

CHAPTER I

GENERAL

1. Introducing the District

Koraput with her rolling mountains, undulating meadows, roaring rapids, enchanting waterfalls and terraced valleys leading up to verdant hills, feasts the eye as few other districts can. Koraput with her golden autumn and misty mornings of the monsoon months, her painted spring, and slumbering summer and her winter ranging from fierce to mild provides varieties of living in different seasons which is rare elsewhere. Here in spring nature and man vie with each other to make living joyous. Koraput with her people who have been living as they lived many thousand years ago and yet accepting newcomers of the latest development of homo-sapiens, with her tribes who enjoy the joys of life today as they ever did before, living in their hamlets hidden in arbours in picturesque valleys, provide education and entertainment for the Anthropologist which few other regions provide elsewhere. Indeed Koraput is a museum of old and new in nature and human endeavour. Human endeavour surpasses itself by producing power from falling water, by manufacturing intricate machines and consumer goods and welcoming into the district and providing homes and occupation for many thousands of persons displaced from their homes, who till then had no hope of calling any place a home of their own. Koraput has both plant life and wild life which would give years of study to the Biologist and limitless adventure for the hunter. "Had I been merely a lover of fine sceneries (of wild life and of mankind) I would have felt little desire to seek elsewhere its gratification."

2. Origin of the name of the District

The district of Koraput derives its name from its headquarters the present town of Koraput. In ancient times when the Nalas were ruling over this tract, Pushkari near modern Umarmkot was the capital city. In the medieval period Nandapur developed as the capital under the Silavamsi kings and sometimes under the kings of the Solar dynasty. Viravikrama Deo of the Solar dynasty shifted his headquarters to Jeypore about the middle of the 17th century and this town prospered as the capital. Koraput was chosen by the British in 1870 for better health

prospects. The origin of the name of Koraput is obscure. There are several theories, none of which is convincing.*

3. Location, General Boundaries and Population

The district of Koraput is located between 20°3' and 17°50' north latitudes and 81°27' and 84°1' east longitudes. On the extreme north it is bounded by Kalahandi and Raipur districts, on the west by Bastar district, on the south by the districts of East Godavari and Visakhapatnam and on the east by the districts of Srikakulam and Ganjam. Being irregular in shape, the district resembles in form the letter 'Y'. Its south-eastern boundary runs roughly parallel to the seacoast and its shortest distance to seacoast is 42 miles. The remotest corners of the district are more than two hundred miles apart.

In area it is 10,498.95 sq. miles. It is the largest district in Orissa and also one of the largest in India. It is more than four times as big as Balasore district and almost equal in extent to Balasore, Cuttack and Puri districts put together.

According to 1961 Census, the district has a population of 1,561,051 comprising 784,278 males and 776,773 females. Of them as many as 954,338 (476,134 males and 478,204 females) belong to Scheduled Tribes, and 197,618 (98,999 males and 98,619 females) to Scheduled Castes. Subdivisionwise break-up of the area and population together with the density of population is shown below :

Serial No.	Subdivision	Area in square miles	Population (1961 Census)	Population per square mile
1	Koraput	2,060.00	305,327	148
2	Nowrangpur	3,223.95	710,298	220
3	Malkangiri	2,288.00	141,955	62
4	Rayagada	1,278.00	192,135	150
5	Gunupur	1,649.00	211,336	128
	Total	10,498.95	1,561,051	149

* According to Mr. R. C. S. Bell, the name of the town is 'Kora-Putti' or 'the hamlet of the nux-vomica' and it is derived presumably from a tree or trees that must at one time have been prominent near the site. But today not a single tree of nux-vomica is to be found near about the town of Koraput and so the assumption of Mr. Bell is open to question.

According to the second theory, Koraput is a corrupted form of 'Karaka-Pentho'. Karaka literally means 'hail-stone'.

It is also believed that one 'Khora Naiko' laid foundation of the village during the time of Nandapur kings. He hailed probably from Ranpur and served under the Nandapur kings in the Militia, and for his faithful and meritorious services he was permitted to establish this village which was named after him as Khora Putu, and later on the name has been abbreviated to 'Koraput'.

There are no cities in the district. The towns according to 1961 Census are Koraput, Machkund, Nowrangpur, Jeypore, Kotpad Rayagada and Gunupur. Out of the population of 1,561,051, no fewer than 346,476 dwell in villages with less than 200 inhabitants in each. 498,189 live in villages with population between 200 and 499 each. Thus the majority of population resides in small villages, with less than 500 people, scattered here and there. In the remote parts of the district are tiny tribal hamlets with perhaps not more than half a dozen huts with no pretension of permanency. In villages with population between 500 and 999 live 385,662 persons and in those between 1,000 and 1,999 live 204,224 persons. Only 54,529 persons belong to large villages with more than 2,000 population. Total number of villages of this district is 5,938 of which 5,189 are with population less than 500. Average population of a village in the district comes to less than 250. The seven urban areas contain a population of only 76,071 which is less than 5 per cent of the district total.

4. History of the District as an Administrative Unit

The whole of the district of Koraput comprises the ex-zamindaris of Jeypore and Kashipur. Vinayak Deo, the founder of the present Jeypore Raj family, inherited the kingdom of the Silavamsis by the middle of the 15th century A. D. It is said that this kingdom then extended up to Budalinga of Kalahandi district in the north, up to Kambamottu in the present Malkangiri subdivision in the south, up to the Bhaskar river in the west and up to the coastal plains in the east. The capital of the kingdom was at Nandapur which had been founded by the Silavamsis. This kingdom, however, lost its independence in 1571 when it became a feudatory of the Qutub Shahis of Golkonda and the Nandapur kings started paying annual tribute to the Sultans. During the time of Viravikrama Deo, who ruled in the middle of the 17th century A. D., the amount of such annual tribute was Rs. 24,000. During the rule of Sri Biswambhara Deo, I (1672—1676) and his successor Sri Mallaki mardana Krishna (1676—1681) a number of feudal estates were created which in course of time assumed independence. During the time of Balaram Deo III (1711—1713) large number of zamindars and feudatories seceded from the Jeypore kingdom with the help of the Marathas. Viziam Raju of Vizianagaram took away a large slice of coastal territory with the help of Jafar Ali Khan, the Fouzdar of Chicacole, during the reign of Biswambhara Deo II (1713—1752). In 1768 the descendants of Viziam Raju claimed Kashipuram*, Nandapur, Madgol, etc., under an alleged patta of Salabat Jang and they were supported by the East India Company. Vikram Deo I, the then ruler, held back those territories

*This is distinct from the ex-zamindari of Kashipur.

in lieu of an annual rent of Rs. 40,000 of which no more than three-fourths was ever paid. It was during the rule of Vikram Deo II that the capital of the kingdom was finally transferred to Jeypore.

Though Lord Clive obtained in 1765 from the Moghul Emperor a Firman granting the Northern Sircars to the Company and four years later Vizagapatam was made the headquarters of the district a century elapsed before the British Government assumed the direct administration of Jeypore territory. At that time the whole of modern Koraput district was not directly under the control of the Jeypore Rajas. There were a number of semi-independent chiefs like the zamindar of Pachipenta and Raja of Bissamcuttack who were administering their own territories without having any concern with the Jeypore kings. The Kotpad Pargana and the Salimi Mutta were parts of Bastar till 1777 and 1828 A. D. respectively. This state of affairs continued till 1862 A. D. and on 1st January 1863 A. D. British Government appointed an Assistant Agent at Jeypore, with jurisdiction over the present Malkangiri, Nowrangpur and Koraput (except Narayanpatna P. S.) subdivisions. Another Assistant Agent at Parvatipuram with jurisdiction over Narayanpatna police-station and Rayagada and Gunupur subdivisions was also appointed under the Collector of Vizagapatam for the administration of civil and criminal justice.

From the time of assumption of administration by the British Government no perceptible change occurred in the territorial limits of the Jeypore estate till the time of Vikram Deo III (1889—1920). This ruler purchased the Pachipenta estate for six lakhs of rupees and thus the boundary of Jeypore extended down to the Ghat near Itikavalsa. In 1920 he also acquired a portion of the Madgol estate by purchase and the other portion was later on acquired by his son Rama Chandra Deo by relinquishment in the year 1928 A. D.

The district of Vizagapatam, like those of Ganjam and East Godavari districts, was divided into two sharply distinct portions, namely, the Plains and the Agency. Due to some administrative difficulties T. Harris, Agent to the Governor in Vizagapatam district, strongly urged the Government of Madras to form a single administrative division of the Agencies in the three districts. His plan was approved and in 1920, all the Agency tracts were removed from the control of Collectors and were placed under the charge of a Commissioner who had his headquarters at Waltair. The administrative subdivisions were distributed as far as possible on linguistic lines overriding the former district boundaries. The present Koraput district was parcelled out among four subdivisions called Kondh, Savara, Oriya and Ghats each in charge of an Officer, designated as Assistant Commissioner. Due to some practical

difficulties, lack of accommodation and financial stringency, the experiment had to be abandoned in 1923. The office of the Commissioner was abolished and the old arrangements were restored.

No further changes of importance were made until the formation of Orissa Province in 1936 when Koraput district was created and a number of changes were found necessary. The Parlakimedi taluk was included in the district for seven months after which it was again restored to Ganjam. The district is now in charge of a Magistrate and Collector with headquarters at Koraput. There were, at the beginning, two subdivisions—Rayagada and Koraput. Koraput subdivision comprised five taluks, namely, Koraput, Pottangi, Jeypore, Nowrangpur and Malkangiri. The Rayagada subdivision had three taluks—Rayagada, Gunupur and Bissamcuttack. On 1st March 1941 a new subdivision called the Nowrangpur subdivision, consisting of the taluks of Malkangiri, Jeypore and Nowrangpur, was created. The taluks of Koraput and Pottangi were abolished and areas of these ex-taluks and of the Narayanpatna Agency which was separated from Rayagada taluk constituted the new Koraput subdivision. At the same time Bissamcuttack taluk was abolished and the area included in Rayagada taluk, less Narayanpatna Agency to form one taluk. The arrangement of three subdivisions continued till 1962 although meanwhile some new taluks or tahsils were created. Nowrangpur subdivision, with 5,511.95 square miles, was too extensive and was presenting administrative problems, its remote places being as far as 200 miles apart. The former Malkangiri taluk was, therefore, constituted a separate subdivision. On 1st August 1962 Kashipur police-station area of Kalahandi district was included in Rayagada subdivision as the area was contiguous to Rayagada and it was extremely difficult to manage the affairs of Kashipur from Bhawanipatna the headquarters of Kalahandi district, for want of communications. On the same day Gunupur and Bissamcuttack tahsils were separated from Rayagada subdivision to form a new subdivision with headquarters at Gunupur. Thus the district has now 5 subdivisions, with the tahsils as shown against them :

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| 1. Koraput | .. Koraput and Nandapur |
| 2. Nowrangpur | .. Nowrangpur, Umarmkot, Borigumma,
Jeypore and Kotpad. |
| 3. Malkangiri | .. Malkangiri and Motu |
| 4. Rayagada | .. Rayagada and Kashipur |
| 5. Gunupur | .. Gunupur and Bissamcuttack |

5. Subdivisions, Tahsils and Police-stations

The district is divided into 5 subdivisions, 13 tahsils and 38 police-stations as shown below :

Subdivision and its area(sq. miles) and population	Tahsil and its headquarters	Police-station		
		Headquarters	Area in sq. miles	Population—1961 Census
1	2	3	4	5
1. Koraput .. A. 2,060.00 P. 305,327	1. Koraput (Koraput) ..	1. Koraput ..	300.00	42,013
		2. Dasmantapur ..	236.00	27,416
		3. Lakshampur ..	175.00	27,100
		4. Narayanpatna ..	371.00	49,328
	2. Nandapur (Pottangi) ..	1. Pottangi ..	323.00	34,904
		2. Nandapur ..	218.00	41,856
		3. Semiliguda ..	130.00	27,089
		4. Padwa ..	176.00	28,387
		5. Machkund ..	131.00	27,234
2. Rayagada .. A. 1,278.00 P. 192,135	1. Rayagada (Rayagada) ..	1. Rayagada ..	484.00	96,781
		2. Kalyansingpur ..	214.00	32,574
	2. Kashipur (Kashipur) ..	1. Kashipur ..	580.00	62,780
3. Gunupur .. A. 1,649.00 P. 211,336	1. Gunupur (Gunupur) ..	1. Gunupur ..	321.00	57,333
		2. Gudari ..	475.00	36,180
		3. Padmapur ..	124.00	17,747
		4. Puttasingi ..	132.00	15,073
	2. Bissamcuttack (Bissamcuttack) ..	1. Bissamcuttack ..	418.00	61,795
		2. Ambadola ..	179.00	23,208
4. Malkangiri .. A. 2,288.00 P. 141,955	1. Malkangiri (Malkangiri) ..	1. Malkangiri ..	819.00	62,458
		2. Chitrakonda ..		
		3. Mudulpada ..	300.00	44,436
		4. Mathili ..	155.00	
	2. Motu (Motu) ..	1. Motu ..	400.00	13,318
		2. Venkatapalam ..	614.00	21,543

Subdivision and its area(sq. miles) and population	Tahsil and its headquarters	Police-station		
		Headquarters	Area in sq. miles	Population—1961 Census
1	2	3	4	5
5. Nowrangpur .. A.3,223·95 P. 710,298	1. Nowrangpur (Nowrangpur)	1. Nowrangpur ..	106·55	54,881
		2. Tentulikhunti ..	163·00	48,817
		3. Papadahandi ..	189·00	42,606
		4. Kodinga ..	235·00	69,702
		5. Dabugan* (Part)	..	
	2. Umarkot (Umarkot)	1. Umarkot } ..	652·00	83,776
		2. Raighar } ..	352·00	50,988
		3. Jharigan } ..		
		4. Dabugan* (Part)	..	
	3. Borigumma (Borigumma)	1. Borigumma ..	142·40	50,097
		2. Bhairabasingpur	133·00	40,586
	4. Kotpad (Kotpad)	1. Kotpad ..	250·00	82,015
	5. Jeypore (Jeypore)	1. Jeypore ..	145·00	65,441
		2. Boipariguda ..	452·00	49,526
		3. Kundra ..	114·00	26,921

6. Natural divisions

The district of Koraput with its vastness and variety makes it a land of geographical diversities. The whole tract can be divided into four distinct divisions each of which can be separated by natural barriers as their respective limits:

- (i) Rayagada and Gunupur subdivisions,
- (ii) the 3,000-foot plateau,
- (iii) the 2,000-foot plateau, and
- (iv) the Malkangiri subdivision.

(i) Rayagada and Gunupur Subdivisions

The tahsils of Bissamcuttack, Gunupur, Rayagada and Kashipur form the first geographic unit. The whole of the region consists of two fertile valleys of the Nagavali and the Vamsadhara, between rugged mountain ranges. The valley of the Vamsadhara slopes down from a height of 1,300 feet near Ambadola to 260 feet at Gunupur

*The Dabugan police-station, having an area of 290 sq. miles and population 46,942, lies partly in Nowrangpur tahsil and partly in Umarkot tahsil.

while that of Nagavali falls from about 1,200 feet north of Kalyansingpur to 500 feet in the south of the tahsil of Rayagada. In the north of Gunupur tahsil and east of Bissamcuttack there are large tracts of forest containing some of the most valuable species of timber in the district. The entire Kashipur tahsil contiguous with the west and south-west of Rayagada is a wild country, a tangle of hills and valleys with a few patches of cultivable land. West of Kashipur tahsil with a slope towards the west is drained by Golagada, a tributary of the Indravati while the south of Rayagada tahsil is drained by the Jhanjhavati and its tributaries. This natural division receives appreciably lower rainfall than the other three divisions due to its situation in the rainshadow of the south-west monsoon formed by the Eastern Ghats. It is a place of scenic beauty with the hills green with forest and undulating valleys. Tamarind and 'mohua' being dominant, the whole country looks like a huge park. This is the most fertile of all the four natural divisions mentioned above. It has better communication facilities than the other three.

(ii) The 3,000-foot plateau

This plateau extends from Kashipur tahsil to the border of the East Godavari district in Andhra Pradesh, its approximate area being 110 miles in length and 40 miles in width. The main features of this plateau are the line of high hills which boldly marks its eastern edge and stands out prominently, presenting an impressive sight when viewed from the western side of the plateau. The portion of plateau which lies in the Koraput district consists of an undulating tableland profusely scattered with hundreds of little hills of remarkable similarity in appearance. The process of denudation has advanced too far and the hills are either covered with low scrub or disfigured with patches bared by shifting cultivation. The average rainfall of the plateau is 62 inches and of this the greater part falls during the months of July and August. It is drained westward by the rivers Indravati, Kolab and southward by the Machkund towards the Godavari valley. Because of its elevation, the plateau never experiences the extreme heat of summer, and with proper measures against malaria it will be able to qualify as a regular hill station. This plateau is really a rare gift of nature for its scenic beauty.

(iii) The 2,000-foot plateau

This third natural division covers almost the entire extent of Nowrangpur subdivision. It extends far to the west into Bastar and in the north into the district of Raipur. In the south it falls away by steep Ghats into the Malkangiri tahsil. In the northern part of its eastern boundary it slopes down to the Kalahandi district lying 1,000 feet below it, and in the extreme north-east of Nowrangpur subdivision there is a region known as the Pannabeda Mutta lying some 500 feet below the

level of the rest of the plateau and separated from it by Ghats and thick forests. The Nowrangpur subdivision is in the main flat country except for the forests in the west of Jeypore tahsil, where there are low hills. Elsewhere the plains are only broken by a few isolated hills. Due to heavy rainfall fine growth of *Sal* and other timbers is noticed throughout the whole plateau. The north-east monsoon scarcely affects the plateau. In consequence, the Nowrangpur and Umarkot tahsils become extremely dry in the hot weather, and men and beasts have to go for miles in search of water. There are hundreds of square miles having continuous thick forests and everywhere *Sal* trees are prominent. Due to its fertile lands and thin population, the plateau has become the principal granary of the district. Besides, paddy, wheat, sugarcane and vegetables are grown in fair quantity. It receives an average annual rainfall of 75 inches, mostly during the months of July, August and September.

(iv) The Malkangiri Subdivision

The Malkangiri subdivision forms the fourth natural division. A strip along the eastern boundary takes in the Ghats which uphold the 3,000-foot plateau and the valley of the Machkund, which flows through this wild and remote country. This tract is very sparsely inhabited by primitive tribes notable among whom are Bondas, Pörajās and Didayis. The rest of the subdivision is a comparatively flat plain declining from an elevation of about 800 feet near Govindapalli in the north to under 400 feet in the extreme south. A number of rocky wooded hills break the monotony of the plain. Almost the whole of the subdivision is a vast jungle. In the forests lying in the lower levels good timber is not conspicuous but plantation schemes are under way. They, however, yield bamboos which are floated down the Sabari and the Godayar to Andhra Pradesh. In the higher country, on the other hand, there is a fine growth of good timber. The Malkangiri subdivision is unfortunate for its climate and situation. During the rainy season it becomes impassably swampy and heavy floods isolate it from the outer world. In the summer, which sets in early, the whole plain is parched in the extreme and drinking water is often very difficult to obtain. It lies within the malaria belt. The subdivision receives sufficient rainfall and paddy can be grown in clearings in the forest. But the soil is poor.

7. Hill system

This district lies on a section of the Eastern Ghats and consists of five natural divisions having mean elevations of 3,000, 2,500, 2,000, 1,000 and 500 feet above sea-level. A number of mountain ranges and isolated hills rise out of these tablelands. The most conspicuous range in the Gunupur subdivision is the Niamgiris, a rugged mass on the borders of the Rayagada and Gunupur subdivisions which rise steeply from 1,000 feet to a number of peaks, of which the highest is 4,970 feet above sea-level.

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South-west and west of Rayagada are the hilly regions of Narayanpatna and Kashipur which are, in part, continuous with the 3,000-foot plateau. Outstanding among the peaks in the regions is Atma Dongar (4,608 feet) which stands five miles due south of Narayanpatna. About 15 miles north-east of this village is Subamadi Dongar, a long ridge running north and south with its highest point 4,414 feet above sea-level. East of Rayagada and between the valleys of the Nagavali and the Vamsadhara are the Kailaskota hills. Here there are summits of 3,000 feet and more, the principal being Matti Dongar (3,304 feet) and Jora Dongar (3,289 feet). On the left bank of the Vamsadhara, east and north-east of Gunupur, rise the Puttasingi hills, the abode of Lanjia Savaras. The highest peak of the hills is Thaladi Dongar, which is 3,217 feet above seal-level.

The main feature of the plateau is the line of high hills which boldly marks its eastern edge. Between this escarpment and the low country proper, however, there are ranges behind ranges of lower foot hills, hidden among which secluded valleys of all shapes and sizes cut off from the outer world except for rough tracks across the passes. Taking them in order from north to south the most notable heights are Panchabat Mali (4,385 feet), Karnapadi Dongar (4,879 feet), Meyamali Parbat (4,921 feet), Turia Dongar (5,244 feet), Deomali (5,486 feet), Polamakhan Parbat (5,201 feet) and Sirimanda Parbat or Damuku (4,642 feet). The village Pottangi lies at the foot of the last named. Deomali, also known as Dudhari, whose twin peaks can be clearly seen from Koraput on any fine day, is the highest point in the district as also in the whole of Orissa.

The plateau itself is dotted with countless hills of varying size. North of the river Kolab few of these rise above 4,000 feet. The most prominent hill in this region is Hathimali (4,563 feet), whose outline closely resembles the head and back of an elephant. This hill though 16 miles off towards the east is also visible from Koraput and presents a picturesque sight. Further south, the hills are higher. East of Nandapur there are a number of peaks over 4,000 feet, principal being Deonani Parbat (4,264 feet) and Kondiamali Parbat (4,433 feet). Some 10 miles east of Padwa rises the mass of hills, in which the Kolab takes its source. Chief among these is Sinkaram Gutta (5,316 feet) just on the boundary between Orissa and Andhra Pradesh. South of Padwa the State boundary is marked by another range of high mountains which stretches southwards for many miles into Andhra Pradesh.

The 2,000-foot plateau of the Nowrangpur subdivision is in the main flat country except for the forests in the west of the Jeypore tahsil, where there are low hills, some of which rise to 2,600 feet. Elsewhere the plain is only broken by a few isolated hills, among which those near Podagada (3,050 feet), Borigumma (3,005 feet) and Boipariguda (3,039 feet) may be mentioned.

The chief hills of the Malkangiri subdivision are those that hedge in the valley of the Machkund throughout its course. These usually stand about 1,000 feet above the bed of the river. The highest point in the subdivision is in the north-eastern corner, a few miles to the north of Duduma falls, at a height of 3,625 feet.

8. River system

The district has many rivers and perennial streams. There are five large and important rivers two of which, the Vamsadhara and the Nagavali, flow southwards into Srikakulam district and ultimately fall into the Bay of Bengal.

(i) Vamsadhara

The Vamsadhara is 173 miles long of which 88 miles are through this district. For some distance this river serves as the boundary between the Ganjam and Srikakulam districts. Rising from the extreme north of the tahsil of Bissamcuttack the river Vamsadhara flows through both the tahsils of Gunupur and Bissamcuttack. The Government of Andhra Pradesh utilises its water for irrigation.

(ii) Nagavali

The river Nagavali is 151 miles long and of this distance, 63 miles run through this district. It rises in the Kalahandi district and flows through the fertile Kalyansingpur valley, flows past Rayagada and enters Srikakulam district. Ultimately it falls into the Bay of Bengal. Near Rayagada it becomes a gorge with two falls of 20 and 30 feet. River gravel occurring at a height of 200 feet above the river-bed indicates a deep cutting river through soft soil as well as rising land. Below the falls the river is joined by an important tributary, the Kumbhikotagedda, flowing from the east in a deep and narrow gorge. It is joined by another tributary the Jhanjhavati, which drains the Narayanpatna area. Further south, the river plays an important part in the irrigation of the Srikakulam district. Before it reaches the sea near Srikakulam, it undergoes a change of name and is known as the Langulya.

Almost the entire Koraput, Nowrangpur and Malkangiri subdivisions are drained by three rivers, the Indravati, the Kolab and the Machkund, with their tributaries. These flow inland westward and the southward into the valley of the Godavari.

(iii) Indravati

The Indravati starts from the jungles of Kalahandi and after receiving a number of perennial hill streams, rising in Kashipur tahsil and Nowrangpur and Koraput subdivisions, it enters Bastar after flowing through Nowrangpur and Kotpad tahsils. The Bhaskel joins it just before it leaves Koraput district. It forms the beautiful Chitrakota falls about 25 miles west of Jagadalpur in Bastar district. The total length is 329 miles, of which 77 miles run through Koraput district or along its boundary.

(iv) Kolab

The Kolab rises near Sinkaram hill on the 3,000-foot plateau, flows north-west in a winding bed, passing five miles to the south of Koraput and falls down to the 2,000-foot plateau not far south of Jeypore. At Bagara, to which a branch road leads from the top of the Jeypore Ghat, there are three small falls whose potentialities as sources of hydro-electric power were investigated in the thirties. At the end of its descent to the Jeypore plateau the river is spanned by a fine bridge near Kotta. It flows right across the Jeypore tahsil in a north-western direction for 20 to 30 miles and then suddenly doubles back and runs nearly south, forming the boundary between Koraput and Bastar. It then runs south back into this district forming, for a few miles, the boundary between the Nowrangpur and Malkangiri subdivisions passing at this point through a gorge in the wild hills west of Ramagiri, which are called Tulisi Dongar range. As it issues from this it falls about 49 feet into a large pool, 12 or 14 feet deep, into which in days gone by, as tradition goes, witches used to be thrown with a stone round their neck. Turning west again, and passing Salimi, the river flows into Bastar, past Sukuma, and at last again divides Bastar from Koraput, forming the western boundary of Malkangiri subdivision for many miles. In this last part of its course, it is called the Sabari. At Motu the extreme south-western corner of the subdivision it meets the Sileru, and the two pass out of Orissa into Andhra Pradesh and fall eventually into the Godavari river. The river receives a number of affluents in the Malkangiri subdivision of which the Poteru, which rises near Balimela, is the chief. These, though mighty and unfordable rivers during the rains, generally dry up during the summer season. The total length of the Kolab or Sabari is 280 miles, of which all but 55 miles flow through this district or along its boundary. In 1856 Mr. Tuke went 132 miles up the Sabari from its confluence with Godavari and his detailed account of the voyage will be found in Lieutenant Haig's 'Report on the navigability of the Godavari' (Madras 1856). The river is only used for navigation on the stretch between Motu and the junction with the Godavari and that too during six months of the year.

(v) Machkund

The Machkund rises in the Madgol hills of Visakhapatnam district on the 3,000-foot plateau, and near Wondragedda, not many miles off its sources, it becomes the boundary between Andhra Pradesh and Orissa. For some 30 miles or more the river runs nearly north along a very meandering course through the wide Padwa valley. When about 39 miles south of Jeypore it winds westward along the edge of the plateau as if looking for a way down through the low hills which fringe the plateau there, and then suddenly turns at a sharp angle to the south-west down a steep descent. The drop changes a somewhat sluggish river flowing between banks of red earth into a series of rapids foaming between

enormous masses of boulders. Three miles from the bend and about the same distance south of Badigada the descent is barred by a huge barrier of rock shut in on either side by walls of rock two or three hundred feet in height. Below this is a sheer abyss over which the river used to fling itself into a boiling pool half hidden by dense clouds of spray, on which the sunlight used to throw the brightest of rainbows. In the dry season it was possible to scramble to the edge of the abyss and look straight down through the spray into the great pool beneath, while from beneath the scene was the most impressive, inspiring a mixed sense of awe and beauty in the minds of the visitors. But, with the diversion of the stream and installation of the Machkund Hydro-electric Project that beautiful sight is no more to be seen. These falls, with a 540-foot drop, are known by the name Duduma falls presumably in the absence of an adjacent village to name them after, as the word 'Duduma' itself means 'Waterfall'. Below the falls for three or four miles the river flows towards the south-west in a deep and a gloomy gorge, hemmed in on both sides by rock walls seven or eight hundred feet high into which it is impossible to descend except by the winch or the flight of steps of the Machkund Project. The river flows down this narrow valley shut in by high hills till it reaches Kondakamberu 42 miles from Badigada. This valley of the Machkund is the most inaccessible and the least populated region in the whole district. At rare intervals on the way one meets a small village of primitive tribes named Didayis, who are not found anywhere but in this valley, while at one point the path runs through dense forests for fifteen miles without any sight of human habitation. The surrounding forests serve as admirable abode of wild life and even in the middle of summer there is a broad stream in the river some two feet deep. It would be possible to make the whole journey from the falls to Kondakamberu in a dug out canoe at any time of the year. At Kondakamberu (1,400 feet above sea-level) the river is some 8 yards wide and unfordable at all seasons. It is now joined by a large tributary, the Gurrapurevu, which rises in the high hills of Madgol and flows entirely through forest down a steep and rocky course. A few miles beyond Kondakamberu the river assumes the name 'Sileru' (Rocky stream) and once again becomes the boundary of the State, separating it this time from the East Godavari district of Andhra Pradesh. It flows on by a much steeper gradient than before, abounding in mahseer and crocodiles, until at Motu it joins Sabari. Nothing can excel the supreme beauty of this lonely river, with its bamboo-covered banks, its deep long reaches of water, its falls, its grass-covered islets and its rushing clear water. Its length is 184 miles, of which there is a thirty-eight-mile flow through this district, and 120 miles along its boundaries.

(vi) Tel

The only other river worthy of mention is the Tel, which rises in the north of Umarkot tahsil, forms for some distance the northern boundary of the district, and then flows into the Kalahandi district after

a short journey through Raipur district of Madhya Pradesh. Later in its course it receives the drainage of the northern extremity of the Bissamcuttack tahsil, and meets the Mahanadi river near Sonapur. The river dries up completely in the summer season.

9. Lakes and Tanks

No lakes exist in the district. Tanks are not numerous, but large embankments holding up wide sheets of water known as 'Sagar' exist at Jeypore, Malkangiri and a few other places. The Jagannath Sagar at Jeypore, the Damayanti Sagar at Kotpad, the Balisagar Tank at Malkangiri, four tanks at Nowrangpur and the Deva Sagar at Papadahandi are some of the largest tanks in the district. These tanks, which owe their existence to the enterprise of former rulers of the country, are intended primarily for drinking purposes, but they are also sometimes tapped for irrigation. Smaller four-sided tanks, excavated in low-lying land, are known as 'Mundas' or 'Bandhas'. Most of these have been built by charitable persons to commemorate their piety, and they are intended only for drinking or bathing.

At Kotpad most part of the high mud wall which used to surround the village is still standing and the moat outside this had been partially filled in and transformed into a chain of tanks. To the west of the town is the great Damayanti Tank, a picturesque sheet of water.

Immediately to the west of the town of Jeypore there is a great tank called 'Jagannath Sagar' which is one mile long and half a mile wide. It never dries up in the summer.

Near Kotpad the Indravati behaves like a deltaic river spreading out into depressions and leaving oxbow lakes. Some of the lakes contain water throughout the year and breed various fish and birds.

As the district abounds in forests and hills, there are a good number of springs which serve the purpose of supplying drinking water. Increasing use is now being made of these springs for irrigation specially for cultivation of rabi crops.

10. Geology

The Indian peninsula may be pictured as a triangular slab with its eastern and western edges curled up forming the Eastern and Western Ghats, respectively. In earlier geological times the zone now occupied by the Eastern Ghats in Orissa was at the base level, comparable to the present-day lower levels of the central part of the peninsula with all the streams draining eastward. Even at that time the main streams like the Brahmani, the Mahanadi and the Godavari were in existence. The general slope of the surface was also at that time towards the east. This surface was flat thou

gently undulating but with residual hills rising here and there to a height of about one to two thousand feet. Sometime subsequent to the deposition of the Gondwana beds south-west of Cuttack and in Angul, the eastern zone commenced to rise along a belt extending from the Chota Nagpur plateau in Bihar, through Ganjam and Koraput and into Madras. Downward erosion along the old drainage lines, however, kept pace with this uplift and the main streams maintained more or less their old courses. It is also probable that stream alignments were partly influenced by trough faulting in the direction of the main river valleys, as it will be noted that the faulted boundaries of the Talcher-Rampur Gondwana basins follow the trend of the main N. W. S. E. valleys.

Uplift did not take place at a single stage, the first uplift of the order of about 1,000 feet giving rise to a plateau, the edges of which soon became deeply eroded. The undulating uplands of this plateau became covered with an extensive capping of laterite. The Koraput plateau and the high hills of the Eastern Ghats are the representatives of this early lateritised surface.

After prolonged erosion of this old plateau during which its western part was reduced to a peneplain, uplift was renewed. The older surface was carried to a level of 3,000 feet, and the newer peneplain to 2,000 feet. Subsequent erosion has removed much of this second peneplain, but part of it is preserved in the 2,000-foot plateau of Jeypore.

(i) Geological Antiquity

The main features of the geology of the district of Koraput are well known but the details have yet to be investigated. The entire district has never been thoroughly explored geologically and hence the relationship between the different strata has not been established in sufficient detail.

The district falls naturally into two parts each characterised by a distinct suite of rocks, the 2,000-foot plateau of Jeypore with its much lower extension into the Malkangiri subdivision and the high hilly regions of the Eastern Ghats lying between the Jeypore plateau and the Visakhapatnam coastal plains.

The inland hill tract of the district is chiefly composed of rocks of a very ancient age, so completely altered and crystallised by metamorphism that all traces of their original nature are lost and any organic remains, which they may originally have contained, obliterated. The same rocks cover enormous area in eastern and southern India and are usually spoken of in works on 'Indian Geology' as the crystalline or metamorphic series.

The plateau is an eastern extension of the great plains of Bastar with which it is geologically connected. On its eastern and southern sides, it is bounded by the high lands of the Kalahandi district and the Eastern Ghats. Within the Koraput district itself the Jeypore plateau attains a width of nearly 40 miles at one place in an east-west direction, and it maintains almost uninterruptedly an average elevation of nearly 2,000 feet above the sea-level for 100 miles in a north-south direction. The northern edge of the plateau ends against the high lands of Raipur district and its southern edge is reached near Ramagiri and the Kolab. From here the main plateau descends into the low-lying tracts of Malkangiri about 900 feet high at their northern end and gradually falling away in a south-westerly direction to 150 feet at Motu at the extreme south-western corner of the district.

The oldest rocks of the above region are a series of metamorphosed sediments, which have been intruded successively by granites, greenstones, charnockites and dolerites. As a result of different types of metamorphism, the texture of these rocks is either schistose or gneissose. They all belong to the great Archaean system of the Indian Peninsula.

(ii) Geological Formation of the District

The chief groups of the district are Archaeans, Cuddapahs, Tertiary and recent formations like Laterite and Alluvium.

The Archaeans of the district may be divided into two main rock groups :

- (i) Sedimentary rocks and their metamorphic variants with which are associated basic igneous rocks.
- (ii) Widespread intrusions of granite and charnockites

The Sedimentary Archaean rocks of the district are highly metamorphosed. The chief rock types consist of quartz, garnet and sillimanite with some feldspars and graphite and very often manganese and iron minerals and is known as khondalite. In a few localities calcgneisses, quartz-veins, garnetiferous quartzites, crystalline limestone are associated with typical khondalites. Khondalitic rocks form a part of the Koraput plateau which passes southwards into the Visakhapatnam district in Andhra Pradesh.

Metamorphosed Archaean sediments of a different type which have not suffered such intense metamorphism as the khondalites occupy large areas on the western and south-western parts of the Jeypore plateau and extend into the lower tracts of Malkangiri. These rocks known as the Bengal series extend westwards into Bastar where they are better developed and were first studied and named by Dr. H. Crookshank. Included within the Bengpals of Koraput district are andalusite bearing grits and schists, chlorite and biotite schists and coarse crystalline quartzites and associated with them are haematite-quartzites, banded magnetite and grunerite-quartzite and calc-granulite

The above Archaean sediments are associated with basic lavas and minor intrusions which are also present in the gneisses to be described next. The basic rocks have been subjected to varying degrees of metamorphism and in all probability belong to more than one period. They consist of epidiorites, amphibolites, hornblende diopside-chlorite and talc-schists. The green-stone intrusions in the Tulsi and Lokki hills assume enormous proportions for rocks of this type.

In most parts of Koraput the metamorphosed sediments have not been separated from the igneous rocks intruded into them. The following types have, however, been noted and may be correlated with the Bengpals of Bastar :

- (a) Grits with andalusite in the Lokki and Tulsi hills
- (b) Andalusite schists in the Kolab valley near Salimi
- (c) Banded haematite-quartzites at Akkuru-Parratam
- (d) Chlorite and biotite-schists in the Pettangunga reserved forest
- (e) Banded-magnetite and Grunerite-quartzites at mile 2 of the Malkangiri-Balimela road.
- (f) Coarse-crystalline quartzites in the hills filling the angle between the Sileru and Sabari rivers.

By far the commonest rock type on the Jeypore plateau and in the Malkangiri subdivision is granite gneiss. In the low-lying area between Malkangiri and Salimi this is coarse porphyritic rock but it becomes finer as one approaches the margin of the Eastern Ghats. Here it is associated with numerous bands of hornblende-schist of uncertain origin.

The complex group of granite-gneisses and metamorphic rocks have been so much altered by regional metamorphism and different cycles of igneous activity that the nature of the parent rocks cannot always be determined. Some of them may represent the crystalline products of true melts whereas others appear to be hybrids or remnants of older rocks which have absorbed liquid or have been altered by gaseous and liquid emanations. Other types of gneisses found in the district are porphyritic granite-gneiss, garnetiferous granitoid-gneiss, fine-grained biotite-gneiss and charnockites. Garnetiferous-gneisses are mineralogically similar to biotite-granite but are characterised by an abundance of red garnet. They vary from coarse-grained banded gneisses and typical injection gneisses to entirely massive granites and carry bands and patches of basic hypersthene-granulites and other dark coloured rocks. Basic charnockites occur in the form of minor patches or bands. Associated with the granite-gneisses near Koraput are some very interesting nepheline syenites. These are of two types, the first light in colour with streak and patches of biotite and hornblendes and the second composed of porphyritic masses of nepheline in a mylonitic matrix.

Immediately on the western side of the charnockite massif of the Eastern Ghats in Malkangiri subdivision occurs a very fine-grained biotite gneiss quite different from the coarsely crystalline granite-gneiss described earlier. It consists of fine angular grains of quartz and feldspar with a variable but small quantity of green biotite. This gneiss was formerly regarded as sedimentary in origin but Dr. Crookshank thinks that it is a granulated variety of a slightly porphyritic granite-gneiss which occurs further west. Garnet is rather rare in this biotite-gneiss which is associated with numerous bands of hornblende-schist of uncertain origin. Large masses of white crystalline quartzite occur in many places among the hornblende-schists and biotite-gneisses.

Hypersthene-gneisses and hypersthene-granulites (charnockites) varying in composition from basic to acid are found as intrusions in the older gneisses within a few miles of the main range of the Eastern Ghats. They intrude, at many places, khondalites giving rise to some very interesting contact phenomena in certain localities. The most striking of these is the development of the rare mineral sapphirine and green spinel and local cordierite. Massive charnockites grade to hypersthene-gneisses which also vary in composition from basic to acid and these in turn are found to grade into biotite-gneisses. It is difficult at places to decide whether to classify some specimens as charnockite or as biotite-gneiss.

Associated with the hypersthene-gneisses of Malkangiri some gneissic-soda-granites are believed to have originated by the invasion of the pre-existing rocks by alkaline solutions.

It has been observed that the trend of the schistose inclusions in the gneisses, the strike of the basic rocks and khondalites and the trend of the Cuddapahs all conform to the foliation of the gneisses in the neighbourhood.

Dolerites which are commonly almost unaltered occur as intrusions both in the older gneisses and in the charnockites along the western margin of the Jeypore plateau. The age of the newer dolerites is clearly younger than that of the charnockites as dykes of the former cut the charnockites at several places. None of these newer dolerite dykes has yet been found to intrude into the Cuddapahs and in all probability the newer dolerites are older than the rocks of the Cuddapah system.

Many of the above rock types occupy larger areas of the Koraput and Jeypore plateaus. At Hirapur hill west of Umakot, an exposure of banded haematite-quartzite carries iron-ore. Chlorite and mica schists and quartzites occur on the ridges north and north-west of Maidapur. Biotite-gneisses carrying basic bands are present on the hilly regions north, east of Tentulikhunti. All these rock types are extensively intruded by coarsely crystalline porphyritic granites.

Resting unconfirmably on the surface of the Archaeans along the Bastar-Koraput border from latitudes $18^{\circ}22'$ to $18^{\circ}32'$ and again from latitudes $18^{\circ}48'$ to $19^{\circ}21'$, lie a series of ancient unfossiliferous sedimentaries doubtfully referred to as the Cuddapahs. Another outlier of Cuddapahs is seen along the Koraput-Kalahandi border to the north of Nowrangpur. The rocks are normally horizontally bedded but marginally they are frequently folded and faulted. The main part of this series in Koraput district is formed of purple shales and slates with intercalations of limestones in places overlying a variable thickness of coarse white quartzite. Exposures of these are seen around the Gupteswar-Siriveda area near Jeypore and Dumajodi-Kondajodi area near Kotpad and Nandivada and Kottameta near Malkangiri.

Laterite cappings of the Koraput district are over 3,000' high. High level laterite is also known at heights of 3,000' to 4,000' capping the khondalites. It is also found on the 2,000' Jeypore plateau near Kotpad.

11. Mineral Wealth

Although there has been no sustained prospecting, it is well known that the district is rich in mineral deposits of which the important ones are given below:

(i) Clays

At several places on the Koraput plateau particularly near the district headquarters, large and small-sized deposits of china-clay of inferior quality are present. Kaolin also occurs in the Nowrangpur and Umarkot tahsils and in the Rayagada and Gunupur subdivisions. Owing to the refractory nature of these clays they can be used as fireclay as well as for the manufacture of coarse porcelain ware and stoneware drain pipes.

Pottery clay deposits are found in the immediate vicinity of Jeypore, Damsaguda and Bondosal in huge quantities and are being used in the Jeypore factory. Kaolin occurrences are reported from Boipariguda, Oduguda and Musoriguda, but the Kaolin is sandy and stained. Fireclay is seen near Deodar. Its plasticity is good, shrinkage is 7.5 per cent and it stands $1,400^{\circ}\text{C}$ of temperature.

The river alluvium near Jeypore and Rayagada carries vast quantities of pottery clay. At both places the clay is used by the local tile factories for the manufacture of roofing and paving tiles, drain pipes, flower-pots, vases, etc.

(ii) Gold

Placer gold is found in Govindapalli, Kyangu and Kollaru. Gold is washed on a small scale (by panning the sand and gravel of the Kolab river) in the Rangapani nala and its various tributaries in the neighbourhood of Govindapalli and in the Kolab river below its junction with

the former stream, east of Kyangu." The gold is in the form of very fine particles disseminated in the river sands and gravels which settle down with black sand on panning.

(iii) **Graphite**

Graphite in small quantities is widespread in the rocks of the Khondalite series. It has been worked at a place half a mile south-west of the village Majikelam. A small deposit is also found south of the village Chuchkona near Rayagada.

(iv) **Iron**

Fairly good deposits are found in the Hirapur hills near Umakot, Garbarai hill, Madhugulimi, Gunnayyapada, Siraguda and Deraguda. The iron-ore has limited use on account of high phosphorus content. Limonite is present at Punjipakna and Ambadivi.

(v) **Limestone**

Extensive deposits of fluxgrade limestone are found in the Siriveda-Gupteswar areas in the Ramagiri police-station and Kondajodi-Dumajodi areas in the Kotpad tahsil. Cement grade limestone deposits with huge reserves are found near Nandivada and Kottameta in the Malkangiri subdivision. Limestones of excellent quality (cement grade) are found in an area of nearly eight square miles between Umpavalli and Tummiḡuda villages in the Pottangi tahsil.

Apart from these, minor occurrences of limestone and lime kankar are found all over the district.

(vi) **Manganese**

Important deposits are found at the following places : Kuttingi, Devajolla, Mandara, Kuttali and Santomra in the Rayagada, Gunupur and Koraput subdivisions. Deposits of Devajolla and Kuttingi are promising.

Other minor occurrences are found at Khalkona, Pukkiti, Dumripur, Koraput, etc.

(vii) **Mica**

It is found in workable quantities near Borigumma and Kimka.

(viii) **Ochre**

Minor deposits of yellow ochre are found near Boipariguda. Occurrences of red ochre are reported from Kandagan.

12. Botany

The flora of Koraput is of considerable interest as although typically northern in character, it has also affinities with the flora of southern India. Unfortunately it has never been investigated by a Botanist and

only a general description is possible. For this purpose it is necessary to keep in mind the four natural divisions of the district which have already been described, namely, (a) the central plateau of 3,000 feet and upwards on which Koraput itself is situated, (b) the Jeypore plateau of 2,000 feet, (c) the Malkangiri plateau of 400 to 800 feet, and (d) the valleys and hill ranges in the Rayagada and Gunupur subdivisions, ranging from 500 to nearly 5,000 feet.

The vegetation of the central plateau is of a degraded type. Originally it must have been of a sub-tropical wet hill type with evergreen species predominating but fires and Podu cultivation have caused great changes. Above 4,000 feet, grass-land is usually found, tree-growth being limited to scattered stunted specimens of *Terminalia chebula* (*Harida*). *Eugenia operculata* (*Bawal*) is also found. In the vicinity of Koraput Podu cultivation has caused the complete disappearance of the original forest and practically no tree-growth exists save fruit-tree such as *Mangifera indica* (*Amba*), *Tamarindus indica* (*Tentuli*), *Madhuca latifolia* (*Mohua*), etc. Over the rest of the central plateau the evergreen type has been partly replaced by deciduous species such as *Pterocarpus marsupium* (*Piasala*), *Bursera serrata* (*Garuda Nimburu*), *Garuga pinnata* (*Kasaramba*), *Terminalia belerica* (*Bahada*), *Dalbergia lanceolaria* (*Chhota sisu*), *Eugenia jambolana* (*Jamu*), *Ahogeissus latifolia* (*Dhaura*), *Bombax malabaricum* (*Simili*), *Terminalia tomentosa* (*Asana*). Evergreen species, most of which have not been identified, include *Michelia champaca* (*Champa*) and *Pongamia glabra* (*Karanja*). *Dendrocalamus strictus* (*Baunsa*) is common locally. *Sal* is scarcely ever found above 2,500 feet.

The greater part of the Jeypore plateau was covered with *Sal* forest of a moist peninsular type, and this forest still survives where it is under protection. The commonest trees are *Shorea rubusta* (*Sal*), *Terminalia tomentosa* (*Asana*), *Anogeissus latifolia* (*Dhaura*), *Petrocarpus marsupium* (*Piasala*), *Madhuca latifolia* (*Mohua*), *Dillenia pentagyna* (*Rae*), *Dillenia indica* (*Waou*), *Bombax malabaricum* (*Simili*), *Gmelina arborea* (*Gambhari*), *Gleistanthus collinus* (*Karada*), *Adina cordifolia* (*Kuruma*), *Phyllanthus emblica* (*Amla*), *Buchanania latifolia* (*Chara*), *Kydia calycina* (*Banakapasia*), *Ouginia dalbergioides* (*Bandhana*), *Bridelia retusa* (*Kasi*) and *Bauhinia retusa* (*Choari*). The underwood comprises species such as *Indigofera pulchella* (*Nila*), *Phoenix acaulis* (*Bhuin Khajuri*), *Grewia species* (*Dhamana*), *Flemingia species* (*Ranidantakathi*), *Woodfordia fruticosa* (*Dahiphula*), *Embelia roubusta* (*Nunnumia*), *Cipadessa fruticosa* (*Nalabali*) and *Ixora parviflora* (*Katharangani*). Creepers include *Bauhinia vahlii* (*Sialilata*), *Butea superba* (*Naipalasa*), *Combretum decandrum* (*Atund*) and *Smilax macrophylla* (*Kumbhatua*). Grasses include *Imperrata arundinacea* (*Sabai*) and *Polinidium angustifolium* (*Bagali*). Bamboos are very rare. Scattered patches of teak occur as far west as 82°36' longitude. *Kusum* is common in open cultivated tracts.

The Malkangiri plateau is hotter and moister. Moist peninsular *Sal* is found in the Ghats above the Malkangiri plateau and in the northern parts. It disappears above latitude 18°31'. Teak (*Saguan*) is much commoner than in further north. Many of the deciduous species mentioned above occur on this lower plateau. *Dalbergia latifolia* (*Pahasisu*), *Xylia xylocarpa* (*Kangada*), *Garuga pinnata* (*Kasaramba*), *Storetiocpermum suaveolens* (*Badapatuli*) and *Terminilia belerica* (*Bahada*) are among other tree species commonly found. Creepers include *Spatholobus roxburghii* (*Naipalasa*) and *Millettia ariculata* (*Arkawala*). In addition to *Dendrocalamus strictus*, *Bambusa arundinacea* (*Kanta Baunsa*), *Oxytenanthera nigro-ciliata* (*Bolanji*) and an unidentified bamboo species occur. Unidentified grasses which produce good fodder are very common and this plateau is well known for its cattle.

It is not possible to refer the valleys and hill ranges in the east of the district to any one forest type. In the north-east and towards the common boundary with the Ganjam Agency tracts moist peninsular *Sal* forest is dominant. *Sal* ascends to the summit of some of the highest hills which are over 4,000 feet. All the species mentioned as occurring on the Jey-pore plateau exist. Additional tree species include *Albizzia procera* (*Dhala Sirisa*), *Dalbergia lanceolaria* (*Chakunda*), *Callicarpa indica* (*Boda*), *Acacia lenticularia* (*Kanta Sirisa*), *Artocarpus lakoocha* (*Jeuta*), *Cedrela toona* (*Tun*), *Trema orientalis* (*Kharkas*), *Bursera serata* (*Nimburu*), *Promna species* (*Gandhana*) and amongst shrubs *Scutia indica*, *Ardisia species*, wild banana, *Cycas circinalis* (*Odasamari*), *Clerodendron infortunatum* (*Genguti*), *Mallotus philippinensis* (*Kamalagundi*), *Calusena pentaphylla*, *Coffea bengalensis* (*Banamalli*), *Wrightia tomentosa* (*Khirua*), *Wondlandia tinctoria* (*Tilai*), etc. *Dendrocalamus strictus* (On basic rocks) and *Oxytenanthera negrociliata* occur. Amongst creepers, *Ubaria hamiltonii* occurs. Amongst grasses, the broom grass (*Thysanolaena agrotis*) is found. In the lower stretches of the Nagavali and Vamsadhara valleys and on the hills bordering them the flora changes to more coastal type. *Sal* disappears. New species of economic importance which are met with include *Strychnes nux-vomica* (*Kochila*) and *Sapindus emarginatus* (*Ritha*). *Bambusa arundinacea* (*Kanta Baunsa*) is common in valleys.

There are two or three interesting features of the Koraput flora. The distribution of teak in scattered patches suggests that this species was once found over a greater tract than is now the case, and that the present patches are survivals. The distribution cannot be explained by edaphic conditions. In the Malkangiri plateau, and the adjoining forests of Bastar district, *Sal* reaches its southernmost limit in India. It disappears fairly abruptly. It seems likely that *Sal* is still in the process of spreading southwards. The non-existence of *Sal* on the central Koraput plateau is probably due to the fact that the original evergreen forest presented an effective barrier against the establishment of *Sal*. Now

that it has been replaced by a more deciduous type, *Sal* may invade the higher hill slopes. In the Vamsadhara and Nagavali valleys *Sal* has not advanced nearly as far southwards as one would expect specially in the centre and west of this region.

Its distribution cannot be explained on climatic or edaphic grounds. Here again it would appear that *Sal* has been invading the district from the north-east. As the main valleys are under permanent cultivation there is little prospect of *Sal* now spreading much further. Another interesting feature is that, in the central highlands, species such as *Pterocarpus marsupium*, *Anogenissus latifolia*, etc., are very nearly evergreen in habit, indicating that the climate is moister than that in which these species are usually found, and that the present type of forest is not a climax.

13. Forests

(i) About 70 per cent of the total extent of the district can be taken as forests*. There is no reserved forest. At present an area of 1,590 square miles has been classified as 'reserved lands' and 110 square miles as 'protected lands'. The unreserved lands have not been fully surveyed but their area will roughly be 5,000 square miles. The reserved lands have been divided into 191 blocks. The management of forests has been put in charge of two Divisional Forest Officers, one stationed at Jeypore and the other at Rayagada. The Jeypore Division covers the whole of Nowrangpur and Malkangiri subdivisions and has an area of 5,512 square miles, the Rayagada Division is 4,407 square miles in area and covers the whole of Koraput, Rayagada and Gunupur subdivision. The whole area has been divided into 15 Ranges—8 in Jeypore and 7 in Rayagada Division.

No detailed description of the Koraput forests has ever been published, nor has any botanical survey been carried out. The following notes are based on a report by J. W. Nicholson, I.F.S., Conservator of Forests, Orissa, who visited the district in May 1937.

Umarkot, Nowrangpur, Jeypore, Kotpad and part of Ramagiri range are all situated on a plateau which is typically *Sal* of a moist peninsular type, the average quality being III. A few patches of teak occur locally. The whole crop was at one time under shifting cultivation and the forests now comprise pole crops in various stages of growth. Large trees are scarce. These forests are of great economic importance.

*Since after this note on Koraput forests was prepared Kashipur tahsil forming the Kashipur police-station area was included in Rayagada subdivision. Kashipur is a forest-clad tract whose vegetation is similar to the west Rayagada area with which it is contiguous. Forest laws of Kashipur are, of course, same as other areas of Kalahandi ex-State of which it formed a part. The present note on forest excludes the Kashipur police-station area.

The Malkangiri, Motu and part of Ramagiri range are situated on the lower 1,000-foot plateau in the south-west of the district. In the north of this plateau there is *Sal* forest mainly of quality III but equaling II in places. It is very remote from any market. The *Sal* disappears about 14 miles north of Malkangiri, giving way to forest of a dry mixed type. Teak occurs in patches. The forests are usually very open and grassy and economically are of little value except for their excellent grazing. The hill ranges which occur on this plateau support dry mixed forest with bamboos, which find a market at Rajahmundry. These are floated down the Sabari and the Godavari from Motu.

The tahsils of Koraput and Pottangi are on an undulating plateau averaging 3,000 feet above sea-level, and containing peaks above 5,000 feet in height. Above 4,000 feet there is little forest-growth, uncultivated grass lands being the usual vegetation. Below 4,000 feet the vegetation is typically forest wherever population is scanty.

In the more densely populated areas, as in the hills to the south of Koraput, repeated shifting cultivation over a long period of years has reduced the forest to an open scrub type or barren soil. The existing forests have all been under shifting cultivation. They contain deciduous species such as *Dhaura*, *Sahaj*, *Kerala*, *Bija*, *Toon*, *Simul*, etc., which occur elsewhere in Orissa, mixed with representatives of the South Indian Flora. A curious feature of the deciduous species is that they lose leaves in the hot weather for a very short period. The probability is that those hills originally supported a sub-tropical evergreen type of forest which has been largely replaced through repeated burning, by species typical of drier zones. Bamboos are common locally but they are of poor quality and they probably obtained a footing as a result of shifting cultivation. The forests in these ranges are of great climatic importance. They will never be of great economic value for timber supply unless by natural or artificial means the percentage of valuable species can be increased.

In the Rayagada subdivision the main geographical features are the low-lying valleys of the Vamsadhara and Nagavali rivers and the high hills rising up to nearly 5,000 feet, which flank them. In the hills and valleys of the Vamsadhara basin, especially along the upper reaches, *Sal* is the dominant species. The forests are of potential economic importance but owing to shifting cultivation large *Sal* trees and pole crops are at present scarce. In the Nagavali basin, except along higher reaches on the left bank, *Sal* is very rare and the forest is mainly of the semi-deciduous type found in the central plateau which adjoins the hills along the right bank.

The most interesting feature of the Jeypore forest flora is the distribution of *Sal*. Over practically the whole of Orissa, *Sal* forest is dominant on any soil which suits its growth. In Jeypore there are large tracts, e.g., the Koraput plateau, where the climate and soil are suitable for *Sal*, but it is not found. In Malkangiri the *Sal* stops at about the same southern point as it does in the adjoining Bastar district (Madhya Pradesh). The rarity of *Sal* in the Nagavali valley can also be explained by the fact that the *Sal* belt was advancing from the north-east until shifting cultivation, through its destruction of most seed trees, checked further progress. The absence of *Sal* on the central plateau can be imputed to the fact that if the forests were once of a damper and more evergreen character, conditions would have been unfavourable to the establishment of *Sal*.

(ii) Government Policy

The Madras Forest Act was extended to these tracts in the year 1891. Rules under sections 26, 32, 35 and 55 of Madras Forest Act were framed in the year 1900. These Rules known as Jeypore Forest Rules underwent many changes. In 1949 Orissa Government granted a concession of reserved trees up to 3 feet in girth to hill tribes in protected and unreserved lands instead of 2 ft. girth allowed previously.

The zamindari system was abolished in 1952 and the Government took over the management of forests. Government have framed the Koraput District Forest and Waste Lands Rules, 1956, and the Koraput District Reserved Lands Hunting and Shooting Rules, 1956. The Wild Birds and Animals Protection Act was extended to the district in 1957. The Orissa Preservation of Private Forest Act was in force till the date of vesting of estates. It is still applicable to the forests not yet vested in Government. There are no separate timber transit rules but the existing forest rules provide for checking of forest-produce in transit.

Under the Koraput Forest Rules the existing forests are classified as reserved lands, protected lands and unreserved lands. Reserved lands and protected lands are notified as such. Unreserved lands require no notification. Lands at the disposal of the Government have been divided under rules into the above-mentioned categories. As a preliminary, the Collector is required to inspect the proposed block and to satisfy himself that sufficient forests have been excluded to meet the domestic needs of the inhabitants of adjacent villages, and for shifting cultivation by members of the hill tribes. The proposals are then scrutinized by the Conservator of Forests from a technical point of view before submission to the Government for final sanction.

The Collector is empowered to notify lands as 'protected'. Protection is only resorted to in areas where, owing to the absence of extensive forest, reservation would cause hardship to the local inhabitants. Its [70 B. of R.—4]

object is to protect existing forest-growth from shifting cultivation its worst enemy. Protected forests are conserved solely for the use of the neighbouring villagers, and are not designed for exploitation. Except that shifting cultivation is prohibited, there are no more restrictions on the protected lands than there are upon unreserved lands.

These forests are guarded by officials of the Forest Department. No experiments have yet been tried in placing them under the control of the villagers, but the latter have recently in not a few cases, themselves taken the initiative in protecting small areas of unreserved land where firewood is scarce. There are small patches of forests where no rights are exercised. These forests have come to the Government.

It cannot be said that the Jeypore forests are scientifically managed. Silviculture and working plans are almost non-existent. Some tentative sketchy working schemes drawn up during the ex-zamindari management are being continued.

(iii) Shifting Cultivation a menace to Forest

This is known in the district as Podu or Dongara cultivation and it has done incalculable damage to forest-growth in the past and is still the most serious problem of forest administration. Even at the present day it is a practice which the authorities can only aim at controlling and not at suppressing. As early as in 1872 H. G. Turner, the then Special Assistant Agent, brought to notice the destruction that was being caused by the hillmen's reckless habits.

The prevention and control of Podu cultivation were for many years among the chief preoccupations of Agency Officers. Education and continuous propaganda effected some good results but the practice persisted as it was impossible to find any means of abolishing it without arousing the greatest discontent among the hill tribes. The most primitive tribes were the worst addicts, and as those inhabited the remotest parts of the district, control of the practice was especially difficult. The forests that suffered on the most extensive scale from shifting cultivation are probably those of the Puttasingi hills in the Gunupur subdivision where the hill Savaras live, and those in the country of the Bonda Poraja in north-eastern Malkangiri. The Savaras on several occasions burnt down cultivated hill slopes within reserved lands in defiance of prohibition. The policy adopted by the ex-zamindari in dealing with Podu cultivation was to permit each family of hillmen to fell a reasonable extent of unreserved forest, which varied with circumstances, for this purpose on payment of an assessment of an anna or two an acre. But all cases of such cultivation without permission were dealt with under the law by prosecution or levying a compounding fee. The system cannot be said to have worked well and it is the exception rather than the rule for a hillman to apply for permission. At present Government have

restricted the practice of Podu cultivation and under the Soil Conservation Scheme cultivation beyond a certain height on the hill tops has been forbidden.

To prevent destruction of forests by Podu cultivation Government have sponsored a scheme of colonising Adibasi families. According to the scheme the Adibasis are brought from hill tops and settled in the colonies in the plains. Land is given free and facilities for irrigation and drinking water wells, roads and schools are provided in the colonies. Bullocks are also given along with agricultural implements so as to settle them in regular cultivation. A subsidy of Rs. 250 is provided for the construction of house and Rs. 150 for reclamation of land. Two colonies were started in the district during 1956-57. It is expected that after the successful implementation of the scheme the forests will have a relief from continuous depredation and the desired result will be attained within a short time. The Dandakaranya Project also contemplates colonisation of some of the Adibasi families. This will go a long way in diverting the attention of the aboriginal tribes from Podu cultivation.

14. Zoology

(i) Although some of the jungles are surprisingly empty of wild life the district as a whole is still rich in game. Owing to the unhealthiness of the country, the difficulty of communication and the scarcity of skilled Shikaris it has never become a hunting ground for sportsmen, except for those officials whose work takes them into the jungles on tour. As no fee is charged for possession of muzzle-loading guns by *bona fide* residents and as all hillmen are passionately fond of hunting there is a certain amount of indiscriminate slaughter of wild animals. This has resulted in a growing scarcity of all kinds of deer, though aboriginal sportsmen have succeeded in reducing the number of tigers and other dangerous beasts. Tigers are met with throughout the whole district. In some areas, notably on the eastern border of Bissamcuttack tahsil, they are still a veritable menace and they cause much loss of human life. In 1934, 1935 and 1936 the number of human beings killed by tigers in the district was 77, 87 and 94, respectively. Panthers and leopards are also common in all parts of the district and are even more destructive to live-stock than tigers. Other representatives of the feline tribe are the leopard cat (*Prionailurus bengalensis*), the small civet cat (*Viverricula indica*), the toddy cat (*Paradoxurus hermaphroditus*) and the common jungle cat (*Felis chaus*). In 1948 the number of human beings killed due to snake-bite was 10 only in the whole district and the number of human beings killed by tigers, panthers and other wild animal was 304. The position, however, improved in the year 1957 and the number was reduced to 130. Again the figure rose to 172 in 1958. But in 1962, 1963 and 1964 the number fell down to 100, 83 and 72, respectively. In 1957 and 1958 the number of human beings killed due to snake-bite was 66 and 63, respectively.

The *dhole* or wild dog (*Cuon alpinus dukhunensis*) is found throughout the district and is a great destroyer of game. The hyaena (*Hyaena hyaena*) and the jackal (*Canis aureus*) are everywhere common, but the India fox (*Vulpes bengalensis*) is less frequently met with. The wolf (*Canis lupus*) has only been found occasionally in the neighbourhood of Ramagiri and Malkangiri. The black sloth bear (*Melursus ursinus*) is common and here as elsewhere is responsible for many casualties among wayfarers who are unfortunate enough to come upon it unawares. Fifteen people were killed by bears in the three years ending with 1936 and many others injured. Fifteen persons were killed by bears in 1957. The number was, however, reduced to 5 during 1958.

Elephants (*Elephas maximus indicus*) are regular visitors to the district. They usually make their appearance in increasing numbers in the vicinity of Chandrapur in the Bissamcuttack tahsil during the rains and cold weather, coming across from the Balliguda subdivision of Baudh-Khondmals district where there are resident herds. They have been seen within ten miles of Gunupur, but are never met with in the Koraput subdivision.

The Indian buffalo (*Bubalus bubalis*) is found in small numbers in the Malkangiri subdivision, especially in the vicinity of Balimela and Kondakamberu. The bison (*Bibos gaurus*) is more widespread and is found in the forests of Malkangiri, Ramagiri, Umarmkot, and occasionally on the 3,000-foot plateau. Among deer, *chital* or spotted deer (*Axis axis*), *Sambar* (*Cervus unicolor*) and barking deer (*Muntiacus muntjak*) are well represented. As with most other games the vast forests round Kondakamberu were the best field for these animals. *Nilgais* (*Boselaphus tragocamelus*) are found rarely in the Malkangiri and Nowrangpur subdivisions. The four-horned antelope (*Tetraceros quadricornis*) and the swamp deer (*Cervus duvauceli*) are to be found but are very rare. The *chinkara* has been seen in the past but appears now to be extinct in the district. The mouse deer (*Tragulus memina*) has been seen in most parts of the district, but is scarce. The black-buck (*Antelope cervicapra*) which was confined to the area known as the Panabeda mutta in the extreme north-east of the Nowrangpur subdivision has nearly become extinct on account of excessive shooting in recent years. Wild bears are found in nearly all parts of the district.

Among primates, the common *langur* (*Semnopithecus entellus*), the common *bandar* (*Macaca mulatta*) and the bonnet monkey (*Macaca radiata*) are all found in good number.

The common Indian crocodile is found in the water of the Kolab, Machkund and Indravati, but the *garial* is not found.

Among smaller species which are well represented in the district are the common striped squirrel, the large Indian squirrel (*Ratufa indica*), the common Indian percupine, the common Indian hare, the

common grey mongoose and the long-tailed mongoose. The honey badger (*Melivora capensis*) and the otters (*Lutrogale perspicillata*) occur but are rare.

(ii) Game Birds

Pea-fowls are common all over the district. The Savaras sometimes catch them by chasing them from side to side of a steep narrow valley until they are exhausted. The red and the grey jungle fowls are both fairly common. Spur fowls are frequently met with, while grey partridges are rather more rare. Green pigeon and blue imperial pigeon are both common in most parts of the district.

Duck and teal are very scarce, as there are but few tanks in the district. But snipe and painted snipe may be had in many parts of the district, especially on the 3,000-foot plateau near Padwa and Nandapur, where the birds remain until April.

(ii) Fish Fauna

The fish fauna of the district consists mainly of cat-fishes, murels and miscellaneous fishes. The cat-fishes breed in the rivers during flood growing rapidly by eating the small weed fish. Similar fishes also breed in the tanks and are mainly plankton feeders although initially they have predatory habit of eating the fries. The major Indian carps have been introduced in 31 blocks out of 36 blocks. *Cyprinus carpio*, an exotic fish, has been introduced with good results. Trials are being made to breed *Chanos chanos*, a fish of marine origin, in the inland waters of the district.

1.5. Climate

The climate of the major portion of the district which lies in the plateau region to the west of the Eastern Ghats is more like that of the Deccan than that of the east coast region. But due to the elevation and its situation in the north-eastern corner of the Deccan plateau the climate is milder than in the main Deccan plateau. The year may be divided into four seasons, the hot season from March to May, the monsoon season from June to September, the post-monsoon months October and November, and the cold season from December to February.

(i) Rainfall

Records of rainfall are available for nine stations in the district for periods ranging from 60 to 70 years. The rainfall at the individual stations and for the district as a whole are given in Tables I and II. The average annual rainfall over the district is 1,522 mm. (59.92"). The spatial distribution of rainfall is largely influenced by the Eastern Ghats which run roughly from south-west to north-east. Areas to the eastern

side of the Ghats get lesser rain than those on the Ghats and to their west, the latter being on the windward side during the monsoon season. During the other season there is not much difference in the rainfall over the areas on the Ghats and to the west.

The monsoon currents rising up the hills, which here form the Eastern Ghats almost like a boundary wall stretching from north-east to south-west in the eastern border of the district, cause heavy precipitation on the hills and on their western slopes. By the time the currents have gone over the hills much of its water content has dropped. The areas, lying east of the hill system may be called under rain-shadow, receive much less rainfall. Rayagada region which is at an elevation of 500 to 800 feet has an average of 1,300 mm. while the Koraput region with an elevation of 3,000 feet has an average of 1,700 mm.

Seventy-nine per cent of the annual rainfall in the district falls during the monsoon season. July and August are rainiest months in the year. The variation in the rainfall from year to year is not large. During the fifty-year period 1901 to 1950, 1914 was the year with the highest rainfall amounting to 129 per cent of the normal. The lowest rainfall in the district occurred in 1920 and amounted to 69 per cent of the normal. During the fifty-year period there were only five years when the rainfall was less than 80 per cent of the normal.

From Table II it will be seen that in 33 years out of 49 the rainfall in the district was between 1,300 and 1,700 mm. (51.2 and 66.9 inches).

On an average on 82 days in a year rain fall of 2.5 mm. or more occurs. As with the amount of rainfall, the number of rainy days is more on the Ghats and the portion of the district to the west than the portions on the eastern side of the Ghats.

The heaviest rainfall in 24 hours which fell in the district was 546.1 mm. (21.5") at Pottangi on 14th October 1931. In July 1962 Jeypore received heavy fall 1,217 mm. (47.9") during the month. On 9th and 10th of the month when rainfall was heaviest it recorded 283.2 mm. (11.1") and 287.3 mm. (11.3"). The tahsil of Kashipur has fairly heavy rainfall.

(ii) Temperature

Meteorological data are available for a few years from the observatory at Koraput. December is the coldest part of the year with the mean daily minimum temperature at 11.2° C (52.2° F.). Both day and night temperatures progressively increase after January till May which is the hottest month. On individual days in this month and in June before the onset of the monsoon maximum temperatures may reach over 38° C

(100·4° F.). Thereafter temperatures decrease with the onset of the monsoon. During the monsoon, weather is cool and pleasant with day temperatures nearly the same as those in the cold season.

Spatial distribution of temperature varies widely. On the 2,000' plateau the maximum in summer may go up to 112° while in Malkangiri which is from 400 feet to 800 feet above sea-level may go up to 115°, although the temperature at Koraput may not be over 103°. Similarly, in winter the 3,000' plateau of Koraput may be very cold while the 2,000' plateau at Jeypore may be called cool.

(iii) Humidity

Humidity is generally high especially in the monsoon and post-monsoon months. In other months, afternoons are comparatively drier. Daily variation of temperature causes morning dew which farmers dislike.

Humidity varies widely between the monsoon months of July and August and the winter months of November and December. The aridity of different regions also varies very widely. Nowrangpur and Malkangiri subdivisions may be so dry that thousands of cattle may die, while Koraput and Rayagada have enough water going down the streams to serve men and cattle even in the hottest of summer.

(iv) Winds

During the summer months winds are generally light and blow from directions mainly between south and west. During the monsoon season winds strengthen and blow from a south-westerly or westerly direction. In the post-monsoon and cold seasons winds are light and variable.

(v) Special Weather Phenomena

The district is affected by depressions from the Bay of Bengal particularly in September and October that cause high wind and widespread heavy rain. A few thunderstorms occur in the pre-monsoon months. Fog occurs occasionally in the months of November and December.

In the monsoon months on the 3,000-foot plateau, it may rain for days together. The sun may not appear for ten days at a time and low clouds may be drifting into the house soaking everything.

Tables III and IV give the temperature and humidity and frequency of special weather phenomena, respectively, for Koraput.

TABLE
Normals and Extremes

Station		Number of years of date	January	February
1		2	3	4
Jeypore	..	49	(a) 6.1 (b) 0.5	8.6 1.0
Nowrangpur	..	50	(a) 8.1 (b) 0.7	10.9 1.1
Malkangiri	..	49	(a) 4.1 (b) 0.4	3.6 0.4
Koraput	..	49	(a) 8.1 (b) 0.6	7.9 0.9
Padwa	..	47	(a) 4.3 (b) 0.4	5.6 0.6
Pottangi	..	50	(a) 5.3 (b) 0.6	13.2 1.2
Gunupur	..	50	(a) 7.1 (b) 0.7	22.1 1.5
Rayagada	..	50	(a) 8.6 (b) 0.5	13.5 1.2
Bissamcuttack	..	50	(a) 8.9 (b) 0.8	16.3 1.0
KORAPUT DISTRICT	..		(a) 6.7 (b) 0.6	11.3 1.0

(a) Normal rainfall in mm.

(b) Average number of rainy days (days with rain of 2.5 mm. or more)

I

of Rainfall

March	April	May	June	July	August
5	6	7	8	9	10
13·7	48·8	65·3	244·1	516·6	550·9
1·2	3·3	4·8	12·3	21·5	22·1
14·2	41·9	66·0	228·1	429·8	481·6
1·1	3·2	4·9	10·9	19·4	19·4
8·6	35·8	46·2	217·4	432·6	483·6
0·9	2·7	3·7	10·1	20·4	20·7
16·8	46·0	62·2	210·1	426·7	429·5
1·4	3·8	4·8	11·0	21·0	21·1
12·9	71·4	91·9	203·8	348·5	337·8
1·1	5·0	6·1	11·0	18·7	18·7
21·6	72·1	99·6	195·3	288·0	318·0
1·8	5·3	6·6	11·7	17·9	18·0
22·3	60·2	81·8	167·9	226·6	267·7
1·6	3·8	5·3	9·8	13·4	15·0
15·5	51·3	71·6	180·3	221·5	250·7
1·3	3·9	5·0	10·3	13·6	14·9
20·1	52·8	90·4	199·9	269·2	303·3
1·5	3·8	5·4	10·8	15·6	16·5
16·2	53·4	75·0	205·8	351·1	380·3
1·3	3·9	5·2	10·9	17·9	18·5

[70 B. of R.—5]

TABLE
Normals and Extremes

Station		September	October	November	December
1		11	12	13	14
Jeypore	..	351.5	100.8	27.2	6.6
		15.3	5.3	1.8	0.4
Nowrangpur	..	265.2	85.3	21.3	6.3
	..	13.2	4.3	1.1	0.4
Malkangiri	..	302.3	104.9	29.0	3.8
		15.4	6.1	1.8	0.3
Koraput	..	265.4	103.4	33.5	8.9
		14.6	6.0	2.2	0.7
Padwa	..	266.5	134.1	38.6	7.9
		14.1	7.0	2.6	0.5
Pottangi	..	290.6	213.4	72.6	10.9
	..	15.2	8.8	3.5	0.7
Gunupur	..	205.2	105.4	36.1	10.7
		11.7	6.0	2.1	0.6
Rayagada	..	199.1	110.5	35.8	5.8
		12.3	6.2	1.8	0.5
Bissamcuttack	..	213.1	90.7	27.9	7.6
		12.0	5.4	1.7	0.5
KORAPUT DISTRICT	..	262.1	116.5	35.8	7.6
		13.7	6.1	2.1	0.5

I—concl'd.
of Rainfall

Annual	Highest annual rainfall as per cent of normal and year*	Lowest annual rainfall as per cent of normal and year*	Heaviest rainfall in 24 hours †	Date
			Amount (mm.)	
15	16	17	18	19
1,940·2 89·5	144 (1914)	61 (1901)	327·1	1910 August 3
1,658·7 79·7	142 (1936)	49 (1935)	269·5	1931 August 15
1,671·9 82·6	136 (1917)	70 (1901)	306·3	1907 June 17
1,618·5 88·1	155 (1914)	66 (1923)	336·5	1914 June 25
1,528·3 85·8	150 (1914)	50 (1923)	248·9	1911 September 24
1,600·6 91·3	133 (1914)	64 (1908)	546·1	1931 October 14
1,213·1 71·5	133 (1917)	66 (1907)	148·1	1940 May 22
1,164·2 71·5	137 (1917)	67 (1935)	167·6	1927 June 17
1,300·2 75·0	135 (1919)	59 (1920)	191·0	1914 May 16
1,521·8 81·7	129 (1914)	69 (1920)	..	..

*Based on all available data up to 1948

†Years given in brackets

TABLE II
Frequency of Annual Rainfall in the District
 (Data 1901—1959*)

Range in mm.	Number of years	
901—1000	..	1
1001—1100	..	2
1101—1200	..	2
1201—1300	..	1
1301—1400	..	5
1401—1500	..	9
1501—1600	..	9
1601—1700	..	10
1701—1800	..	3
1801—1900	..	4
1901—2000	..	2

*Rainfall data not available for two years

TABLE III

Normals of Temperature and Relative Humidity

Month	Mean daily temperature °C		Highest maximum ever recorded °C	Lowest minimum ever recorded °C	Relative Humidity	
	Mean maximum temperature °C	Mean minimum temperature °C			08-30 17-30* Per cent	
January ..	25.3	11.9	29.4 (1958 Jan. 29)	6.1 (1956 Jan.18)	69	43
February ..	28.2	14.1	31.7 (1953 Feb. 27)	6.7 (1956 Feb. 8)	62	35
March ..	31.6	17.7	36.1 (1953 Mar. 27)	10.6 (1952 Mar. 4)	63	41
April ..	33.3	20.6	37.2 (1956 Apr. 27)	15.0 (1956 Apr. 23)	66	48
May ..	34.0	22.6	38.9 (1956 May 10)	17.2 (1955 May 7)	63	47
June ..	30.6	22.4	40.0 (1953 Jun. 12)	17.8 (1955 Jun. 30)	76	66
July ..	25.6	20.3	31.1 (1952 Jul. 12)	16.1 (1957 Jul. 7)	90	85
August ..	25.4	20.1	30.6 (1958 Aug. 10)	15.6 (1957 Aug. 27)	91	87
September ..	26.2	19.9	29.4 (1955 Sept. 27)	16.7 (1957 Sept. 2)	89	84
October ..	26.0	18.2	30.6 (1957 Oct. 16)	10.6 (1954 Oct. 30)	82	74
November ..	24.9	13.3	28.9 (1957 Nov. 16)	8.3 (1955 Nov. 14)	74	58
December ..	24.2	11.2	27.8 (1957 Dec. 17)	5.0 (1955 Dec. 28)	74	50
ANNUAL ..	27.9	17.7			75	60

* Hours I. S. T.

TABLE IV
Special Weather Phenomena

Mean No. of days with	January	February	March	April	May	June	July	August	September	October	November	December	Annual
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Thunder	.. 0	0	0	0	0	0	0	0	0	0	0	0	0
Hail	.. 0	0	0.1	0	0	0	0	0	0	0	0	0	0.1
Dust Storm..	0	0	0.1	0	0	0	0	0	0	0	0	0	0.1
Squall	.. 0	0	0	0	0	0	0	0	0	0	0	0	0
Fog	.. 0	0	0	0	0	0	0.3	0.3	0	0.9	1.9	0	3.4