CHAPTER I

GENERAL

Whatever doubt there may have been about the name of the district according to the records of old Central Provinces, it has always been known in Orissa as Kalahandi (black pot). There never was any controversy about the name in Orissa. What the name may have to do with black cotton soil which brings out black pots from the potters' wheel that are predominant in the markets of the district and neighbourhood can only be speculative.

Till a few years ago Kalahandi had the reputation of being the home of man-eating tigers which attracted hunters from many parts of India. The well known Indian hunter Kumudnath Choudhury lost his life in Kalahandi under the paws of a man-eater. Not only man-eaters, but the tiger population generally is nearing extinction in Kalahandi as in most parts of India.

In recent years Kalahandi has added to its area the Zamindari of Khariar which has become the Nawapara subdivision and has lost to Koraput its Zamindari of Kashipur. Nawapara has been the home of teak, but on account of depredation of contractors the teak forest had nearly been lost. In recent years, however, the Forest Department of Orissa have tried re-afforestation of teak in many parts of the district.

The district has magnificent scenic spots with towering hills and deep valleys. Standing on the hill top one can see very thick valleys with wild banana catching the eye. The Kandha living in the wild tract enjoy the babbling brook by the side of which they have built their huts. They also make their home brewed liquor without which they cannot live.

Motoring through the district one cannot miss the ravages of Podu or shifting cultivation. It looks as if somebody has shaved the hill sides of tree growth.

Kalahandi also boasts of pre-historic paintings on the walls of caves showing that man many thousands of years ago had an artistic mind which was striving to find expression while living in forests. The pre-historic drawing at Gudahandi, and Jogimath near Khariar, are worth visiting.

Origin of the name of the District

No record is available to show how the name Kalahandi originated. It was previously known by the name Karond. According to Lieutenant Elliot, Deputy Commissioner, Raipur (1856), "This dependency is known only on the Nagpur side as Kharonde (Karond), the Oriya name being Kalahandi, and as there is no place or village corresponding to the former name it would appear to be a corruption of the latter, though it has been originally entered in the accounts."* In Koraput and Bastar border areas one comes across such names, with identical phonetic variations, which corroborate the above presumption. The village Bakawond in Bastar is called by the Oriyas as Bakahandi, Bajawand as Bajahandi, Nalpawond as Nalphandi and Kumarwond as Kumarhandi. Similarly the village Sasahandi near Kotpad and Papadahandi are respectively called by the Bastar people as Sasawond and Papadawond. In the Maratha records the word Karond occurs invariably, but since 1905 when this territory formed a part of the Bengal Presidency the name Kalahandi is commonly used.

According to a popular belief, a powerful man of Rajputana named Kalahambir, came to this part and ruled it for many years. After his name this country was called Kalahambir which, in course of time, corrupted into Kalahandi. The name Kalahandi, as stated earlier, may literally mean 'black pot', or it may also mean 'pot of arts'. According to the latter interpretation, the name has possibly been derived from 'Gudahandi', a hill located close to Koksara police-station of the district, in the caves of which are painted pre-historic paintings in red and black colours. These interpretations concerning the origin of the name of Kalahandi are, however, conjectural.

Junagarh was the headquarters of Kalahandi until 1849. The name Kalahandi occurs for the first time in the Dadhibaman Temple Inscription, Junagarh, (unpublished), which was issued by Maharaja Juga Shahi Deo from Kalahandi Nagar, his capital, in the Yuga era, 4819, i. e., 1718. The modern Junagarh was known as Kalahandi Nagar in those days (vide Chapter II History). The ex-State of Kalahandi was perhaps named after its headquarters town Kalahandi (modern Junagarh). In a later period though the headquarters of the ex-State was shifted to Bhawanipatna the name of the ex-State remained unaltered.

Location, general boundaries, total area and population

The district of Kalahandi occupies the south-western portion of Orissa and is situated between 19°.3′ N. and 21°. 5′ N. latitudes and 82°. 20′ E. and 83°. 47′ E. longitudes. It is bounded on the north

*1. Eliot's Report on Kalahandi State, the 28th July, 1856, O. H. R. J., Vol. XIV, No. 2, p. 11.

by the districts of Balangir, Sambalpur, and Raipur (Madhya Pradesh); on the south by the district of Koraput, on the west by the districts of Koraput and Raipur (Madhya Pradesh) and on the east by the districts of Koraput and Boudh-Khondmals. It extends over an area[1] of 11,835 sq. km. and ranks 4th among the districts of Orissa with regard to size. Its extreme length from north to south is about 220 km. and its extreme breadth from east to west about 140 km. Its shape is fairly compact except for the projection caused by the Nawapara subdivision on the west in a north-south direction. The headquarters town, Bhawanipatna, stands almost to the eastern border and is, thus, far removed from the northern and south-western parts of the district. It had a population of 1,163, 869 persons (578, 929 males and 584, 940 females) in 1971. In regard to population it occupies tenth position among the districts.

History of the District as an administrative unit and changes in its parts

The district consists of three subdivisions, viz., Kalahandi, Dharamgarh and Nawapara. The first two subdivisions comprised part of the ex-State area of Kalahandi which merged with Orissa on the 1st January, 1948. The ex-State after integration together with the ex-States of Patna and Sonepur formed the district of Kalahandi with headquarters at Balangir. On 1st November, 1949, Patna and Sonepur ex-State areas were separated to form the district of Balangirpatna (later Balangir) and the ex-State of Kalahandi, together with the Nawapara subdivision which formed a part of Sambalpur district since 1st April, 1936, was reconstituted a separate district (Kalahandi) with headquarters at Bhawanipatna.

The entire area comprising Kashipur police-station had no direct communication with the district headquarters which posed administrative problems. To overcome such difficulties the above police-station was transferred from Kalahandi and tagged to Rayagada subdivision of Koraput district on 1st August, 1962.

Subdivsions Tahsils and Thanas

The district is divided into three subdivisions, five Tahsils and sixteen police-stations. The names of subdivisions, Tahsils with their

1. These represent "Geographical area" figures supplied by the Surveyor General, India. Figures of urban areas have been supplied by the local bodies. Area figures for rural areas are derived by subtracting the urban areas from the total area of the district. The total of the area figures of the subdivisions or Tahsils given hereafter will not tally with the district figures, because the former represent land use area and are derived from the figures supplied by the local revenue authorities.

area and population (1971) and the component police-stations are furnished in the following table.

Subdivisions with area in sq. km. and population (1971)	Tahsils with area in sq. km. and population (1971)	Police-stations
Kalahandi A. 5,282·3 P. 407,753	Kalahandi A. 2,593·7 P. 236,223	Kalahandi, Kesinga (portion), Thuamul-Rampur, Lanjigarh (portion), Kegaon (portion)
	Lanjigarh A. 2,688·6 P. 171,530	Kesinga (portion), Madanpur-Rampur, Lanjigarh (portion), Narla
Dharamgarh A. 2,915·1 P. 417,222	Dharamgarh A. 1361·1 P. 201,428	Dharamgarh, Junagarh (portion), Kegaon (portion)
	Jayapatna A. 1,554·00 P. 215,794	Jayapatna, Koksara, Junagarh (portion)
Nawapara A. 3,398.1 P. 338,894	Nawapara A. 2193·7 P. 168,577	Nawapara, Jonk, Komna
	Khariar A. 1,204·4 P. 170,317	Khariar, Sinapalli

Until 31st December, 1973 Nawapara subdivision had only one Tahsil, Nawapara. The subdivision was divided into two Tahsils, namely, Nawapara and Khariar with effect from 1st January, 1974 under Revenue Department notification No. 59185—1IJ-55/73-R., dated the 11th September, 1973 partially modified in No. 74819-R., dated the 19th November, 1973.

Town

According to the norms of 1971 Census there existed five towns in the district. The area, population and classification of these towns are furnished in the table below :

Name of Town	Area in sq. km.	Population	Classification
Bhawanipatna (Including irrigation colony, college and I. T. I. area)	14·37	23,264	Municipality
Kesinga	14·50	8,536	N. A. C.
Junagarh	15·54	7,876	N. A. C.
Khariar Road	11·4	9,226	N. A. C.
Khariar	23·83	7,651	N. A. C.

Bhawanipatna, the headquarters town of the district, is named after the presiding deity Bhawanisankar Mahadev. In the topographical map of 1843 Bhawanipatna was known as Bhandeswar and the presiding deity was Bhandeswar Mahadev, besides Manikeswari. In 1849 Maharaja Fatenarayan Deo shifted his headquarters from Junagarh (old fort) to Bhawanipatna and enshrined Bhawanisankar Mahadev and changed the name from Bhandeswar to Bhawanipatna.

TOPOGRAPHY

The district may be broadly divided into two distinct natural divisions, the hill tracts and the plain country. The former chiefly comprises the ranges of hills which run from the north-east to the south-west of the district and the western portion of the Nawapara sub-division, and the latter constitutes the river valleys of the Tel and its tributaries, and the Jonk.

About eight kilometres south-east of Bhawanipatna, commences the mountain tracts called the Dongarla which cover a vast area of about 3,665 sq. km. on the eastern side of the district and extends southwards to the Koraput border. These tracts rise in a series of precipitous hill ranges from the plains. The path by which the ascent on Karlapat side is made is quite impracticable even for *sagars* (solid wheeled carts) and in many parts are inaccessible except by foot. The hill sides are covered with dense Sal (Shorea robusta) forests, and it is not until the open valleys at the higher elevation are reached that cultivation is met with. These valleys are mostly fertile and are splendidly watered being intersected by perennial streams. Here and there patches of regular rice cultivation are met with and crops of wheat; but for the most part, the country is given over to *dahi* cultivation or Jhuming. The hill tracts form a conspicuous landmark in the scenery and the wild precipitous ranges which mark their border, stand up from the plains like a vast wall and are visible for many miles. There are fine open valleys from about 850 to 975 metres above the sea level; rising from these valleys are great hill ranges running due north and south, the tops of which are plateau lands covered with long grass; the larger of these ranges are above 15 km. long with a breadth varying from about half to three kilometres and water is available close to their summits. The principal plateau lands are the Karlapat, Thuamul-Rampur ranges and the Baphlimali hill, a fine plateau on the district border near Mahulpatna; these in parts reach an elevation above sea level of 1,220 metres and over. In these hills of the Dongarla area the splendid stream of the Indravati takes its rise near Thuamul. It makes its way through the hill range which forms the southern boundary of Kalahandi. Not far from the place where the Indravati flows south through this barrier the Hatti river rises on the northern

slopes and flows due north in exactly the opposite direction. The report of Lieutenant C. Elliot, Deputy Commissioner of Raipur, contains the following description of the country (quoted with corrections):

"The country is high, lying near the foot of the main line of the Eastern Ghats and partaking of the watersheds, both of the Mahanadi and the Indravati, which last, with several tributaries and sub-tributaries of the first, rise within its limits; it is well supplied with water, and in some parts (as Thuamul, Kashipur, Karlapat and Lanjigarh, etc.) the soil is enabled to yield two crops of rice within the year. The hills are chiefly plutonic and independently of two or three considerable ranges, detached hills of greater or less size are interspersed throughout the State".

The mountainous tract extending almost to the entire western part of Nawapara subdivision from north to south contains a broad plateau varying from 610 to 915 metres in height cut off from the plains below by a range of precipitous hills. "This plateau contains remains of fortifications and was probably the last stronghold of the Bhunjias. The sites of old and forsaken villages, where herds of bison now roam undisturbed, show that here at one time there was considerable cultivation, but only two villages now remain."*

The river Tel which runs through the district in a north-east direction intervenes the two natural mountainous divisions. It receives a number of tributaries, both large and small, whose valleys constitute the plain fertile regions. The valley of the Utei comprising a large portion of the Madanpur-Rampur and Narla police-station areas commences south of the river Tel and stretches away from about 65 km. interspersed by stray hills and isolated peaks. The country is mostly undulating, the general elevation of the tract being over 180 metres above the sea level. This plain country extends south-west and then westwards, south-west into the Sadar police-station area and westwards into the Titilagarh subdivision of the Balangir district. The general feature of the country greatly resembles the plain tracts of Madanpur and Narla police-station areas. From the Titilagarh subdivision, it stretches further west and then northwards into Nawapara subdivision, here sandwitched between a massive hill range to the west and the Komna range to the east. The fertile tract is the contribution of the two tributaries of the Tel, Sundar and Udanti. The Tel in its upper reaches creates the extensive fertile

* Central Provinees District Gazatteer, Raipur District, P. 298

tracts of the Dharamgarh subdivision which stretches south beyond Jayapatna police-station and running northwards meets the plains of Nawapara subdivision across the Deobhog police-station area of Madhya Pradesh. In between the plain countries in the Dharamgarh subdivision and that in the Sadar and Nawapara subdivisions there occurs larger mountain blocks, some continuous and others scattered and broken intermittently by narrow valleys. The valley in Dharamgarh having an elevation of above 240 metres is less undulating in character and except for a very few isolated hillocks, the country is an extensive plain. It is flanked on the west by a continuous hill range marking the district boundary which separates it from the Nowrangpur plateau. From this plateau, situated at an average elevation of 610 metres, one has to descend down more than 305 metres through Ampani Ghat to reach the Dharamgarh valley.

The Sunder-Udanti valley of Nawapara subdivision is separated from the Jonk valley lying higher north at Kurampuri by a narrow hill range. The latter valley is less fertile and is of poorer soil.

Plateaus and plains

The Nawapara plain—The Nawapara plains are drained by the rivers Jonk and Masankuda, mainly by the former river. This tract has been considerably deforested excepting the portions lying between Saipalla and Lakhna stretching up to the Nawapara Road Railway Station. But the villagers have, according to their convenience, cut down the forests here and there for their cultivation. The only forest worthy of mention within this region is between the villages Gidhnipani and Maraguda, where extends the forest called Kalami-Dadar, a very wild and almost inaccessible tract.

The Sonabeda plateau—The Sonabeda or Gauragarh plateau extends over a considerable portion of the Nawapara subdivision measuring about, 780 to 1,035 sq. km. This plateau varies in height between 610 m. and 915 m. and both the rivers Udanti and Sundar have their source on it. About half a dozen of villages lie scattered over it. To the east the sides of the plateau are very precipitous, but to the west the slopes are easier. At places it rises to a height about 915 m. The plateau, according to Mr.Hewitt, offers an ideal site for a sanatorium. The scenery is very fine and the climate much cooler than it is in the plains below. But it is mostly covered with jungles. One may have access to it from the Komna side through two risky passes, viz., Gaighati and Maharchuan, of which the latter is easier. Within this range of hills is situated the famous hill-fortress of Manikgarh which is accessible from the village Maraguda in the Nawapara police-station area. It is about 80 km. long from north to south and about 25 km. broad on the average. The country to the west

of the plateau extending beyond Nawapara right up to Fingeswar in Madhya Pradesh consists of massive granites, often forming elevated ground. To the west of the plateau occur the peaks, Deo-Dangri (929m.) and Darpani (887 m.). The name Gauragarh is not improbably derived from Gauras or cowherds meaning the fort of cowherds.

The Udanti Sunder Valley—The most fertile area of the Nawapara subdivision is the Udanti-Sunder valley which forms really its granary. Particularly the land intervening the rivers Sunder and Udanti from the village Nehena, is a black-cotton tract. The most precious teak wood forests lie within this area though at present it is in a very impoverished condition due to ruthless exploitation.

Valleys of the Tel and Utei—The plain country of Sadar and Dharamgarh subdivision is undulating and for the most part closely cultivated. The general elevation of this tract is 275 metres above the sea level. It is intersected here and there by hill ranges and isolated peaks, but contains a large area of cultivated lands. It is occupied largely by the Kultas who are clever and capable agriculturists. A few embankments and tanks are no uncommon features. A certain number of Kandhas are also to be met with; these people have left their hill fastnesses and settled down to plough cultivation. The plain area stretches away from the river Tel to the south for about 65 km. and in the east it includes large portion of the Rampur-Madanpur police-station. From Bhawanipatna, the headquarters of the district, the plain country sweeps round on the west through Junagarh and runs southward to the Jeypore border, forming a regular valley between the uplands of the dongarla and the high hills of Koraput and Nawapara subdivision.

Hills

The principal hill ranges belong to the Eastern Ghats. It covers almost the entire eastern and southern parts of the district. Continuous in the north with the hill ranges in the Baliguda subdivision, it stretches but for interception by the valleys of the Nagavali and the Vansadhara, into the mountainous tracts of Rayagada subdivision of the Koraput district. These ranges are named at different points differently after the village near their base. The main peaks in these ranges are Tangri dongar (1,229 m.), Kattighara (953 m.) and Karlapat (1,213 m.). The hill ranges of the Nawapara subdivision belong partly to Chhota Nagpur mountain system and partly to Eastern Ghats. The largest of these ranges is the Katpar-Puruvadi range. The Gaurgarh or the Sonabeda plateau only forms a part of this hill system. The elevation of this range is 986 m. in the south and

931 m. at the central point called Birbusi. To the west of the plateau the peak of Deo-Dongri is 929 m. high and at Darpani it attains 887 m. Near the village Maraguda lies the hill fortress of Manikgarh over this range of hills. A place of considerable scenic beauty by the side of this range of hills is the Godhans waterfall near the village Lodara, about 24 km. south -west of Nawapara.

The highest peak Tangri Dongar (1,229 m.) is situated in Thuamul-Rampur police station. Among other notable peaks mention may be made of Kunkot Parbat (852 m.) in Kegaon police station; Jamharpat Dongri (537 m.), Burharas Parbat (741 m.), Ghochki Dongar (555 m.) and Ara Dongar (376 m.) all in Nawapara police station; Supkon Dongar (882 m.), Chaura Dongar (933 m.), Godma (784 m.), Guru Dongar (734 m.) and Gaijhar Pahar (494 m.) all in Komna police station; Barepat Dongar (1,006 m.) and Kachki Dongri (506 m.), both in Khariar police station. The Guru Dongar also extends to the Khariar police station. Besides the above hills, there occur numerous unnamed peaks of considerable height. The western part of the Nawapara subdivision abounds in fine natural scenery and the wild precipitous ranges standing with their majestic grandeur and magnificence are visible for many miles. The plateau lands lend to cultivation at places.

A fascinating account of the hills around Khariar from the pen of a Christian missionary Rev. Emil Menzel, during the early part of this century is reproduced below :—

"Khariar nestles in the warm and kindly lap of a perfect circular mountains of that deep blue colour that speaks of friendliness and sincerity : They are not mountains like the Himalayas which overawe you with their tremendous mass, nor are they hungry looking mountains like the Ozarka, nor business-like mountains with even tops like the Appalachians, nor symbols of barrenness like the Palestinian hills. They are romantic mountains just high enough to make you feel cozy in their lap, with just forest enough to soften them and rocks enough to give them character and save them from being merely sentimental. The outline curves of the hills, without breaking the cozy circle, are so graceful and varied that they remind you of the Greek's contribution to art.

The forest-clad hills lend an inward touch to the romance of the scene in the reminder that the beautiful spotted deer has chosen them to be its home, and a dozen tigers roam free[1]".

1. Melick E. M.—"The Evangelical Synod in India",P. 130

RIVER SYSTEM AND WATER RESOURCES

Main rivers and distributaries

The Tel, Indravati and Jonk, which form tributaries of large rivers like the Mahanadi and Godavari may be mentioned among the principal rivers of Kalahandi. Besides, the Tel receives a large number of affluents in the district. The scenery along the banks of these streams during their course through the hills specially on the Indravati and the Raul, a feeder of the Tel, is exceedingly fine and varies from wild raging torrents sweeping over bare rocks, to placid stretches of deep pools with the stream swirling in the eddies between rich meadow land, verdant with grass and banks overhung with willows.

Most of the hill streams of the district are perennial. The rivers in the open country seldom carry a large flow of water in the hot weather. The Tel, Sagada, Hatti, Ret and Utei are almost reduced to tiny streams in their lower reaches from February to June. On the other hand, the Raul throughout its whole length, most of which lies inside the forests, holds a fair flow of water even in the month of May. The Sagada, Ret, Indravati, Bada Nala and many others carry a strong stream of perennial water in the upper and middle reaches and only lose it in their sandy beds when they descend to the plains. The villagers in the open tracts scoop water holes in the sand during the summer months and manage to provide themselves with exiguous supply of drinking water.

These rivers are scarcely subjected to high floods. The Hatti occasionally overtops its low banks and spreads out into the surrounding plains. The floods during their short duration generally cause formation of sand deposits. No other loss or damage is normally recorded by the floods. The Tel also sometimes deposits sand on the fertile agricultural land along its course.

These rivers are scarcely navigable as they dry up in the plain country during the summer.

Tel

The Tel is by far the longest and most important river in the district. Rising in the north of Nowrangpur subdivision of Koraput, it enters the district a few kilometres west of Dharamgarh and flows through an alluvial tract. Pursuing almost an easterly course through the Dharamgarh subdivision, it instantly takes a more northerly direction after its junction with Sagada until it meets the Udanti on its left bank. About eight kilometres from this point of confluence, it runs almost north-east and forms the boundary between Balangir and this district for a fairly long distance and enters Balangir north of Risida-Kumbharpada. The bed of this river is generally sandy, it is more observable from breadth than depth and its water, though decreases very much during the hot season, does not entirely dry up.

The important feeders on its right bank are the Moter, Hati, Sagada, Bulat, Ret, Utei and the Raul. The Raul rising in the hills of Baudh-Khondmals district flows through the mountainous tract in the north-eastern part of the district, and enters Balangir near Sikerkupa and joins the Tel a few kilometers from the borders of Kalahandi district. It receives most of the drainge of Madanpur-Rampur police station area. The Utei rises on the same hills and receives a few feeders in the fertile tract of Madanpur-Rampur area and joins the Tel on the border of Balangir-Kalahandi district near Belkhandi. It drains the wide plain between Rampur and Narla. The Hati, a large tributary of the Tel, rises in the high hill ranges of the Jayapatna Tahsil almost on the south-western border of the district and flows due north draining the open country of the Dharamgarh subdivision till it joins the Tel about 12 km. to the north of Junagarh. Its bed is deep rather than broad and the volume of water it carries is not constant throughout the year. The Moter drains the western part of the Koksara-Ampani plains as well as the hills of Shajkhol reserved forest which forms the western boundary of the plains. It joins the Tel near Dharamgarh on the borders of Madhya Pradesh. The Ret rises in the mountains of Lanjigarh and the Khalsa Dongarla to the east of Bhawanipatna and falls into the Tel just above Kesinga, The Bulat rises at the southern end of the Gundi Donger about 15 km. south of Bhawanipatna and flows past the town in a north-western direction under the name of Pipal Nala before it turns north wards to join the Tel near Karlapara. In the hills above Karlapat the Sagada takes its origin and flows a steep course to the plains into which it debouches near the village Sagada and thence flows north across the Junagarh road to join the Tel.

Indravati

Unlike other tributaries of the Tel on its right, all flowing north, the Indravati rising about two kilometers above the village Thuamul in Thuamul-Rampur range at an altitude of 915 m. quickly gathers volume and even in February roars and rushes with its copious flow down its hilly southerly course in seething cataracts in its wild rush to the plains. Its catchment area is fairly well wooded. Running for a short distance on the south-western border of the district, it receives the Golagad Nala and then flows in a very winding course across the Koraput district. Passing about three kilometers south of Nowrangpur town, it enters Bastar of Madhya Pradesh where becoming a considerable river it joins the Godavari. It drains the south-eastern corner of the district.

Jonk

The Jonk has its origin in the Sonabeda plateau near Bad-dongar. After a very tortuous course for a few miles, the river enters the Nawapara plain and is very deep in between the villages Lodra and Patora.

Near about Lodra crocodiles are seen in the river. The Katingpani Nala joins it near about the village Lodara. Before joining the Jonk, this Nala creates the Godhans waterfall of about 60 m. that presents a natural scene of exquisite beauty . At the waterfall every year a festival is held. It is attended by people even of the adjoining villages of Madhya Pradesh. An image of Lord Siva is worshipped here and the deity is said to have been consecrated by Raja Vikram of legendary fame of whom the people of this area still sing songs. A tributary known as the Masankuda river joins the Jonk near the village Dharambandha. The Jonk then forms for a certain distance the boundary of the district on its north-western side with Madhya Pradesh. It falls into the Mahanadi at Seorinarayan in Madhya Pradesh a little distance below the confluence of the Seonath. During the summer its flow almost dries up except in its upper reaches where it continues to receive perennial but slender flow from its tributaries. The rapidity with which it flows and the volume of water depending with the quantity of rainfal render it unfit for navigation. Prospects of canal irrigation from the river is equally bleak owing to the undulating plains through which it passes.

There is a deep *darha* in the river locally named, Trishul *darha* within the village limit of Maraguda.

Sunder

The Sunder owes its origin on the eastern side of the Sonabeda plateau near about Tarbod ; obliquely traversing the Nawapara subdivision for about 96 km. it enters the Balangir district near the village Tukula in the Khariar police station area. During the rainy season Teak woods were said to be floated through this river from the interior. It dries up completely during summer and is thus not navigable.

Udanti

The Udanti or Udet takes its origin in the hills of Madhya Pradesh and enters the district three kilometres to the west of the village Chitrama in the Sinapali police station and flowing in an almost easterly direction ultimately joins the Tel about ten kilometres from the village Borda. Its bed is rocky up to the village Kathibadi whereafter it gradually turns sandy. On either side of this river are met excellent teak wood forests which are in the process of disintegration. The river served as a highway for exporting forest products prior to the opening of Arang-Khariar Road and Vizagapatnam-Rampur railway line.

Periodical change in its course has been reported. In fact, in recent years, it denuded its bank near the villages of Kapsi and Jogenpadar.

Tanks

Tanks occur in almost every village. Apart from the private tanks a large number of tanks are in Government possession. These tanks vary from less than a hectare to about 40 hectares in area. They are

generally classified as Kata, Sagar, Bandh and Sara. The tanks are chiefly used for bathing, drinking, pisciculture and irrigation purposes depending on the popular needs of the locality. Dharamgarh Tahsil seems to have largest number of tanks compared to other Tahsils. Purusottam, Suratarangini and Ram Sagar are the important tanks located in the headquarters town of Bhawanipatna.

Springs and spring heads

Throughout the hill tracts of Kalahandi are met numerous perennial hill streams. The conspicuous among them which is popularly known as Patalganga occurs in the village Kutagaon under the Nawapara Tahsil. Every year especially on Baishakh (April-May) Purnima large number of pilgrims gather there to take a dip in it.

GEOLOGY
Antiquity

The different lithostratigraphic units met within this district are Basement gneisses, Charnockite and Khondalite suits of rocks, leptynite, anorthosite, granitoid gneiss; vein quartz, pegmatite, metadolerite, nepheline and hornblende syenite, sub-arkosic quartzite, shale, quartzite, laterite soil and alluvium. Of these rock types the position of charnockite, suite of rocks and also that of leptynite in time stratigraphic sequence is not very certain. However, from the evidences available till recently the following stratigraphic sequence has been worked out which, in future, may undergo modification.

Recent to sub-recent		Soil, alluvium, and laterite with seggregation of bauxite
	....unconformity....	
'Gondwana Sequence		Pebbly and gritty sandstone
Purana group—Cuddapah	Cuddaph or Vindhyas	Upper quartzite Purple shale sub-arkosic quartzite
	....unconformity....	
Intrusives		Nepheline and Hornblende Syenite
Archean		Anorthosite, Metadolerite (Amphibolite), Vein, Quartz, and pegmatite
		Granitic and granitoid gneiss
Eastern Ghats Super Group	Charnockite suite Khondalite suite	Leptynite Charnockite gneiss Crystalline limestone cale granulite and Calciphyre, Quartz—garnet—Sillimanite, graphite schists-Sillimanite quartzite-Quartzite.
	....unconformity....	
	Basement gneiss	

Distribution and description of individual rock units are as follows :

Basement gneiss—This rock type is exposed in the western part of the district between the plateau 250 m. and 1,000 m. It is pink and grey in colour and gneissose in texture and composed of mineral like feldspar, biotite, hornblende and pyroxene. Bands of amphibolite, mica schist and quartzite occur in this rock. Andalusite and cordierite developed at the contact of this rock with the cuddapah slates indicating contact metamorphism of shales and thus the gneiss may be of post cuddapah in age although it has been correlated with the peninsular gneisses by the earlier workers. Nest of Khariar, shale and conglomerate rest with overlaps on to the gneiss which is the basement of cuddapah garnet developed along its contact with Khondalite.

Khondalite Group—The khondalite group of rocks consists of graphite-sillimanite schist and gneiss, calciphyres, calc granulite, quartzites and sillimanite quartzite. They are interbanded with charnockite and gneiss. The khondalite group of rocks widely exposed from the 910 m. hill towards south-east and form the western margin of the Eastern Ghats. They occur as bands within the gneisses and charnockites. They are usually foliated and consist of minerals, quartz, garnet, sillimanite and graphite. The trend of the foliation in these rocks is NNE-SSW.

Charnockite Group—The charnockite group of rocks is well exposed near Bhawanipatna, Dharamgarh, Mahulpatna (19°25′ : 82°35′) and at Ranimal (19°35′). The members of this group are hypersthene bearing rocks of acid and basic composition. They vary in colour from brownish black to grey, usually coarse grained showing frequent occurrence of porphyric feldspars and garnet. Lenses and bands of pyroxene granulite occur in the charnockite suite of rocks.

Leptynite—The garnetiferous granite (leptynite) occurs as lenses and bands within the charnockite and khondalite suites of rocks in the hilly tracts of the country. Leptynite contains porphyroblasts of feldspars, biotite, quartz and garnet.

Intrusives—Anorthosite—The khondalite and charnockite groups of rocks described earlier have been intruded by anorthosite near Jugsaipatna, Bandpani, Dharamgarh, Ghatikunduru and east of Kundru. It occurs as discontinuous lenses within the hoast rock. In composition it ranges between norite and gabbro. It consists of plagioclase feldspar having 65 per cent of anorthosite, garnet and pyroxene.

Nepheline syenite—Along the western margin of the rocks of the Eastern Ghats Group hornblende and nepheline syenites and nephelites occur as discontinuous bodies being confined to the shearzones within the granite gneiss.

Granite and granitoid Gneiss—These rocks are intrusive into khondalite and charnockite suites of rocks. In the vicinity of Bhawanipatna, they are coarse grained, gneissose and contain large grains of pink feldspar and broken fragments of red garnet distributed within a dark coloured groundmass. At places these rocks have been crushed, pulverised due to intense pressure, resulting into mylonite. These gneisses vary from coarse grained banded gneisses and typical injection gneisses to extremely massive granites and are characterised by abundance of red garnet.

Vein quartz, pegmatite and amphibolite occur concordantly within the charnockite, anorthosite and granite gneiss.

Cuddapah or Vindhya—Unconformably overlying the rocks of the Eastern Ghats Group there is a less deformed and metamorphosed rock sequence with characteristic argillaceous, arenaceous and calcareous members of the platform facies. Here they are considered to represent the cuddapahs although there are possibilities of their being correlated to the Kurnools and Vindhyans. The boundaries of these rocks with the other rock units of the area are usually marked by highly felspathic arkose and chert. The cuddapahs here comprise sub-arkosic quartzite, purple shale, and upper quartzite. These occur as detached and discontinuous outcrops. They are exposed between Ampani (19°35′ : 83°40′) and the Khariar plateau almost following Orissa and Madhya Pradesh boundary.

Gondwana Group—Along the Kalahandi-Balangir boundary, confined to the southern bank of the Tel river, occur small and detached outcrops of gritty and pebbly sandstone lithologically similar to the rocks of Talchir group of the Gondwana sequence. The sandstone is unfossiliferous, coarse grained and contains pebbles of gneiss.

Laterite—Thick profile of laterite cap the hill ranges which consists of khondalite suite of rocks. They occur at elevations between 600 m. and 900 m. thickness of this high level laterite profile vary from 24 to 60 m. Besides this laterite low level laterite occurrences are also reported in the valley. The laterite cappings on khondalite as well as on Purana shales contain deposits of bauxite.

Mineral resources

Bauxite

Bauxite of good quality occurs as blankets and lenses within the above 1000 m. M. S. L. laterite on Purana shales of Khariar highlands, on khondalite groups of rocks on Karlapat, Khalguda 2 km. ENE of Gudamalabali, east of Gudamalabali peak, 2 km. East of Polingpedar near 1105 m. hill, Kathekhal, Pasangmali, Lakharisi and further northwest, at Kashipur Chandgiri and Manjimali, etc "Kalahandi bauxite is usually ferruginous in character, although SiO_2 and TiO_2 contents are low. It may be used for extraction of metal"[1].

1. Introduction to India's Economic Minerals by N. L. Sharma and K. S. V. Ram, 1964. p. 21.

Khariar Highland—Bauxite occurs in the Khondmal hills, overlying the cuddapah shales at 333 m. elevation, Barapet Dongar, Sandbahal and Sainipara hills of the Khariar plateau. The minimum probable reserves of this area is roughly estimated at 0·3 million tonnes of bauxite having 55 per cent $Al_2 0_3$ per cent. The ores are localised along a narrow east-west trending fault zone in the purana quartzite and are apparently derived from the topmost shales overlying the quartzites. This is difficult for approach and as such for exploration.

Karlapat Occurrence—The Karlapat plateau has extensive laterite capping varying in thickness from 20 to 40 m. and runs for a strike length of about 25 km. The seggregation of bauxite is confined to the area between Khalguda in the north and Polingpadar in the south through Gudamalabala peak. The seggregation of bauxite occur as pockets, lenses, and bands and thin blankets within the laterite cappings over the khondalite. This has an estimated possible reserve of the order of 0·4 million tonnes.

Graphite—The graphite deposits of this district occur in the rocks of the Eastern Ghats group being confined to the contact zones of khondalite with the granite gneiss. The host rock of the ore is usually pegmatite the controles of mineralisation are the foliation, fracture planes and fault zones. They occur as veins and lenses distributed over strike length varying from a few metres to 200 m. and the thickness varying from a few centimetres to three metres. These lentoid are bodies swell and pinch with dis tance and down the dip of the enclosing rock. The carbon content of these ores varies from 30 per cent to 80 per cent. The individual occurrences of graphite have been noticed at Komna (20°30′ : 82°40′), Billanjore (20°28′ : 82°42′), Baghmunda (20°31′ : 82°42′), Babupali (20°39′ : 82°44′), Gandamer (20°38′ : 82°46′), Rang (20°38′ : 82°40′)), Tapan hill 1622, at a place 0.8 km. and north-east of Bengura, Kundughat, Kus mal, Loitara, Gantasala, Singhjharan, Ketupada, Dengsugi, Salehpali, Ranikot, Dayabhati, Barabali abandoned quarries and prospecting pits of graphite were seen at Kineikula Tunda, Tapan, Salibota Rindabati, Surda, Benagura, Kerlakuta and at many other places.

Manganese—Deposits of manganese ore in Kalahandi district stretches over a belt of 27 km. from near Boriputtu in Koraput district to Minakhunti in Kalahandi district. These manganiferous horizons are confined to granetifero us quartz-sillimanite-graphite schists and khondalite at or near the junctions of the rocks with calc silicate rocks and quartzite. In these deposits, manganese occurs as nodules, stringers, pockets and tabular bodies varying in thickness from a few metres

to 12 metres and more. The lentoid bodies attain thickness up to 30 m. after which they pass on to lithomarge. The ores are associated with free quartz. Phosphorus content of these ores varies from 0·1per cent to 0·36 per cent and are highly ferruginous. The manganese content of these ores varies from 25 per cent to 40 per cent and are reported at Taldoshi, Podakana, Nishikhal, Kinehkhal, Koka Liligumma, Karanjiguda and Balakpai. The probable reserve of manganese in these deposits has been estimated at one million ton up to a depth of 15·2 metres out of which 60,000 tonnes contain 40 percent manganese oxide and 67,500 tonnes of low grade ores containing 26 to 31 per cent of Mn. oxide ores. These manganese ores are cobalt bearing.

Galena

Galena occurs sporadically in the area to the north-west of Baminimunda village in weathered pegmatite veins in quartzite as pisolitic nodules.

Road and Building materials

Khondalites, granulite gneiss, massive quartzites, and pyroxene granulites are quarried extensively for use as road metal and building materials.

FLORA

Botanical Divisions and rare types of flora

But for a few collection works undertaken by the Botanical survey of India, the district remains botanically under-explored. H. H. Haines had sent his collectors who are reported to have visited the northern parts of the district. H. F. Mooney, the then Forest Adviser to the State Government, had once visited the whole of Kashipur, Thuamul Rampur, Mahulpatna and Karlapat areas. Dr. S. K. Mukherjee of the Indian Botanic Garden had visited Bhawanipatna and its neighbourhood.

The geology, topography, climate and the soil all have a close bearing on the nature of vegetation. Above all, man's influence on the flora is no less important. The one time densely wooded tracts on the high hills of Kalahandi is reduced to mere bamboo and dry mixed scrub in no time through denudation brought about by shifting cultivation.

The flora of ravines and valleys is evergreen and where the few small patches of reserve forests occur, the crop inside, is that of pure Sal (*Shorea robusta*) or plateau sal, whereas the adjacent hill sides are covered with grass and mixed forest with no trace of sal (*Shorea robusta*).

Sal (*Shorea robusta*) tends to occur in isolated patches due to the influence of man and as such it is only a relic in the areas wherever it is found. It extends a short distance towards south and ceases at about 18°30′ north.The flora was described under the following five regional types on the ba is of altitude which plays an important part.

(1) The outer slopes of plateau (330 to 650 m.)

(2) Open valleys of main plateau (680 to 1000 m.)

(3) The ravines between 800 to 1100 m.

(4) Upper slopes of higher hills (800 to 1100 m.) and

(5) High plateau (1100 to 1300 m.)

1. The forest found on the outer slopes of the plateaus of 300 to 700 m. is essentially a dry mixed deciduous forest with characteristic species of *Acacia lenticularis, Anogeissus latifolia, Cleistanthus collinus, Dalbergia latifolia, Pterocarpus marsupium, Flacourtia ramontchi, Stereospermum sauveolens, Spondias mangifera* and *Dendrocalamus strictus* (common bamboo) with *Nyctanthes arbortristis* and *Petalidium barlerioides* as typical shrubs. *Eranthemum lurpurascens* is a conspicuous herb. On the drier and rocky sites are found trees like *Bursera serrata, Butea superba, cochlospermum gossypium, Euphorbia nivulia* and *Sterculia urens.* While on lower slopes, on slightly moist sites, are found *Adina cordifolia, Alangium salviifolium, Antidesma diandrum, Garuga pinnata, Helinus lanceolateus, Ixora parviflora, Justicia betonica, Hymenodictyom excelsum, Fluggea obovata,* and *Ventilago madaraspatana.* Common grasses are *Amphilophis glabra, Apluda varia, Eragrostis interrupta, Heteropogon contortus, Themeda triandra* and *T. laxa,* last named plant being abundant and gregarious species. *Cheilanthes tenuifolia* is the common fern at these altitudes. This type of mixed forest changes to Sal on the red soil when one reaches the plateau on the crest of Karlapat and Thuamul where Sal is accompanied by *Xylia xylocarpa.*

2. The more open valleys above 800 m. are cultivated but in almost all areas a stream fringed with trees flows down the centre of each valley. *Albizzia stipulata, Cedrela toona, Cipadessa fruticosa, Ficus glomerata, Mangifera indica, Salix Tetrasperma* and *Trema politoria* are abundant along the course of the streams. These are often accompanied by *Albizzia procera, Brevnia rhamnoides, Bursera serrata, Callicarpa arborea, Clematis gouriana, Clerodendrum infortunatum, Combretum decandrum, Derris scandens, Elaeocarpus robustus, Ficus cunia, Moghania semialata, Floscopa scandens, Jasminum arborescens, Linoceora intermedia, Mallotus philippinensis, Milia composite, Michelia champaca, Plectranthus coetsa, Reinwardtia*

trigyna, Smilax macrophylla, Sterculia colorata, Vitex leucoxylon, V. heterophylla, Vangueria pubescens and *Zyzyphus rugosa* forming the shrubby elements of the flora. On the lower slopes in the valleys are scattered trees like *Ailanthus excelsa, Anthocephalus cadamba, Bauhinia retusa, Bombax malabaricum, Bridelial retusa, Butea frondosa, Careya arborea, Holarrhena antidysenterica, Schleichera oleosa, Syzygium cumini, S. Operculatum, Terminalia belerica* and *T. tomentosa. Trewia nudiflora* was seen along the Indravati in some abundance below Mahulpatna where *Glycosmis cochinchinensis* was common on the banks. *Bischofia javanica* was also met with here. *Aristida setacea* and *pennisetum hohenackeri* are the two grasses growing in abundance throughout the area, latter being more common in clayey bottoms. Along the Nalas are found *Apluda varia, Heteropogon contortus, Themeda triandra, Polytoca barbata, Sorghum halepense* while *Saccharum spontaneum* and *Phragmites karka* are found in the beds of Nalas along with *Imperata cylindrica* in water logging areas. Several ferns like *Blechnum orientale, Anisogonium esculentum, Nephrodium molle, N. moulmeinensis,* and *N. proliferum* are frequent along the streams. *Solanum torvum* is remakably common on the highlands of Mahulpatna. The 'Mahua'tree *Madhuca indica* is absent on the southern plateau in Thuamul Rampur. It is common in Mandibisi and on the northern slopes of the plateau of Karlapat but absent elsewhere. *Xylia xylocarpa* is most abundant in north and west in Karlapat, Thuamul and Mahulpatna, and on the summit of Jherka hill 1200 metres. *Cosmos caudatus* and *Bidens pilosa* are two introduced weeds in the fallow fields after shifting cultivation. *Tridax procumbens, Ageratum conyzoides, Celosia argentea,* and *Scoparia dulcis* are other weeds met with in this area.

3. The ravines between 800—1100 metres comprise the upper courses of numerous perennial streams. For most part they are narrow glens of steep gradient. The moist evergreen type of vegetation they bear, does not extend far on either side of the stream. The flora has more affinity to Madras flora and comprise characteristic species, viz., *Actinodaphne angustifolia, Amoora spectabilis, Anodendron paniculatum, Ardisia depressa, A. solenacea, Artocarpus lakoocha, Barleria strigosa, Boehmeria platyphylla, Caryota urens* and *Calamus* sp., *Citrus medica* (frequent in thickets along the streams), *Cleistanthus patulus, Clematis smilacifolia, Colebrookea oppositifolia, Dicliptera bupleuroides, Disporum pullum, Entada scandens, Ficus macrophylla, Heynea trijuga, Hoya pendula, Gnetum scandens, Impatiens chinensis, Licuala peltata, Linoceira intermedia, Murraya exotica, Musa rosacea, Oldenlandia auricularia, Osbeckia rostrata, Phaylopsis parviflora, Phrynium capitatum, Phyllochlamys*

spinosa, Pilea scripta, Pittosperum floribundum, Plecospemum spinosum, Pouzolixia bennettiana, Pygeum acuminatum, Rhaphidophora hookeri, Rubia cordifolia, Rubus ellipticus, R. lasiocarpus, Schleffera roxburghii, Seleria cochinchinensis, Senecio corymbosa, Sideroxylon tomentosum, Strobilantes circarensis, S. consanquineus, S. jeyporensis, S. Neilgherrensis, Symplocos spicata, Tragia involucrate, Villenbrunea frutescens, Xylosma longifolium and *Zizyphus funiculosa,* etc. Typical grasses are *Capillipedium assimile, Centotheca lappacea, Cyrtococcum pallens, Isachne elegans, Microstegium ciliatum, Oplismenus compositus, Panicum montanum* and *Thysanolaena maxima.* There are many ferns like *Alosophilia clabra, C. spinulosa, Angiopteris eyecta, Asplenium lunulatum, A. unilaterale, Leptochilus sculpuratus, L. Virens, Nephrodium cochleatum, N. Molle, N. tenericaule, Pteris biaurita* and *Odontosoria chinensis* etc. Tree ferns are met with in several areas.

4. The higher slopes between 1000—1150 m. were formerly covered with a moister type of vegetation than at present. Constant felling and burning for shifting cultivation leaves the areas denuded of evergreen species and the vegetation assumes a xerophilous aspect. A typical Hill Sal is seen in Goyal-Khoj where *Syzygium cumini, Bauhinia retusa* are common and *Albizzia stipulata, Cedrela toona* and *Xylia* in the overwood. The undergrowth are *Alstonia venatus, Boehmeria platyphylla, Indigofera pulchella* with few grasses like *Capillipedium Setaria plicate and Theysanolaena.* Sal reproduction is profuse. The more characteristic spceies of the upper slopes are *Acacia canescens, A. torta, Anisochilus carnosus, Aegle marmelos, Bauhinia variegata, B. vahlii, Cissampelis pareora, Dalbergia volubilis, Dysophylla quadrifolia, Emblica officinalis, Helicters isora, Hemigraphis latebrosa, Kydia calycina, Lepidagathis cuspidata, Millettia auriculata, Morinda tinctoria, Petalidium barleriodes, Thalictrum loliosum* (over 1000 m.), *Trema politoria, Vernonia divergens, Vicoa cernua, Wedelia Wallichii, Woodfordia fruticosa, Zizyphus xylopyrus,* etc. *Arundinella hilocoides, A. pumila, A. setosa, Bothriochloa intermedia, Ischaemum aristatum* are the grasses met with there. *Pteridium aculium* was common above 800 m. under shade. *Lepidagathis cuspidata* is abundant on dry slopes above 1000 m.

5. Hill tops which range 1200—1300 m. are for the most part flat laterite plateaus; some are extensive as in Sijimali (1330 m.) and Baphlimali (1200 m.), and others like Sasobohumali hill (1200 m.) and Jherka hill are *pats.* These are dry except during rains when they are grassy expanses and much resorted to pasturage. A few stunted tree species are found along water courses. Karlapat and Jherka hills

are wooded with Sal at 1300 m. More typical species of these hill tops are *Callicarpa arborea*, *Crepis acaulis*, *Dillenia pentagyna*, *Ehretia laevis*, *Elaeodendron glaucum*, *Gardenia gummifera*, *G. latifolia*, *Grewia tiliaefolia*, *Hemalium nepalense*, *Memecylon edule*, *Neolitsea foliosa*, *Pterocarpus marsupium*, *Shorea robusta*, *Moghania congesta*, *Thunbulgia fragrans*, along with *Terminalia chebula*, *T. tomentosa*, *Tricholepis stictocarpum*, *Wendlandia glabrata* etc. The sedge, *Carex buccans*, was collected on Karlapat hill and Pustiguda valley. Grasses *Cymbopogon martinii*, *Themeda triandra* and *Arundinella setosa* are abundant at these altitudes on the plateau. *Narenga porphyrolana*, *Ischaemum aristatum* at 1300 m. in Sijimali hill, *Eriocaulon seiboldianum* and *Drosera burmanni* were collected at this elevation.

The following account of the village flora has been summarised from the Nawapara Gazetteer by Shri D. P. Tripathy (unpublished).

The village site has its characteristic flora in the groves, gardens, tanks and house-enclosures where during rains small crops of vegetation and grain are reared. The vegetation differs on the river beds and along the stretches of sandy banks.

The *bhatta* waste at present is mostly void of all tree and shrub growth and it looks as though it never bore any forest. *Diospyros melanoxylon* (Kendu) witb short stunted growth standing on some of the recently cleared wastes bear testimony to the fact that more dense vegetation once existed here.

Amaranthus spinosus (Kharda) grows luxuriantly on rubbish heaps round the road corners or in the backyards. *Martynia diandra* (Baghnakha) and *Datura stramonium* (Dhatura) are also common. *Moringa pterygospermum* (horse raddish) the pods of which are taken in preparing curry or fry and *Zizyphus Zuzuba* (Bara plum) are other common trees. The latter trees along the embankment of a tank found within the forest area are indications of a deserted village site. *Acacia arabica* (Babul) and *Anona Squamosa* (Custard apple), the latter yielding a delicious fruit, are found near village sites. The fruit of *Melia azadirachta* (Neem) yield an acrid bitter oil which is used both medicinally and for lighting, *Opuntia dillexii* (Nagpheni) and the common *aloe* are planted along the fence.

Among the aquatic species, the most common are *Nelumbium speciosum* and *Trapa bispixosa*.

There are many excellent groves close to villages, predominated by mango trees (*Mangifera indica*) and occasionally by tamarind trees. Of trees recently grown beside the avenues are Gold Mohur, Sisoo and Chandana.

Forests

Nearly half of the total geographical area of Kalahandi (5,859·57 sq. km.) is covered with forests. For administrative purposes these forests are divided into two divisions, Kalahandi Forest Division, with headquarters at Bhawanipatna and Khariar Forest Division with headquarters at Khariar.

The following table shows categorical break-up of the total forest area in sq. km. separately for both the Forest Division in the year 1977-78.

Category	Kalahandi Division*	Khariar Division	Total
Reserve Forest ..	1,734	Nil	1,734
Demarcated Protected Forest ..	758	1,724	2,482
Undemarcated Protected Forest ..	418	141	559
TOTAL ..	2,910	1,865	4,775

Besides, Khariar division possesses an area of 1,673 sq. km. of unclassed forests.

The forests broadly fall into the folllowing three categories :

Sal Forests—The Sal (*Shorea robusta*) forest is of a moderately moist type. It corresponds, more or less, with Champions Moist Penisular Sal. The quality is for the most part IV/III and passes into III quality over considerable areas in Lanjigarh and Madanpur-Rampur and very occasionally attains quality II in the latter forests. The percentage of Sal is generally over 80 in these forests and at places reaches 90 per cent. The common associates of Sal (*Shorea robusta*) are chiefly Asan (*Terminalia tomentosa*), Dhaura (*Anogeissus latifolia*), Jamun (*Eugenia jambolana*), Kendu (*Diospyros melanoxylon*), *Bahara* (*Terminalia belerica*), *Harida* (*Terminalia Chebula*), Kusum (*Schleichera trijuga*), Mohul (*Madhuca latifolia*), Kasi (*Bridelia retusa*), Bija (*Pterocarpus marsupium*) and Kurum (*Adina cordifolia*). It should be pointed out that Tangan (Xylia xylocarpa) is of widespread occurrence, and is often locally abundant in parts of Karlapat, Lanjigarh, and more especially in Madanpur-Rampur. Bija (*Pterocarpus marsupium*) is also noticeably common in parts of Madanpur-Rampur.

*Figures for Kalahandi Division include the forest area of Kashipur *tahsil* of Koraput district.

Dry mixed Forest—The number of species which go to make up this community is too unweildy to be mentioned in details. The principal among them are Asan (*Terminalia tomentosa*), Dhaura (*Anogeissus latifolia*), Mohul (*Madhucca latifolia*), Harida (*Terminalia chebula*), Bahara (*Terminalia belerica*), Kasi (*Bridelia retusa*), Sidha (*Lagerstroemia parviflora*), Jamun (*Eugenia jambolana*), Bija (*Pterocarpus marsupium*), (there were formerly some fine trees in Chura block), Bandhan (*Ougeinia dalbergioides*) and *Sisu* (*Dalbergia latifolia*) on the upper slopes, Kusuma (*schleichera trijuga*), Mundi, Mai (*lannea*), Aonla (*Phyllanthus umblica*), Bel (*Aegle marmelos*), Simul, Haldu, Kotkol, Ambada, Ankule, on alluvium and lower slopes, and Khari and Bheru (*Chloroxylon swietenia*) on the calcareous soils and eroded ravines where Rohini is also found. Besides, *Grewia*, *Albizzia*, and many other species also occur. The *Albizzia stipulata* (now *A. Chinese*) is extremely common along the hilly streams above 60 metres Tangan also occurs in the dry mixed forests, but does not attain a large size. Climbers are not generally abundant. *Butea parviflora* is perhaps the most conspicuous as *Millettia auriculata* and *Bauhinia vahlii* are in the Sal forests.

The protected forests of Khariar Division comprising 73 forest blocks fall into this category of dry deciduous mixed forests wherein the common miscellaneous species found are teak (*Tectona grandis*), Asan (*Terminalia tomentosa*), Dhaura (*Anogeissus latifolia*), Saloi, Piasal (*Pterocarpus marsupium*), Bandhan (*Ougenia dalbergioides*), Sisu (*Dalbergia latifolia*), Karla (*Cleistanthus collinus*), Sidha (*Lagerstroemia parviflora*), Mai, Kasi (*Bridelia retusa*) and Kendu (*Diospyros melanoxylon*). Salia bamboo (*Dendrocalamus strictus*) is found at places and teak (*Tectona grandis*) is met across the forest blocks to the south of Khariar.

Just as Sal shows a preference for the more acid rocks, the dry mixed forest follows the basic rocks, especially on their hotter and drier aspects. Hence, the vegetation on the escarpment generally partakes of the nature of dry mixed forests (often shrubby), with or without bamboos, where hornblende-schist is the common rock type, and Sal (*Shorea robusta*) is almost invariably absent.

Bamboo Forest—The only bamboo of any importance is the Salia bans (*Dendrocalamus strictus*). Here and there it forms virtually pure patches, as on some of the *gudia* areas in the hills, but even there, it commonly constitutes small consociations surrounded by mixed forest and sometimes by Sal (*Shorea robusta*) where the underlying rock is khondalite , or where the more basic parent rock (charnockite

or horneblende-schist) has not been expressively exposed. The most extensive areas under this type are to be found in Madanpur Rampur and Lanjigarh, where the areas are appreciable. Elsewhere, as already stated, it occurs in small patches or in admixture with other classes of forest, generally the dry mixed type.

Teak—There was a time when it could have been said that there was considerable quantity of teak, most of it short-boled and yielding little clean timber, situated in the village lands and the adjacent jungle in the valley of the Tel in the north and north-west of Kalahandi. Unfortunately, such a statement can now no longer be made since the bulk of the teak disappeared in an orgy of destruction which followed the granting to villagers of the right to trees standing on their own holdings in June, 1948. In consequence there is now almost little teak left in Kalahandi, for what still exists in the reserved forests, is of no great importance as regards quantity and is of poor quality. Some few patches of good teak do still exist in the far north-west in the valley of the Udanti.

Special mention may be made of a few individual species of interest which occur outside the reserved forests. *Anogeissus acuminate*, locally known as Phasi or *kin* occurs scattered along the bank of the Tel and several of its feeders, notably the Sagoda Nala, as far as the base of the escarpment. Some individuals attain large dimensions. Champa (*Michelia champaca*) occurs sparingly throughout the southern hill tracts, generally at the heads of the valleys over 762 metres and more usually about 915 metres. *Vitex quinata and Picrasma Javanensis* are two very rare trees which are found in the southern highlands. The former is fairly widely dispersed and occurs near streams above 915 metres, while the latter is only found at Sagbari near Sunger.

Broad effects of Government Forest Policy

Till 1905, Kalahandi ex-State was within the jurisdiction of the Political Agent at, Raipur, and the first effort towards forest conservancy was initiated by the Commissioner of Chattisgarh States towards eighties of the last century after the *melee* of 1883. But no tangible progress could be made in the matter of reserving forests and waste lands till 1905 when Kalahandi was included in the Orissa States. It was in 1902 when the State was under Government management that small scattered blocks of forests were demarcated which until 1949 constituted the only reserves in the hill Zamindaries; with the creation of the post of Agency Forest Adviser for Orissa Feudatory States, the real forest conservancy and management started.

Till 1949-50, when the first provisional working plan for scientific management of reserved forests of Kalahandi division was drawn up, the forests were being worked under the advice of the Agency Forest Adviser mostly on royalty basis to large firms like B. T. T. Co. and D. N. Dutta & Co. In the plains, some areas were being worked under coppice system to meet the needs of tenants. Bamboos were not leased out on a long term basis although this was advised by the Agency Forest Adviser. With the introduction, after merger, of the new plan, the forests are being worked under scientific system of management on a sustained yield basis. The old system of royalty sale was discontinued and coupes were sold in open auction. Long term leases for bamboos were given for a period of 9 years to the Orissa paper mills from the year 1954-55. The minor forest produces like broom sticks, sabai grass and kendu leaves fetched a good amount of revenue on auction sale.

The Zamindary forests of this division with an area of 175 sq. miles (453 sq. km.) vested with the State Government on the 27th November 1952, with the abolition of the Estates. These rich forests, which were almost intact and were under the Durbar management until the date of merger, along with more *Khalsa* areas are managed according to the new plan.

In the plains, the village forests which have been rendered desolate due to indiscriminate felling by the local tenants both for fuel and agriculture, need immediate rehabilitation.

All the forests of Nawapara subdivision were in the possession of Khariar Zamindari, who having proprietory rights, was solely responsible for their conservancy, maintenance and destruction. Under Section 202 of C. P. L. R. Act, 1917, the Deputy Commissioner of Sambalpur had certain statutory powers to control the Zamindari forests but, in any case, the indirect control exercised by him was far too inadequate to check the reckless deforestation being perpetrated in these forests. Nelson, in Raipore District Gazetteer (1909), mentions that an area of 700 sq. miles (1812 sq. km.) had been so much overworked that big timbers were seldom left in the forests. At present the entire forest area inclusive of many small patches left here and there have poor forest growth. The area under the forests had been steadily receding due to reckless felling resorted to by the estate's contractors coupled with the Grow More Food Campaign started by the Government in the post-Second World War Period when permission was accorded to reclaim lands containing forest growth. Deforestation was so rampant that even hill tops had not been spared.

It is after vesting of Khariar estate and particularly since 1957 when the Zamindari forests came under the management of the Forest Department of the State Government that a working scheme has been drawn up and the prescription of the scheme is being followed rigidly. The forests of the ex-State have been brought under one Division with a Divisional Forest Officer and the forest area has been divided into Protected Forests which are further sub-divided into 73 forest blocks and Khesra forests.

With the object of consolidation and scientific management afforestation of barren land, enrichment of the existing forests of low value by replacement, where necessary; intensification of management and development of communication in the forests, conservation of nature and wild life for scientific study of flora and fauna, and various other measures had been undertaken. Progress achieved until 31st March, 1976 under some specific projects/ programmes/schemes in the forest divisions are described below:

Economic Plantations—In Kalahandi division 2,497 hectares have been covered under this scheme. Above one hectare have been put under teak nursery and nearly 70 hectares under fruit bearing trees in the Khariar division.

Forest Development Consolidation—In both the forest divisions, although the progress is slow, work seems to have been started to demarcate and survey the forest areas to bring them under scientific management.

Communication—About 261 km. of road have been constructed in the Khariar division.

Nature Conservation—Under the Kalahandi division there exists four game sanctuaries at Taparang, Urlandan in Madanpur-Rampur range, Niyamgiri in Lanjigarh range and Karlapat in Bhawanipatna.

Working Plan—All the forests of Kalahandi division are managed under the working plan in force from 1962—63 to 1982—83. The period of working scheme of Khariar ex-Zamindari having been exhausted since 1st July 1973, a fresh scheme is under preparation by W. P. O., Jeypore.

Forest Protection—No special measures have been taken for rigid protection of forests except booking of offences for prosecution under the provisions of Orissa Forest Act, 1972. In fact, forests are damaged by *podu* cultivation and illicit felling.

Podu Prevention—Though the *podu* areas are being covered by plantation, no special machinery has been set up to prevent *podu* cultivation in the forest areas.

Game Laws and prevention of Wild Life

No information is available relating to the measures undertaken for preservation of wild life in the ex-State of Kalahandi. The shooting and hunting of wild animals and birds, after its merger, were used to be regulated under the provisions of the wild Birds and Animals Protection Act, 1912 and the Orissa Government Reserved Forests Shooting Rules, 1938. The Orissa Forest Shooting Rules, 1973 framed under the Orissa Forest Act, 1972 apply to all the reserved and protected forests of Orissa. The various provisions embodied in the above statutes are strictly enforced for the protection of the wild life in the district.

FAUNA

The forests were reputed for the abundance of wild fauna—both herbivora and carnivora. Extension of cultivation, laxity in the enforcement of game laws and liberal use of fire arms by villagers and Shikaris have all contributed towards fast disappearance of herbivora population. This has precariously upset the equilibrium in nature compelling the carnivora like tigers to take to man-eating on a menacing scale.

Zoological Types

Mammal

Writing in 1907, Cobden-Ramsay in his Gazetteer of the Orissa Feudatory States points out that the elephant (*Elephas maximums indicus*), however, does not generally range south of the Mahanadi although fairly numerous in the central and north-eastern portion of the tract. A few stray ones occasionally cross the Mahanadi into the State of Boud, but practically never further south. In 1907, a few stray elephants appeared in the State of Kalahandi for a few days and the occurrance was reported most unusual and novel. At present, however, the elephants are not uncommon in the north-east portion of the Kalahandi division adjoining the hill tracts of Baliguda in Phulbani (*Boudh-Khondmals*) district where herds are reported to migrate to Kalahandi during the harvest season.

The Indian bison (*Bos gaurus*) usually called *gayal* occurs in the denser and remoter forests and was said to be numerous in the high hills of Kalahandi. It is also met with in other places in the Ghatmal forests. It is prone to retire in the rains in the hills during the day to avoid the flies and comes down at night to feed on the young grass. A very retiring animal, it lives in small herds with generally a fine bull in charge.

The Sambhar (*Cervus unicolor*) a forest loving animal generally frequents the high and thick inaccessible hills. The largest among the Indian deer, it is nocturnal in habit and grazes chiefly at night. It returns to the hill tops during the day to choose a shady corner to escape the heat. Good Sambhar heads are a rarity as the horns do not attain luxuriant dimensions.

The black buck antelope (*Antelope cervicapra*) was reported to be uncommon in Raipur by Nelson in the District Gazetteers, but Cobden-Ramsay mentions the occurrence of the animal only in Kalahandi State. It is declared as a protected species as their number is rapidly dwindling.

The spotted deer (*Axis axis*) known as *chital* is very common. Gregarious in habit, it is less nocturnal than the Sambhar. Preferring low lying lands close to water sources, it is careless of the neighbourhood of man and therefore falls an easy prey to *shikaris* aiming from a water hole. Shedding of horns, said to be in July and August, is extremely irregular. They seldom choose more hilly tracts for their habitat.

The Indian mouse deer (*Tragulus meninna*), the smallest of its tribe is met with, but owing to its diminutive size is seldom seen. It stands 25 to 30 centimetres at the withers and in colour is brown with white or buff spots and longitudinal stripes. In Kalahandi it is generally known as *Kebri.*

The Indian hare (*Lepus nigricollis*) is the only hare found though uncommon. It prefers bushy jungles to thick forests. Its flesh is fairly delicious except in the hot and rainy seasons when they are more or less infected by the grub of a species of Bot fly.

The tiger (*Panthera tigris*) was fairly numerous and was greatly destructive to human life. The great majority are game killers, some cattle killers and others are man-eaters. Death toll due to wild animals and particularly tigers were fairly large, though of late, their number has greatly reduced and in many places where they were a sure find have practically vanished now. Their number was recorded at 41 in the enumeration in 1968, which was reduced to 17: Kalahandi Forest Division 12, and Khariar Forest Division 5, in 1972. Due to steep decline in its number, it has been declared a protected species except when considered dangerous.

The panther or leopard (*Panthera pardus*) Chita is found in considerable number and is of varied size. It is bolder and more sneaking than a tiger. To add to this, its climbing habit makes it a greater menace. It lifts cattle and other domesticated animals freely from villages and attacks men in *manchan* watching their fields. The leopard is killed by wild dogs. Lowrie, the District Magistrate of Raipore, is reported to have shot one that had been treed by these animals.

Another fascinating but tragic story of the death of a leopard has been related by him as below:—

A few years ago a leopard was chased by a pack of wild dogs and climbed into a tree; the dogs then began to jump wildly about, and one of them while doing this was impaled on a sharp branch sticking out near the root of the tree; this brought him into a sitting position and he died there. The panther on seeing the dog seated there evidently made up his mind that it had been specially placed there for him; so he never tried to come down and eventually died of starvation in a fork of the tree.

The hyaena (*Hyaena*) is common. It is nocturnal in habits, feeding chiefly on carrion, but will at times carry off dogs and goats.

The wolf is met with, but is very rare and does a fair amount of damage to sheep and goats while out grazing. Seldom more than two are seen together, the packs having been broken up.

The wild dog (*Cuon alpinus*) is numerous and is extremely destructive to game.

The jackal (*Conis aureus*) is very common. It avoids heavy forests and chiefly inhabits the scrub-jungle near villages.

The fox (*Vulpes bengalensis*) is common in the open areas as it avoids heavy woods. It is known to become tame in captivity.

The sloth bear (*Melursus ursinus*) is found all over the forests generally in caves and in the plain areas of the Udanti valley in greater number. It lives on the Mahua (*Basia latifolia*) flowers, berries and white ants but now and again one develops carnivorous tendencies. They seldom attack people except when taken by surprise.

The Indian boar (*Sus eristatus*) is extremely destructive to crops.

Game Birds

Game birds of fairly large varieties are found in the district. *Pavo cristatus*, the common peafowl, is numerous in the forests. Being the national bird of India it is declared protected by law throughout the year. *Perdicula Asiatica*, the jungle or bush quail, *Turnix Dussumieri*, the button quail and *Treron phoenicopterus* the common green pigeon are found. Of the migratory ducks, the gadwall and the blue-winged teal are most common. The spurred goose, the goose-teal and the whistling teal also occur in fair numbers *Gallinago caetestis* the common snipe, though a winter visitant, is found in fair numbers along the beds of the tanks.

The district is also quite rich in other birds than game birds.

Fish

Varieties of fresh-water fish, both large and small, occur in the tanks and rivers, of which *Clarias batrachus* (Magur), *Heteropheustes fossils* (Singhi), *Barbus* specially (Kerandi), *Glonogobius Giuris* (Baligarada) and *Amblypharyngodon Mola* (Mohurali) are common. *Labeo rohita* (Rohi) and *Catla Catla* (Bhakur) are rather rare.

Reptiles

The crocodile is found in the gorges of rivers. Crocodile and big fish are also reported to occur in the mountainous ravines over the mountain plateaus. As the crocodiles are wantonly killed for their skin, to save it from complete extinction, it has been declared as a protected species.

Among snakes, *Naja naja*, Cobra (Tampa and Gokhara) *Echis carinaters*, *saw scales viper* (Chiti), *Bungarus fasciatus*, *Banded Krait* (Rana) are most common.

Mortality from reptiles and wild animals

The wild animals, especially the reptiles, claim fairly a large toll of human lives annually. In Appendix I is given separate figures of mortality in the district from reptiles and wild animals during the 1959—1975 period.

CLIMATE

The climate of this district which is in the north-eastern corner of the Deccan plateau is in many respects similar to that of the main Deccan plateau. The year may be divided into four seasons. The hot season from March to May is followed by the south-west monsoon season from June to September. October and November consitute the post-monsoon season. The cold season is from December to February.

Rainfall

Records of rainfall are available for only three stations in the district, for sufficiently long period. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1378·3 mm. The variation in the annual rainfall from year to year is not large. In the 48 year period from 1902 to 1950 the highest annual rainfall occurred in 1919 when it amounted to 139 per cent of the normal. 1923 was the year with the lowest rainfall which was only 66 per cent of the normal. There were five years in this period when the rainfall was less than 80 per cent of the normal in the district. Although considering the district as a whole there were no two consecutive years with rainfall less than 80 per cent of the normal, at Bhawanipatna alone there were two such occasions. It will be seen from Table 2 that in 34 years out of 46 the rainfall was between 1100 and 1600 mm.

On an average there are 65 rainy days (i. e., days with rainfall of 2·5 mm.—10 cents—or more) in a year. This number varies from 59 at Nawapara to 69 at Bhawanipatna.

The heaviest rainfall in 24 hours recorded at any station in the district was 322·2 mm. at Nawapara on the 11th September 1959.

Temperature

There is a meteorological observatory at Bhawanipatna which has started functioning very recently. The description of the climate is based on the records of the meteorological observatories in the neighbouring districts where the climatic conditions are very similar to those in this district. The hot season commences by about the beginning of March when temperatures begin to rise. May is the hottest month when the mean daily maximum temperature is about 41°C and the mean daily minimum temperature is about 28°C. On individual days the maximum temperature may reach 47°C. With the onset of the south-west monsoon by about the second week of June, temperatures drop appreciably and throughout the south-west monsoon season the weather is generally cool. After the first week of October when the south-west monsoon withdraws, the day temperatures increase slightly, while the night temperatures begin to decrease progressively. December is usually the coldest month with the mean daily maximum at about 28°C and the mean daily minimum at about 13·0°C. In the cold season, short spells of cold weather occur in association with the passage of western disturbances across the northern India and the minimum temperature may go down to about 6°C. The highest temperature ever recorded is 48·5°C at Bhawanipatna on the 29th March 1972, whereas lowest ever recorded is 4·5° C on the 24th January 1973 at the same station.

Humidity

The relative humidities are high in the south-west monsoon and post-monsoon months. The air becomes gradually drier thereafter. The summer is the driest part of the year with the relative humidities particularly in the afternoons often going down below 30 per cent.

Cloudiness

During the south-west monsoon season the skies are generally heavily clouded to overcast. In the summer and post-monsoon months there is moderate cloudiness, the afternoons being more cloudy than the mornings. In the other months the skies are mainly clear or lightly clouded.

Winds

The winds are generally light to moderate with some increase in force during the summer and monsoon seasons. The winds are mostly from the directions between south-west and north-west in the monsoon season. In the post-monsoon and cold seasons they blow from the directions between west and north-west. In the summer months the winds are variable in direction.

Special Weather Phenomena

The storms and depressions originating in the Bay of Bengal affect the district in the monsoon season and in October, causing high winds and widespread heavy rain. Thunder-storms mostly in the afternoons occur in the summer months and in October. Rain during the south-west monsoon season is also often associated with thunder.

TABLE I

Normals and Extremes of Rainfall

Station	No. of Years of data	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Bhawanipatna	48 a	10·2	16·5	15·0	29·5	42·7	243·1	360·9	399·3
	b	0·8	1·1	1·4	2·1	3·1	10·3	16·0	17·0
Nawapara	32 a	10·7	10·4	11·7	13·5	22·9	205·0	363·2	405·1
	b	0·8	0·9	0·9	1·2	1·4	8·4	16·3	15·1
Khariar	44 a	13·5	19·3	14·2	28·2	35·6	237·0	306·3	349·3
	b	0·9	1·6	1·4	2·3	3·0	10·6	15·9	16·1
Kalahandi (District)	a	11·5	15·4	13·6	23·7	33·7	228·4	343·5	384·6
	b	0·8	1·2	1.2	1·9	2·5	9·8	16·1	16·1

Station	No. of years of data	Sept.	Oct.	Nov.	Dec.	Annual	Highest annual rainfall as%of normal & year*	Lowest annual rainfall as%of normal & year**	Heaviest rainfall in 24 hours	
									Amount (mm.)	Date
(1)	(2)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Bhawanipatna	48 a	235·5	83·1	17·5	3·8	1457·1	139 (1944)	63 (1920)	311·4	1930 July 2
	b	11·2	4·7	1·1	0·3	69·1	..	..	..	..
Nawapara	32 a	220·5	82·5	17·3	1·3	1364·1	153 (1919)	57 (1923)	322·2	1959 Sep.11
	b	9·6	3·4	0·9	0·1	59·0			..	..
Khariar	44 a	206·8	80·0	18·8	4·6	1313·6	141 (1919)	55 (1941)	264·2	1917 Oct. 29
	b	10·7	4·2	1·1	0·3	68·1			..	..
Kalahandi (District)	a	220·9	81·9	17·9	3·2	1378·3	139 (1919)	66 (1923)	..	..
	b	10·5	4·1	1·0	0·2	65·4	..	..	..	..

(a) Normal rainfall in mm, (b) Average number of rainy days (days with rain of 2·5 mm. or more). * Based on all available data up to 1970. ** years given in brackets.

TABLE 2

Frequency of Annual Rainfall in the District (Data 1901—1950) *

Range in mm	No. of years	Range in mm.	No. of years
901—1000 ..	3	1501—1600	11
1001—1100 ..	2	1601—1700	2
1101—1200 ..	6	1701—1800	2
1201—1300 ..	7	1801—1900	2
1301—1400 ..	2	1901—2000	1
1401—1500 ..	8	..	..

* (Data available for 46 years only).

APPENDIX I

Death due to Snake bite and attack of wild animals during the period 1959 to 1975

Years	Death due to snake bite	Death due to attack of wild animals				
		Elephant	Tiger, Leopard and others	Bears and wolves	Other wild animals	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1959 ..	5	..	76	..	..	76
1960 ..	46	..	53	..	51	104
1961 ..	4	2	21	3	..	26
1962 ..	27	..	32	4	1	37
1963 ..	8	..	26	1	..	27
1964 ..	16	..	32	3	..	35
1965 ..	28	..	20	3	1	24
1966 ..	27	1	3	2	1	7
1967 ..	33	..	8	3	..	11
1968 ..	20	..	..	..	1	1
1969 ..	..	..	..	..	..	..
1970 ..	12	..	..	..	1	1
1971 ..	43	..	1	..	1	1
1972 ..	33	..	..	..	3	3
1973 ..	33	..	..	..	2	2
1974 ..	28	2	1	1	1	5
1975 ..	31	..	2	..	..	2