonly called the *chinkára*; neither are plentiful. A few years ago the plains about Bijápur were noted for their immense herds of black buck, now scarcely one is seen. These beautiful deer have almost disappeared from the district; only a few small herds remain scattered over Indi, Sindgi, Muddebihál, and the black-soil plains of Hungund. A few gazelles inhabit the ravines in the southern sub-divisions and the hills near Horti and



Bijápur. The Common Indian Hare *mol* *Lepus nigricollis* is found pretty generally throughout the district.

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Production.

BIRDS.

Pea Fowl *Pavo cristatus* are found in large numbers in the scrub-covered islets along the banks of the river Krishna and in the wooded hills of Bádámi, specially above Kendur. They are perfectly wild and are apparently held in no special veneration. The Painted Partridge *Francolinus pictus* is much commoner than the Gray *Ortygornis ponticerianus*, and fair bags may be made in the hilly tracts. The Gray Quail *Coturnix communis*, and the Rain Quail *Coturnix coromandelica* in ordinary years are exceedingly plentiful, large numbers of rain quail breeding in the district. The Bush Quail *Perdicula argoondah*, the Bustard Quail *Turnix taigoor*, and the Button Quail *Turnix dussumierii*, are found, but not abundantly. The Bustard *Eupodotis edwardsii*, though not so common as in the Deccan, is met in the open parts of the district, particularly in Bijápur and Muddebihal. As many as thirteen have been seen together, but they are generally only in threes and fours. No instance of their breeding is known, but as they are seen at all seasons of the year and are known to breed in Sholápur, they probably breed in Bijápur. The Lesser Florican *Sypheotides aurita* is rare and is not known to breed. The Common Sandgrouse *Pterocles exustus* is fairly common to the north, and the Painted Sandgrouse *Pterocles fasciatus* to the south of the Krishna. The Green Pigeon *Crocopus chlorigaster*, though by no means common, is found in Bágalkot wherever the Indian fig tree grows. Both the Common Crane *Grus cinerea* and the Demoiselle Crane *Anthropoides virgo* are cold-weather visitants. Immense flocks of them may be seen among the wheat fields of the Don valley. The common Snipe *Gallinago cœlestis* and the Jack Snipe *Gallinago gallinula* are cold-weather visitants, and in some places large bags may be made. A few possibly may remain and breed on the banks of the Mamdápur reservoir. The Painted Snipe *Rynchœa bengalensis* turns up at times and breeds in the district. The Ruddy Shieldrake or Bráhmāni Duck *Casarca rutila* comes in the cold weather and may be seen in pairs on the banks of the Krishna and Bhima. Many kinds of duck visit the district and some may stay during the whole year. The following are among the commonest. The Common Gray Duck or Gadwall *Chaulelasmus streperus*, the Widgeon *Mareca penelope*, the Common and Bluewinged Teal *Querquedula crecca* and *Querquedula circia*, and the Shoveller *Spatula clypeata*, the Pochard *Fuligula ferina*, and the Pintail *Dafila acuta*. Plovers, Curlews, Herons, and many other birds either stay in or visit the district. The Bittern *Botaurus stellaris*, and Avoset *Recurvirostra avocetta*, though rare, have also been found.

<sup>1</sup> There are no snakes peculiar to the district. Those found are the same as those ordinarily met in the Deccan and are neither very numerous nor particularly destructive of human or animal life. The

SNAKES.

<sup>1</sup> Contributed by Mr. H. F. Silcock, C.S., from materials supplied by Ráo Sáheb Hanmant Rámchandra, Mámlatdár of Bijápur.

## Chapter II.

## Production.

## SNAKES.

following are the chief kinds: the Cobra, *nágar hávu*, *Naja tripudians*, is found everywhere and generally attains a length of three to six feet with a girth of four or five inches. The Dháman, *kyári hávu*, *Ptyas mucosus*, a colubrine snake wrongly said to be poisonous but not deadly, is somewhat black in colour and has no hood. The country people consider it the male and the cobra the female.<sup>1</sup> It generally grows to a larger size than the cobra and is very erratic in its movements, never moving in a straight line but making frequent tracks. The *chingi hávu*, that is a jumping snake so called because it jumps with wonderful quickness from branch to branch of trees, is a Tree snake probably *Dipsas trigonata* or *Dipsas gokool*.<sup>2</sup> It is not very common, but is occasionally met in open ground. It is believed to be venomous and is dreaded by the natives on account of its ferocious disposition. It is only a foot or a foot and a half long and is of a light brown colour. The Indian Rock Snake, *ajgar hávu*, *Python molurus*, is sometimes but rarely met in the neighbourhood of old trees and is of a harmless disposition. Its colour is said to be a dark brown, almost black. It is mistaken for the Deccan *parad* *Gongylophis conicus* which is superficially very like a young Python both in shape and character of markings. The Common Green-grass Snake, *hasar hávu*, *Tropidonotus plumbicolor* is occasionally found in houses. It is said to be venomous, but in one specimen examined the fangs appeared fixed. When young it has a black and yellow colour and faint blackish rings. The Water Snake, *niragin hávu*, *Tropidonotus quincunciatus*, is a harmless snake of the colubrine tribe found in ponds and wells where it feeds on frogs and other water animals. It is generally three feet long and black with a yellowish-white belly. The Common Sand Snake, *manna mukka hávu*, *Eryx johnii*, is common. Its Kánarese name *manna mukka* literally earth or dust-eating has been given from its burrowing character. Its Maráthi name is *dotonde* because it has a thick tail which snake-charmers mutilate to make it look like a second head.<sup>3</sup> In colour it is dark-brown, almost black; and its length is about three feet. Another snake, the *Daboia elegans*, has been found once or twice. A specimen obtained in Bijápur in 1876 was between five and six feet long and eight or ten inches in girth. Though extremely rare the natives dread it even more than the cobra, as it is so powerful and vindictive as to attack when disturbed and make no attempt to escape. The poison fangs of one specimen examined were about three-quarters of an inch long, and the head had the flattened and truncated appearance characteristic of the most venomous snakes. This is probably the species which is called in Kánarese *bálivadak hávu* and in Maráthi

<sup>1</sup> The same belief prevails in parts of the Madras Presidency. In the Southern Konkan all cobras are conversely held to be males, while all individuals of a species of harmless colubrine (*Zamenis fasciolatus*) are called *nágin* or female cobras. Mr. G.W. Vidal, C.S.

<sup>2</sup> Both *Dipsas trigonata* and *Dipsas gokool* have rather viperine looking heads and are therefore mistaken for the venomous *phursa*. Mr. G. W. Vidal, C.S.

<sup>3</sup> The common belief is that it has two heads, one at each end of the body, and that every six months the tail takes the place of the head and the head of the tail.

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*kavadya sáp* or *ghonas*.<sup>1</sup> During the eight years ending 1882 rewards were given for the destruction of thirty-two snakes. During the same period sixty-five men and four animals were reported to have been killed by snake-bite.

There are no tame bees. Honey is produced only in Bádámi by two kinds of bees locally called *doda jembula* or the big bee and *sanna jembula* or the little bee. Neither of these bees is like any kind of European tame bee. The honey of both kinds is produced from January till April. Both kinds are fond of the *turvech* flower and the honey produced from it is good. The combs of the larger bee are found among rocks, and those of the smaller bee generally attached to bushes. Though smaller in quantity the honey of the smaller bee is more valued than that of the larger bee. The yearly yield in the district from both kinds of bees is estimated at 500 pounds of honey and 144 pounds of wax. Honey sells for 3*d.* a pound (2 *as.*) and wax for 5*d.* (3½ *as.*) a pound. All the honey is locally used; none is either imported or exported.

BEES.

<sup>2</sup>Except the Don, the larger rivers of the district are fairly stocked with fish. The chief varieties are, *avul*, *báli*, *belchi*, *gogri*, *hadd*, *hangi*, *hasru*, *hávu*, *heral*, *jhingí*, *katráni*, *kemp*, *kund*, *kurub*, *malag*, *surma*, and *unchi*. Of these the *kund* is the largest, sometimes five or six feet long. It is of a blackish gray on the back and a white belly, and it is furnished with a large ventral fin four or five feet long. The *hadd* has its head furnished with several tentacles from three to six inches long. Though of a rather dull muddy flavour its flesh is fairly good and is often eaten by Europeans. The *avul*, which is the chief fish eaten by Europeans, is of a dark colour reaching eight or ten pounds in weight, and from two to three feet in length. Its chief characteristic is the care with which it guards its young, the male and female watching them by turns until the young are able to care for themselves. The *báli*, weighing as much as fifteen pounds, and the *málag* as much as eight, belong to the Muracnidæ or eel family, the former representing the common English fresh-water eel. The *gogri*, a small fish of a reddish golden colour and somewhat like a perch, rarely weighs more than a pound and is so full of bones that it is almost useless as an article of food.

FISH.

Breeding fish and fry are not destroyed to any great extent. In Indi the fish are trapped during the rains in irrigated fields, and all over the district they are caught both by rod and line and by net. With the rod and line the bait in general use is wheat flour made into paste, the rod being generally a piece of bamboo with a line tied to the end of it. Neither the frog bait nor the fly is ever used. With a minimum mesh of the size of a wheat grain the nets used are of five sorts, *sarkhya*, *bagar*, *sokari*, *jhyar*,

<sup>1</sup> The name *balivadak hávu* meaning literally broken bangle snake would seem to refer to the three conspicuous and sometimes broken chain markings, which cover the upper parts of the chain viper. The name Cobra manilla, a Portuguese corruption of *Coluber monileger* literally necklaced snake, is applied to the same species and conveys a similar idea. Mr. G. W. Vidal, C. S.

<sup>2</sup> Contributed by Mr. H. F. Silcock, C.S.

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and *báva*. Of these the *sarkhya* and *bagar*, fastened to stakes driven into the river-bed and left stationary, are large nets with meshes about two inches in size. The *sokari* and *jhyar* are hand-nets with very small meshes; while the *báva*, a long deep net with large meshes, is used chiefly for dragging river-bed pools. None of these nets are dyed; they last two to three years. They are made during the rains by the fishermen themselves from hemp brought from the Nizám's country. Besides a few Musalmáns who fish for amusement, the fishermen belong to the Mhár, Bhoi, and Ambigár castes. Almost all are poor, and as there is very little trade in fish, they work as day labourers. Fish are eaten by those who catch them and are sold both for money and grain. They are neither sold in regular markets nor hawked from place to place. Their price varies according to their size; 6*d.* (4 *as.*) is a fair price for a fish of four or five pounds. Maráthás, Dhangars, Chámhárs, Vadars, Kumbhárs, Musalmáns, and other low-caste Hindus, forming perhaps twenty-five per cent of the whole population, eat fish. The local supply of fish is believed to have neither increased nor decreased for several years.