

**Gazetteer of India**

**ARUNACHAL PRADESH**

**Lohit District**



ARUNACHAL PRADESH DISTRICT  
GAZETTEERS



# LOHIT DISTRICT

*By*

S. DUTTA CHOUDHURY  
Editor

GOVERNMENT OF ARUNACHAL PRADESH  
1978

## FOREWORD

I have much pleasure in introducing the Lohit District Gazetteer, the first of a series of District Gazetteers proposed to be brought out by the Government of Arunachal Pradesh. A Gazetteer is a repository of carefully collected and systematically collated information on a wide range of subjects pertaining to a particular area. These information are of considerable importance and interest. Since independence, Arunachal Pradesh has been making steady progress in various spheres. This north-east frontier corner of the country has, during these years, witnessed tremendous changes in social, economic, political and cultural spheres.

These changes are reflected in the Gazetteers. I hope that as a reflex of these changes, the Lohit District Gazetteer would prove to be quite useful not only to the administrators but also to research scholars and all those who are keen to know in detail about one of the districts of Arunachal Pradesh.

Raj Niwas  
Itanagar-791 111  
October 5, 1978

K. A. A. RAJA  
Lieutenant Governor, Arunachal Pradesh

## PREFACE . . .

The present volume of the District Gazetteer of Arunachal Pradesh is an account of the Lohit District, and incidentally it is the first of its kind. It may be noted that some of the 1905-06 publications of the Assam District Gazetteers, notably the one of Lakhimpur District edited by B. C. Allen, contain important references to the north-east frontier tract now known as Arunachal Pradesh. The Sadiya and Balipara Frontier Tract Gazetteer brought out in 1928 in continuation of the Lakhimpur District Gazetteer is the only gazetteer published during the British days for this part of the country. Although this old gazetteer conveys some valuable information of the area of the present Lohit District, it was not on our plan for revision, for much of its contents has become outdated by now. Moreover, since its publication the area has undergone great changes through its constitutional and administrative growth.

This publication is the result of a long-drawn and persistent effort of the Gazetteers Department of the Government of Arunachal Pradesh. A draft of Lohit District Gazetteer, submitted to the Advisory Board in 1973, was subsequently examined at various levels of the Government in accordance with the decision of the board. The draft underwent a series of revision, amplification and re-writing, and this process continued for quite a pretty long time until eventually in 1978 the final draft of the gazetteer recommended by the Advisory Board was approved by the Government of Arunachal Pradesh and the Government of India.

Situated in the north-eastern extremity of India and peopled by diverse tribes with distinct tradition and culture of their own, the Lohit District is for the most part a difficult mountainous terrain which does not allow easy access. There are groups of tribal people organised in village communities and settled on agriculture, yet there are others who are still living in a very scattered manner. The socio-economic development of various tribal societies in the district varies widely. But the conditions are changing. Since independence remarkable developments have taken place in the area in various spheres, and they are of far-reaching consequences. Our task to reflect all these important facts on the gazetteer far outweighed our means. Collection of detailed information and verification of facts relating to numerous subject-matters were for us a veritable problem indeed. We, therefore, make no claim that this volume is exhaustive, although no pains were spared to write the gazetteer as comprehensively as the available material enabled us to do so. Deficiencies are likely to occur, and errors may have crept in the volume.

Most of the numerical and statistical data incorporated in the gazetteer pertain up to the year 1975-76.

I should like to take this opportunity of expressing my deep sense of gratitude to Shri K. A. A. Raja, Lt. Governor of Arunachal Pradesh, whose gracious interest in the gazetteers has always been a source of our inspiration and guidance; Shri Sobeng Tayeng, Minister of Agriculture, Rural Development and Co-operation, who spared some of his precious time to read the draft and favour us with his highly encouraging and valuable observations, and Shri I. P. Gupta, Chief Secretary to the Government of Arunachal Pradesh and Chairman of the Advisory Board, who has been the main goading force. I am also grateful to Shri R. Yusuf Ali, formerly Chief Secretary for his advice and appraisal of the draft.

My grateful thanks are also due to Shri B. Hussain, Deputy Secretary (Political) and Shri M. P. Hazarika, Director of Information and Public Relations, who are members of the Advisory Board, for the help and support extended by them to bring out the gazetteer. I am thankful to Shri L. N. Chakravarty, till recently the Director of Research and member of the Advisory Board, for his scrutiny of the draft and useful suggestions.

I will be failing in my duty, if I do not express my thanks to Dr. P. N. Chopra, M.A., Ph.D., Editor (Gazetteers), Government of India, Department of Culture and the staff of the Central Gazetteers Unit, Union Ministry of Education, New Delhi, for their effective role in planning and co-ordinating the work of preparation of the District Gazetteers. The Unit scrutinised the draft of this volume with great care and made several helpful suggestions with a view to improving the standard and quality of the publication. It may also be mentioned here that a portion of the expenditure incurred on the compilation and printing of the District Gazetteers is being met by the Government of India.

Indeed, I am obliged to so many Government officials for being able to prepare the final draft for publication that I feel I can hardly express in full measure my acknowledgement of debts to all of them. I am largely indebted to Shri T. K. M. Baruah, District Research Officer as also to Dr. H. Bareh and Shri S. M. K. Subhani, both of whom were Editor (Gazetteers), Arunachal Pradesh for the periods 1965-66 and 1967-73 respectively. The publication of this gazetteer would not have been possible without the drafts prepared earlier by them.

My grateful acknowledgements are also due to officers of various departments and the district offices of the Government of Arunachal Pradesh for their co-operation and constructive suggestions. Many of them sent us a mass of data and information. I should like to record my thanks to Shri J. N. Chowdhury, till recently the Librarian, Central Library; Shri C. K. Maupoong, formerly Extra Assistant Commissioner, Anini Sub-division and Shri Nirod Baran Mazumder, the then Statistical Inspector, Forest Department, Shri A. M. Chanda, Deputy Director of Economics and Statistics, Shri Y. A. Gohain, Shri A. K. Paul, Tabulation Officers and Shri K. J. Pandit, Artist of the Directorate of Census Operations, Arunachal

Pradesh have lent us helping hands for preparation of the maps drawn under the direction of the Survey of India. They have also supplied us important statistical and census data. I would thank all of them gratefully.

At my request Shri B. Kakoti, the then Geologist (Sr.)-in-Charge, Geological Survey of India, Arunachal Pradesh Circle, and Dr. A. K. Ghosh, the then Officer-in-Charge, Eastern Regional Station, Zoological Survey of India sent important reports on geology and fauna respectively. I am grateful to them. I am also greatly indebted to Dr. A. S. Rao, the then Regional Botanist, Botanical Survey of India, Eastern Circle for his valuable floristic account. I owe a special debt to Dr. S. K. Jain, till recently the Deputy Director of the same circle of the Botanical Survey of India, for his keen and active interest in the preparation of botanical reports for the gazetteers.

I have the pleasure of recording my grateful thanks also to Shri R. N. Bagchi, Art Expert for the cover-design and lay out of the publication ; Shri C. Khanikar for the help rendered by him to publish this volume, and Shri S. N. Goswami and Shri Dipak Choudhury for the photographs.

I express my deepest thanks to all my colleagues, the officers and members of staff of the department, who have worked as a team and contributed their mite to bring the compilation of this gazetteer to its completion. Shri C. K. Shyam, Compiler, in particular, has been of immense help in preparing the final draft and press copy for publication. I should specially thank him. Dr. S. D. Tyagi, Compiler collected some very valuable information. Shri Kamalendu Ghosh, Research Assistant, worked hard to collate the text typed out painstakingly by Shri S. C. Deka, Lower Division Clerk and Shri S. S. Marbaniang, Stenographer.

Shillong

S. DUTTA CHOUDHURY

October 18, 1978

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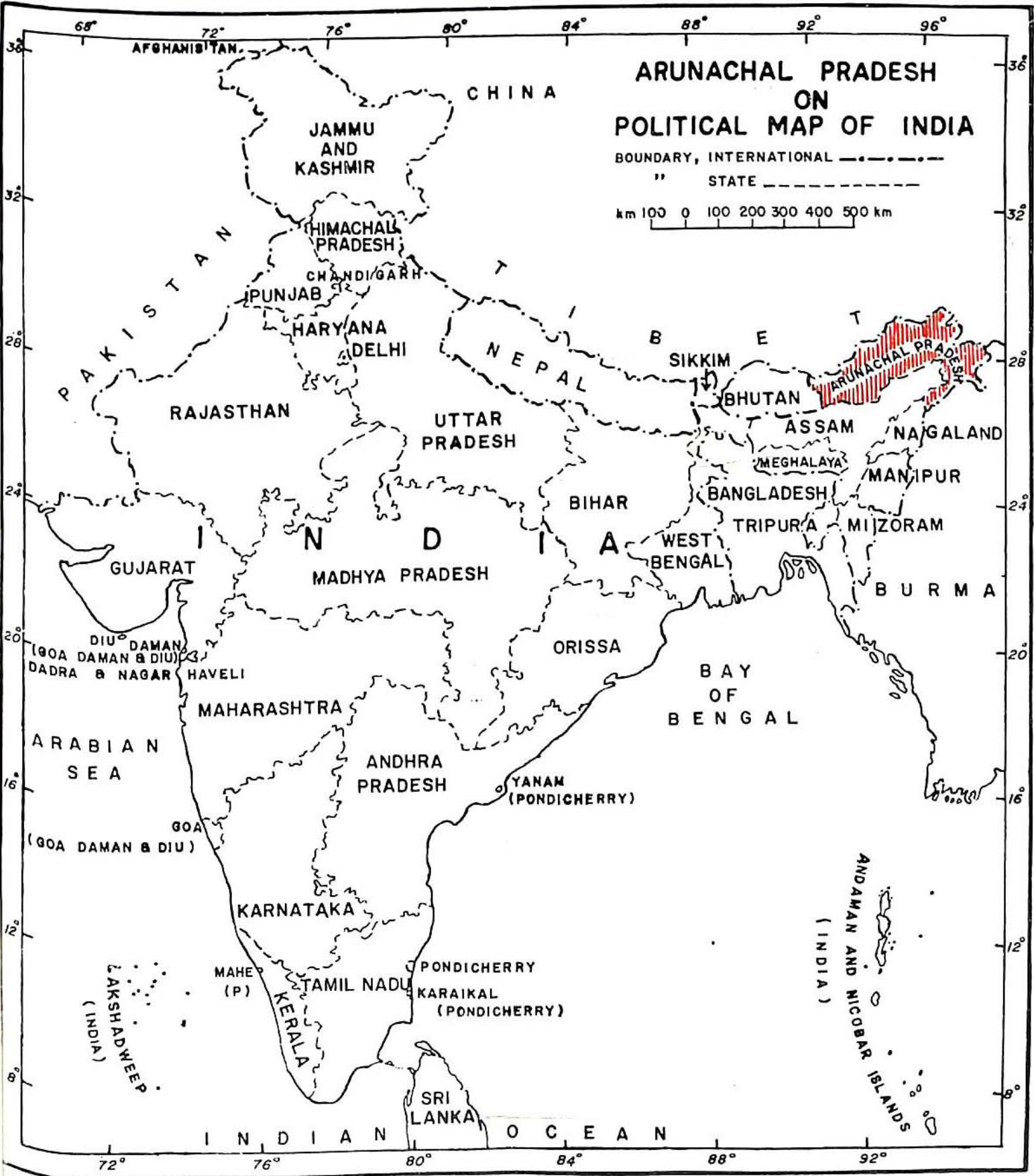
## GUIDE TO SPELLINGS OF PLACE AND OTHER NAMES

NAME		CORRECT VERSION	NAME		CORRECT VERSION
Arunachal	...	Arunāchal	Kamlang	...	Kāmlāng
Chaglagam	...	Chāglogām	Kibithoo	...	Kibitho
Chappri	...	Chāpari	Lallichapri	...	Lāli Chāpari
Charduar	...	Charduār	Man Bum	...	Mān Bum
Chowkham	...	Chowkhām	Mathun	...	Māthūn
Dambuk	...	Dāmbuk	Mayu	...	Māyu
Deopani	...	Deopāni	Namsai	...	Nāmsāi
Dibang (or Dibong)	...	Dibāng	Nizamghat	...	Nizamghāt
Digaru	...	Digāru	Pasighat	...	Pāsighāt
Dihang (or Dihong)	...	Dihāng	Patkai	...	Pātkai
Dillee	...	Dilli	Paya	...	Pāya
Dirak	...	Dirāk	Santipur	...	Sāntipur
Disang	...	Disāng	Sitpani	...	Sitpāni
Etalín	...	Etālin	Talon	...	Tālon
Galai	...	Galāi	Tengapani	...	Tengapāni
Ghalum	...	Ghālum	Timai	...	Timāi
Glao Hawel	...	Glāo Hawel	Twang	...	Twāng
Granli	...	Grānli	Waket	...	Wāket
Hawai	...	Hawāi	Wakro	...	Wōkro
Hayuliang	...	Hayuliāng	Walong	...	Wailāng
Kamakhya	...	Kāmākhyā	Zayul	...	Zāyul

# ARUNACHAL PRADESH ON POLITICAL MAP OF INDIA

BOUNDARY, INTERNATIONAL - - - - -  
" STATE - - - - -

km 100 0 100 200 300 400 500 km



Based upon Survey of India map with the permission of the Surveyor General of India.  
 The territorial waters of India extend into the Sea to a distance of twelve nautical miles measured from the appropriate base line.  
 The boundary of Meghalaya shown on this map is as interpreted from the North-Eastern Areas (Reorganisation) Act, 1971, but has yet to be varified.  
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ARUNACHAL PRADESH  
DISTRICT LOHIT

km 16 0 16 32 48 km



Boundary, International.....	---
" State.....	---
" District.....	---
District H.Qs.....	■
Sub-Divisional H.Q. under A.C./E.A.C....	▲
" " " " Addl. D.C.....	□
Circle H.Qs.....	○
Historical/Archaeological sites and Pilgrim centres.....	●

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## PHYSICAL FEATURES AND NATURAL RESOURCES

*Origin of the Name of the District*

The district derived its present name from one of its principal rivers, the Lohit (also spelt Lohit), which rises from the eastern Tibet and enters India near Dichu village in the Kibithoo area of the district. Flowing southward it drains the eastern part of the district and meets the Dibang near Sadiya and then the Dihang (or Siang). The confluence of these rivers is known as the Brahmaputra. In the ancient Indian literature the river is called Lauhitya, a name which is associated with the legends of Parasuram.

The name of the area now known as the Lohit District underwent a series of changes. In 1914, this area was a part of the administrative unit called the Central and Eastern Sections, North-East Frontier Tract, which was renamed in 1919 as the Sadiya Frontier Tract. In 1948, the Mishmi Hills District was created as a result of the bifurcation of Sadiya Frontier Tract. In 1954, the Mishmi Hills District came to be known as the Lohit Frontier Division, and finally in 1965 as the Lohit District.

*Location, General Boundaries, Area and Population*

The Lohit district is situated on the north-eastern extremity of Arunachal Pradesh. It lies approximately between the latitudes 27°-33'N and 29°-22'N and the longitudes 95°-15'E and 97°-24'E. The latitude of 28°N crosses the district at its broadest part and the longitude of 96°E runs through its longest part. The district map resembles, as though, a hunting boot in outline with its toe pointing towards the east.

The district is bounded on the north by Tibet (China), on the east by Burma, on the west by the Siang District of Arunachal Pradesh and the Lakhimpur District of Assam and on the south by the Tirap District of Arunachal Pradesh.

The district occupies an area of 24,427 sq. km,\* and its total population is 62,865 persons of whom 35,461 are males and 27,404 females as enumerated in the 1971 Census. Although Lohit is the largest district of Arunachal Pradesh, it is very sparsely populated. The density of population is 3 persons per sq. km compared to 6 persons per sq. km in Arunachal Pradesh as a whole.<sup>1</sup> \* The population is almost entirely rural.

\*Area figure is provisional.

<sup>1</sup> Census of India, 1971, Arunachal Pradesh, Part II-A, pp. (ix), (xi), 10 & 19.

### *History of the District as an Administrative Unit*

The history of the district as an administrative unit may be traced back to the year 1914 when the North-East Frontier Tract consisting of three administrative units—(1) the Central and Eastern Sections, (2) the Lakhimpur Frontier Tract and (3) the Western Section came into existence. The first and third units with headquarters at Sadiya and Charduar respectively were each placed under the charge of a Political Officer and the second unit under the Deputy Commissioner, Lakhimpur District. In the year 1919, the Central and Eastern Sections was renamed as the Sadiya Frontier Tract and the Western Section as Balipara Frontier Tract. The Lakhimpur Frontier Tract continued to be known as such. In the year 1943, a new administrative charge was created with inclusion of certain area from the Sadiya Frontier Tract and the Lakhimpur Frontier Tract and was named as the Tirap Frontier Tract. In 1948, under the North-East Frontier Tracts (Internal Administration) Regulation, 1948 the remaining portion of the Sadiya Frontier Tract was divided into two separate administrative charges, namely the Abor Hills District and the Mishmi Hills District each under the charge of a Political Officer with headquarters at Pasighat and Sadiya respectively. In 1951, the plains portion of the Mishmi Hills District was transferred to the administrative jurisdiction of the Government of Assam. In 1952, the headquarters of the Mishmi Hills District were shifted from Sadiya of Tezu. According to the North-East Frontier Areas (Administration) Regulation, 1954, the North-East Frontier Tract came to be known as North-East Frontier Agency and the Mishmi Hills District was renamed as the Lohit Frontier Division. In 1956, the Dibang Valley was constituted as a separate administrative unit within the division and placed under the charge of an Additional Political Officer with his headquarters at Roing which was subsequently shifted to Anini. In 1965, under the North-East Frontier Agency (Administration) Regulation, 1965, the Lohit Frontier Division came to be known by its present name—the Lohit District, and the Political Officer and Additional Political Officer were redesignated as the Deputy Commissioner and Additional Deputy Commissioner respectively.

### *Sub-Divisions and Circles*

The district is divided into five sub-divisions<sup>1</sup>, namely Tezu, Namsai, Hayuliang, Anini and Roing which are further divided into circles. The first named three sub-divisions are situated in the Lohit and Kamlang Valleys administered by the Deputy Commissioner, Lohit District and the last two in the Dibang Valley administered by the Additional Deputy Commissioner, Dibang Valley. A brief description of the sub-divisions is as follows :

*Tezu* : The Tezu Sub-division with Tezu as the district as well as sub-

<sup>1</sup> Vide the North-East Frontier Agency Administration letter no. GA-40/71 dated May 21, 1971 on administrative jurisdiction and revised set-up delimiting circles and sub-divisions in the districts.



divisional headquarters is in the over-all charge of the Deputy Commissioner, Lohit District. He is assisted at the headquarters by a number of Extra Assistant Commissioners and Circle Officers.

Tezu is the only circle of this sub-division, and it comprises the Tezu township and a number of nearby villages inhabited by the Taraon (Digaru) Mishmis.

*Namsai*: The Namsai Sub-division is divided into three circles, namely Namsai, Wakro and Chowkham, each under a Circle Officer. An Extra Assistant Commissioner with his headquarters at Namsai is the sub-divisional head.

The sub-division comprises the southern part of the district. The Namsai and Chowkham circles are inhabited mostly by the Khamptis and the Singphos, and the Wakro circle by the Taraons.

*Hayuliang*: The Hayuliang Sub-division is in the charge of an Extra Assistant Commissioner with his headquarters at Hayuliang. He is assisted at the headquarters by a Circle Officer.

Situated in the eastern part of the district adjoining both Burma and Tibet, the sub-division is constituted by five circles, namely Hayuliang, Chaglagram, Hawaii, Walong and Kibithoo. Each of these circles is in the charge of a Circle Officer.

The Kaman (Miju) and the Taraon Mishmis are the inhabitants of this sub-division. The Zakhrings and Meyors live in the Walong-Kibithoo areas in the northern extremity of the sub-division.

*Anini*: The Anini Sub-division is situated in the remote northern part of the district bordering Tibet. It consists of three circles, namely Anini, Etalin and Adane.<sup>1</sup> The headquarters of the Additional Deputy Commissioner, Dibang Valley is at Anini, where he is assisted by some Extra Assistant Commissioners and Circle Officers. An Extra Assistant Commissioner is the sub-divisional head. The other two circles are each in the charge of a Circle Officer. The sub-division is inhabited mainly by the Idu Mishmis.

*Roing*: The Roing Sub-division comprises the western part of the district inhabited by the Idu Mishmis and the Padams.

Roing, Dambuk and Desali are its three circles. An Extra Assistant Commissioner with his headquarters at Roing is the sub-divisional head, and he is assisted by two Circle Officers at the headquarters. Dambuk and Desali circles are, each under a Circle Officer.

### *Topography*

Mountains are the most imposing features of topography of the Lohit District. Situated in the easternmost stretch of the Himalayas flanked by the Patkai and other associated ranges on the east, the district contains many lofty ranges and towering peaks, some of which rise above 5000 m.

<sup>1</sup>The circle headquarters later shifted to Anelih.

The mountains are precipitously steep with altitudes varying from 610 m to 5182 m. The ranges along the northern border are perpetually covered with snow. On the southern fringe of the district, a strip of land rises gradually northward from the plains to the foot of the hills. The Man Bum (range) spurs out from the Patkai, and descends to this plain belt on the south-eastern part of the district.

Between the craggy hills the dales open out at some places to plateaus with bold undulations intersected by glens and ravines. From the higher elevations of this mountainous tract, spring forth a number of rivers of which the Lohit and Dibang are the main.

The Dibang Valley is a rugged area of steep hills and mountains spreading out to the northern border. The ranges along the border are snow-clad. The valley is most formidable for its difficult terrain marked by sharp contours of pointed hills and precipitous slopes.

The scenic beauties of the Lohit District are splendid. The snowy mountains along the international border, the lower hills decked with dense evergreen forests, and innumerable rivers and rivulets cascading down from the rocky heights and rippling through the green expanse of the valleys constitute a panorama, which is at once magnificent and awe-inspiring.

### *River System*

The principal river of the district is Lohit. The Mishmis call it Tellu. It rises from the mountain range across the north-east border of the district, where it is known as the Zayul Chu. Flowing southward it enters the district through a gorge approximately 6 km north of Kibithoo. The river has a course of about 190 km through precipitous hills and valleys before it reaches the plains at Parasuram Kund, a place of pilgrimage near Tezu. It receives in its course many tributaries of which Dau (Dou), Derai (Delai), Digaru, Ghalum (Kallung), Dichu, Tidding, Kamlang and Noa-Dihing are important. All these rivers are snow-fed perennial water-channels, and before they join the Lohit river they are also fed by many rivulets.

The Dibang is the main river of the western part of the district. It cuts through deep gorges and difficult terrain in its upper course. Originating from the 'southern flank of the great Himalayan range', it flows from north to south through the district, and finally meets the Lohit near Sadiya. The main tributaries of the Dibang are the Dri and the Ithun.

The Dibang is called Talon by the Idus. It changes its course very often in the foothill regions and erodes its bank whenever it is in spate. All the tributaries of Dibang in their turn are fed by small perennial streams.

The river Sessiri in the western part of the district flows from north to south along the boundary of the Lohit and Siang Districts at some length. Descending into the plains of Assam the river bifurcates and meets the Dihang and the Dibang.

The plains towards the south of the district is drained by the Kamlang and Noa-Dihing rivers. The main tributaries of the Noa-Dihing in the Lohit

District are Dirak on the left bank and Tengapani on the right. During the monsoon, the rivers overflow their banks causing serious erosions. They change their course very often and cut themselves into innumerable channels. The river Kamlang originates from the Glao lake in the Wakro circle and flows east-west to meet the Lohit river.

The flood waters of these rivers cause considerable damage to the roads and bridges almost every year. In 1951, the Sadiya town was washed away by the flood waters of the Lohit. The road communications in the lower regions of the district are frequently disrupted during the monsoon.

#### *Lakes and Springs*

In the Dapha Bum region on the south-eastern fringe of the Lohit District adjacent to the border of Tirap District lies a large natural lake called Glao Hawel at an altitude of about 1,400 metres. A team of geologists visited the lake to ascertain whether its origin lay in pleistocene glaciation, and observed that a dyke of rocks running across a basin of marble and gneiss dams up the water into a lake. It is situated on the upper reaches of one of the tributaries of the Kamlang river. On the high watershed of the Tellu valley on the east and west of the Walong area, there lie many lakes, large and small, within an orbit of about 1,200 sq. km. Most of these lakes are situated above 3,000 metres. Another noticeable hydrographic feature of the lower regions is the large *beels* or shallow lakes formed by the shifting rivers. These *beels* are natural fish ponds.

There are two hot springs in the district, one on the right bank of the river Dichu at a distance of 39 km from the confluence of Lohit-Dichu rivers about 64 km east of Kibithoo, and the other on the right bank of the Lohit river at a distance of 4 km north of Walong on the way to Kibithoo. There are many other springs in the district used as sources of water supply to the village settlements.

#### *Problem of Water-Logging*

Water-logging is a problem particularly of the Namsai area. During monsoon, the Noa-Dihing overflows its left bank and the flood-waters enter a number of villages causing considerable damages to the cultivation fields. The villages which suffer badly from the water-logging are Dharampur, Krishnapur, Tekorani, Mohaloni, Lekang Gohaingaon, Raja Beel, Rangali Beel, Dirak etc. The Namsai township is also inundated at times by the flood-waters of the Noa-Dihing sweeping through the swamps and low-lying areas. As a result, an area of about 14 km from the Ningru village to the Namsai township gets water-logged.

## GEOLOGY

### *Introduction*

Lohit, the largest among the districts of Arunachal Pradesh, is comparatively less known in the geological literature, probably because of the

difficult terrain conditions and limited accessibility. Nevertheless, the record of geological observations in this district dates as far back as to 1825. Geological interest in the modern sense was, however, taken about four decades ago with particular reference to the eastern syntaxial bend in the geotechnical projects and earthquakes. The activities of the Geological Survey are now directed towards the stratigraphic and tectonic problems and investigation of mineral deposits. The ultrabasic rocks in the lower Himalayan region of the district also present an unique geological feature.

### *Physiography*

The terrain may be divided into three main physiographic units as follows :

(1) The plain-belt of Lohit forming the eastern continuity of the upper Assam plains is drained and often inundated or marooned by the powerful westerly flowing Dibang, Lohit, Kamlang and partly Noa-Dihing rivers. These rivers pour a large volume of waters to the Brahmaputra.

(2) The lesser Himalayan region rising abruptly from the Lohit plains and comprising a rugged mountainous and forested terrain with conspicuous northwest-southeast ridges with altitudes above 3000 m in its middle reaches.

(3) The higher Himalayan region, which is normally snow-clad, rises to altitudes around 5200 m. The comparatively low ridges of the lesser Himalayas gradually rise to high snow-covered areas, particularly in the watershed of the Lohit (Tellu) river.

The Lohit and Dibang rivers and their important tributaries emerge from the higher Himalayan region. The Kamlang and Noa-Dihing rivers on the south emerge from the Dapha Bum range of the lesser Himalayas. The Dibang Valley is probably the most awe-inspiring, whereas the Lohit river is the longest antecedent system emerging on the northern side of our frontier.

### *Tectonics*

The general physical succession of rocks as seen from the Lohit plains to parts of the higher Himalayas in the north-east-southwest direction may be represented as below :

#### NORTH-EAST

Diorite-granodiorite complex

#### Lohit Thrust

Schistose metasediments (Chlorite-quartz and Mica schists, carbonate rocks, emplacements of basic and ultrabasics.

#### Thrust (?)

Tidding limestone, quartzites, quartz-sericite schists  
(fault and/or unconformity?)

Parametamorphites (high grade schists and paragneisses)

Mishmi Thrust  
Upper Tertiaries and/or Quarternary  
Lohit alluvial plain

SOUTH-WEST

(i) *Diorite-granodiorite Complex*

Exposed at about 8 km away from the Tidding bridge on the Tidding-Hayuliang road, the diorite gneisses are thrust (Lohit thrust) against the quartz mica schists. The foliated and amphibole bearing diorite gneisses are further north-eastward, associated with non-foliated granodiorite, foliated biotite gneiss, leucocratic granite, metanorites, pegmatites, marbles, hornblende schists etc. as seen along the Lohit (Tellu) valley up to Walong area. In its north-western strike continuity this zone is identifiable in the Dibang Valley near Endolin. On the south-east of the Lohit (Tellu) Valley, these rocks have been encountered in the Kamlang Valley in the region of Chulam pass on the Dapha Bum range, and further south-eastward they are bound to continue within the zone of the Burmese Axial.

The most characteristic rock type is the foliated grey to greenish coloured diorite gneisses. Bands of amphibole and chlorite schists and marbles have been noted in Minutang Valley and between Minzong and Walong. Masses of non-foliated hornblende granodiorite are seen almost concordantly emplaced in the diorite gneiss. A light coloured somewhat foliated granodiorite rock (leucocratic granodiorite) is also seen emplaced within this complex in the Minutang valley. Metanoritic bodies are seen in the Hayuliang-Tawliang region and on the upstream of the Tellu valley. Most of the gneisses and emplaced rocks show characteristic epidotisation. Some lamprophyric bands have also been described within the dioritic gneiss. It is surmised that granitic bodies akin to the granite bodies of the Putao of Burma may also be occurring further north-east in the higher Himalayan regions.

Although the general foliation is northwest-southeast, the regional changes within this complex indicate folding and strong dislocation movements. The widespread epidotisation observed in the area may be related to the regional shearing movements suffered by these rocks, probably during the Tertiary times. It has been suggested that the appearance of epidote in the Tipam sandstone (Miocene) for the first time in the Assam Tertiary sediments may have some relation with the epidotisation in the Himalayan region of Lohit.

Some surveyors believe that the whole complex belong to the Precambrian age, while others surmise the possibility that this complex might have been affected by successive tectonic and intrusive phases from the pre-early Palaeozoic to Tertiary times.

(ii) *Schistose Metasediments*

A characteristic group of rock comprising chloritic schists with arena-

aceous bands shows extremely fine banding sometimes accompanied by graded bedding. Upwards in the secession carbonaceous and calcareous bands start appearing while towards the top the schists are mostly arenaceous with chloritic and sercitic constituents. In the Tidding river section, the basal rocks are intimately associated with serpentinites (ultrabasics) showing conspicuous sheared bands. The serpentinites have been recorded as far south-east as the middle reaches of the Kamlang river in the strike continuity. On the north-west the serpentinites have not been reported beyond the Tidding Valley, but the schistose belt is prominent with amphibolitic and occasional carbonate bands in the Dibang Valley as seen south of Endolin. This schistose belt shows regional northwest-southeast trend with moderately high north-easterly foliation/bedding dips. Some surveyors assign it to the Pre-cambrian (Daling) age, and group them with the Tidding limestone, parametamorphites etc. of the frontal range. The other surveyors feel that it could be a flysch facies, probably of the Pre-hercynian geosynclinal belt, which has now been overthrust against the south-western platform rocks represented by the Tidding limestone in the Tidding Valley, and feel that part of these schists might have been granitised into diorite gneisses of the diorite-granodiorite complex.

#### *Tidding limestone, quartzites, quartz schists etc.*

Grey crystalline limestone of the Tidding Valley has been traced between the Tidding and Lang rivers, on both sides of the Lohit Valley. From the regional picture it appears that these limestones overlie quartzitic rocks which seem to widen up south-eastwards. Some ill-preserved fossil like casts tempted some to assign the limestone to the early Palaeozoic age. This limestone has not so far been recorded in the Dibang Valley. The limestone is tightly folded and faulted in the Tidding Valley. As the chloritic schists are tentatively considered to be overthrust unit sitting on it, it is possible that this platform facies is tectonically cut off strikewise.

#### *Parametamorphites*

A folded sequence of high grade schists comprising quartz, mica, garnets, graphite, sillimanite schists and para-gneisses (biotite gneiss-augen to banded type) etc. occur on the outermost south-westward ridge of the Lohit Himalaya. These rocks underlie the Tidding limestone, and towards the western base of the ridge finally laminated micaceous quartzitics quartz schists and some marble bands underlie the high grade parametamorphites.

The parametamorphites are found extending as far south-eastwards as the Kamlang Valley east of Wakro. The micaceous quartzites and quartz schists of Demwe-Deningam area physically underlying the high grade metamorphites extend further north-westwards where these are intimately associated with gneisses rocks in the outermost range in the Dibang Valley. In the north-west of the Dibang Valley this unit is represented by fine grained flaggy to schistose quartzites overlying the Mishmi thrust against the narrow

zone of upper Tertiary rocks. It has been suggested that the parametamorphites represent a folded recumbent fold on the Sewak ridge. If so, it is possible that the micaceous quartzites, marbles etc. along the Mishmi thrust are the inverted parts of the fold and possibly these may be smaller thrust slices within this highly tectonised zone. The Mishmi thrust on which the parametamorphites rest has undergone movements at least as late as Pliocene as it overrides the rocks of probably that age, if not the younger ones. In fact, the south-eastern part of the Mishmi thrust shows movements later than that of the Naga thrust which affects the Dihing beds of Man Bum area.

### *Tertiaries etc.*

A narrow zone of sands, minor clays and some pebble beds showing north-easterly trend is seen north-west of the Dibang Valley. In the Nizamghat area similar Plio-pliestocene rocks are seen with a north-westerly trend. These upper Tertiary-Quarternary rocks thus form a knee bend which has been taken as one of the evidences for the syntaxis in this part of the Himalayas. Occurrence of definite Tertiary rocks underlying the Mishmi thrust has not been reported from the south-east so far. But there can be no doubt that the Tertiary-Quarternary rocks immediately underlie the alluvium of the Lohit plains. It is evident from the aeromagnetic surveys indicating nearly 5000 metres of sediments above the basement.

The eastern syntax in the Lohit Himalayas is still a problem to be studied carefully. It is not certain whether the zone of Mishmi thrust (north-west-southeast) in the Lohit District really turns and joins its counter parts with northeast-southwest trend in the Siang District. Moreover, Gondwanas and Miri quartzites of the Siang District are cut off and do not seem to extend in the Lohit Himalayas. An orographic bend may not necessarily mean a similar bend in the constituent formations.

## MINERAL OCCURRENCES

### *Asbestos*

Localised occurrences of fibrous amphibole-asbestos are observed at about 1 km upstream of the confluence of Lohit (Tellu) and Tidding rivers on the Tezu-Hayuliang road and in the Tidding Valley. This mineral is usually found to be associated with talc-termolite schist in intimate association with the serpentinites.

### *Clay*

In the Dibang Valley, clay occurs all along the Mishmi thrust in the foothills from Chidu ( $28^{\circ}12' : 95^{\circ}47'$ ) to Koronu ( $28^{\circ}03' : 95^{\circ}57'$ ). The white brownish clay which is often mixed with crushed quartz occurs in the form of very thin lenses in crushed feldspathic quartzite. These

occurrences are pockety in nature and too small to be considered for economic exploitation.

### *Copper Ore*

Minor stringers of copper ore in the form of chalcopyrite, bornite, covellite, azurite etc. and in association with quartz. Keins have been noticed in hornblende granite boulders in and around the Tellu river, a tributary of the Lohit (Tellu) river near 84.6 km on the Tezu-Hayuliang road.

### *Graphite*

A deposit of low grade graphitic schist occurs at Lalpani ( $27^{\circ}56' : 96^{\circ}22'$ ) at about 50 km from the Tezu-Hayuliang road. The deposit comprises bands of garnetiferous graphitic schist in which graphite occurs in the form of fine to medium sized flakes and inclusions. The associated rocks are garnetiferous quartz—mica schist, garnetiferous gneisses, staurolite-kyanite schist, white crystalline limestone and garnetiferous amphibolite. The main graphitic schist body extends for about 1.10 km on the surface with an average width of about 300 m. The total reserves estimated up to a down dip depth of 100 metres are of the order of 71 million tonnes with an average of 5.86% graphitic carbon content.

### *Limestone*

A deposit of good quality (cement grade) crystalline limestone is located at Tidding ( $27^{\circ}58' : 96^{\circ}24'$ ) near the confluence of Tidding and Tellu rivers. The deposit, situated at about 65 km from Tezu can be approached from Tezu by the Tezu-Hayuliang road. Internally folded band of finely-bedded crystalline sometimes massive limestone appears to continue for more than 20 km strikewise. Based on preliminary investigation carried out by the Geological Survey of India, the estimated reserves of the limestone for a length of 1.70 km with an average thickness of 240 m are of the order of 25 million tonnes down to a vertical depth of 50 m.

A detailed surface investigation of the limestone deposit was carried out recently by the Geological Survey of India. The observations are as follows :

(a) *Tezu Area* : Near Tezu ( $27^{\circ}54' : 96^{\circ}09'$ ) there are two occurrences of marble within the metamorphites rising from the Tezu plain. The marble is, in general, white, medium grained and jointed.

(i) *Tezu River Deposit* : A lenticular deposit of crystalline limestone/marble occurring among schists, granulites etc. is located at about 13 km north-west of the Tezu-Denning road. The band has a surface extension of about 1230 m with an average thickness of 92 m. Chemically the marble has shown CaO—24.35 to 31.29%, MgO—0.66 to 12.10%,  $R_2O_3$ —0.33 to 1.60% and insolubles—19.64 to 47.4%. The total reserve of marble in this area upto a depth of 50 m is estimated at about 30.3 metric tonnes.



(ii) *Dora River Deposit* : The deposit occurs at about 10 km from Tezu towards the east along the bed of Dora river. There are two major lenses of this calcareous rock within quartz-felspar-sericite schist. The lenses vary from 45 m to 186 m in thickness and from 160 m to 875 m in length. The analytical results show that the marble contains CaO-20.08 to 26.07% ; MgO-3.51 to 16.95%,  $R_2O_3$ -0.43 to 1.60% and insolubles—28.60 to 48.36%. The probable reserve of this carbonate rock is about 43.3 metric tonnes down to a depth of 50 m.

The physical and chemical properties of the marble occurrences described above indicate that the deposit, in general, are likely to be suitable for lime burning. In somewhat selective manner, the material could also be found useful as building stones and marble chips for mosaic flooring.

(b) *Lohit (Tellu) Valley Deposit* : A 200 metre thick marble band with an intercalating band of hornblende schist (4m) is located west of Bambi ( $27^{\circ}58'$  :  $96^{\circ}58'$ ) village in the Lohit Valley. The marble contains 53.62% CaO, 1.14% MgO, 43% other oxides and 2.53% insolubles.

A number of marble bands are visible along the Tezu-Hayuliang road between 40 km and 70 km stones. They are generally coarse grained and siliceous in nature. However, the banded character and compact nature of these bands may render them useful for lime processes and building purposes.

(c) *Dibang Valley* : Two bands of impure marble of about 40 to 150 m width occur along the Talon river in the Dibang Valley. Another band of about 200 m thickness occurs at about 3 km north of Granli ( $28^{\circ}40'$  :  $95^{\circ}56'$ ) village. A few chemical analyses have indicated presence of high grade calcic bands within the marble. A thin impure marble band is noticeable on the bank of Echi N (Inchinala) near Endolin ( $28^{\circ}30'$  :  $95^{\circ}51'$ ).

### *Mica*

Minor occurrences of biotite and muscovite books in the pegmatite are observed in the Dibang Valley. These are highly crumpled and fractured and about 6 cm to 8 cm in diameter. The muscovite flakes are, however, highly stained rendering them uneconomic.

### *Pyrite and Pyrrhotite*

Minor stringers and patches of pyrite are observed in a 10 m wide band of epidote granulite within hornblende schist west of Orsam village ( $28^{\circ}00'$  :  $96^{\circ}58'$ ) about 16 km downstream of Walong ( $28^{\circ}07'$  :  $93^{\circ}01'$ ) in the Lohit Valley. Strike extension of this zone is not known.

Disseminations and thin stringers of pyrite with rare chalcopyrite are also reported (i) near Arnuli ( $28^{\circ}37'$  :  $97^{\circ}01'$ ) in diorite grains, and (ii) Roing ( $28^{\circ}07'$  :  $95^{\circ}50'$ ) areas about 10 km upstream of the Deopani river in association with chlorite-quartz schist within felspathic quartzite.

These occurrences are of academic interest only.

### *Talc*

Existence of a low grade talcoseschist with pyrite crystals embedded in the schistose matrix is also reported. The talc though of inferior quality could be explored for economic use.

### *Earthquake*

Seismicity is high in this region. In 1897 and 1930 tremors of not very devastating nature were recorded. But, the terrible earthquake of August 15, 1950 with its epicentre close to Rima in Tibet, shook the terrain violently. It was the greatest earthquake recorded in the history of this area and its menacing effects were enormous. It was catastrophic. The earth was shaken and shattered and the tremor continued for a number of days. The earthquake brought down an endless cascade of rocks and boulders into the stricken district. The hills were mutilated from where millions of tons of rocks loosened by the earthquake dislodged themselves and crashed into an appalling explosion. The rock avalanches came thundering down from above the eroded hills and produced a terrifying clatter and an agonising sound which at times turned into a deafening roar. A large cloud of dust raised above enveloped and smothered a vast area.

The devastations in the wooded hills and valleys brought down countless tons of logs and timbers and vegetations over an wide area were absolutely destroyed as though they had never been there. It was a shocking spectacle, for the entire faces of hills were peeled off, leaving not a shred of vegetation. From the top to the bottom, range after range was stripped off, and hardly any tree was visible where there were deep forests. The devastating earthquake of 1950 laid many parts of the land bare and desolate.

A serious consequence of the earthquake was that many rivers were blocked by landslips and choked by debris which fell into them from the rocks. Immeasurable quantity of mud was hurled into torrents turning the sparkling blue water into a thick chocolate brown paste. There were floods in the rivers when the accumulated rubbles broke open causing heavy rush of pent up water. Indeed, profound were the effects of earthquake on the river system of this district, for many cascading torrents were either altogether dried up or ceased to flow except for a trickling thread of water. Some of the rivers changed their courses considerably while some other seasonal channels were swollen into mighty streams.

The damage caused by the great earthquake of 1950 were enormous and many-sided. In some areas, the old tracks were obliterated by a chaotic jumble of granite slabs piled one above the other and many bridges collapsed, or were swept away by the floods. Some villages were buried or extinct. A great part of the flourishing town of Sadiya was destroyed and many neighbouring villages of the area were washed away leaving no trace behind.

## FLORA

The hills of Lohit District are covered by very interesting vegetation which has attracted plant explorers from long before. Griffith, a member of the Assam Tea Delegation that travelled in the upper Assam area in search of wild tea discovered many new species. More recently Kingdon-Ward, a professional plant-hunter explored these forests several times in 1926, 1928, 1949 and 1950 and introduced innumerable plants into temperate gardens. The Botanical Survey of India has been studying in detail the vegetation of this district and collecting plants of the area since 1956. A specially organised joint scientific survey team including Geological, Botanical, Zoological, Anthropological and Archaeological Surveys made a two-month study of the area around Dapha Bum in 1969-70.

Conducive climatic and edaphic factors and the geographical location of the Lohit District foster a vegetation luxurious in its density and most varied in its rich species content. Virgin forests are very much restricted to isolated areas where man's destructive hand has not been able to reach as yet. In many areas there are scrub jungles of secondary vegetation that have sprung up on abandoned *jhum* lands. In other areas the vegetation is kept in a sub-climax state by periodic devastation caused by sweeping floods of the numerous mountain streams and rivers that feed the Lohit or red river that gives the district its name. From the plains it is a common sight to see ugly bare soil patches amidst dense forest greenery consequent on huge landslides. The banks and flood plains of several rivulets are choked with gregarious growth of tall grass, chiefly *Neyraudia reyna-udiana* with inter-twining *Equisetum* sp. and dotted with tress of *Bombax ceiba* of various age.

The regions adjacent to the Lohit river and in lower elevations support a deciduous forest with islands of evergreen forests, the vegetation looking very much like that in the adjacent upper Assam plains. The dense vegetation displays a tiered arrangement very much similar to other rain forests. The trees are dense, close together, with tall boles carrying the widespread canopy to the sky. The dominant species are *Dipterocarpus macrocarpus*, *Terminalia myriocarpa*, *Acrocarpus fraxinifolius* and *Chikrassia tabularis* with a second line of nearly equally tall trees of *Mesua ferrea*, *Lagerstroemia parviflora*, *Ptersospermum acerifolium*, *Bischofia javanica*, *Cinnamomum* spp, and *phoebe* sp. Mixed with these are found scattered specimens of *Adina cordifolia*, *Schima wallichii*, *Macaranga*, *Mallotus* and *Bridelia* sp. *Gmelina arborea*, *Albizia* sp. and *Bauhinia* spp. *Talauma hodgsoni* and *Dillenia indica*, particularly frequent along stream and river margins. These trees are intertwined and enmeshed in a variety of woody climbers or lianes chiefly belonging to the families: *Vitaceae*, *Menispermaceae*, *Cucurbitaceae*, *Acanthaceae*, *Caesalpinaceae* and *Mimosaceae*. There is the *gymnospermous* climber *Gnetum ula* also. Amongst the *herbaceous* climbers exist members of the family *Piperaceae*, *Araceae*

and *Convolvulaceae*. A particularly nasty climber is the Cane palm or *Calamus* which has sharply reflexed curved prickles all over the plant.

In many open areas and along stream margins gregarious clumps of the screwpine or *Pandanus furcatus* occur with tall grasses of *Arundo donax* and *Sachharum spontaneum*. The small tree and shrub layer is extremely rich, and is composed of members of the family *Verbenaceae*, *Euphorbiaceae*, *Asteraceae* and *Melastomataceae*. There is a profusion of the ferns, mostly belonging to the family *Polypodiaceae*. In many places, the tree-ferns with distinct tall stems and a crown of huge leaves occur gregariously. Some places have a dense growth of the troublesome nettle *Girardinia*.

Herbaceous epiphytic growth occurs on almost every tree. These include chiefly ferns, fern-allies, orchids and members of the family *Gesneriaceae*, *Commelinaceae* and *Zingiberaceae*. The orchid flora is particularly striking when the plants are in bloom. The various genera of orchids present in these forests are *Dendrobium*, *Gymbidium*, *Bulbophyllum*, *Coelogyne*, *Eria*, *Oberonia* and *Pholidota*. Ground orchids like *Goodyera*, *Habenaria*, *Liparis*, *Malaxis* and *Phaius* are also present, particularly in shady, moist humus covered areas of the forest. In similar dark, dingy places, on the roots of trees, may be occasionally seen curious fleshy root parasites like *Balanophora dioica*. It is from the forests of the Mishmi hills that long ago Griffith, one of the very early plant explorers in the area, discovered another very attractive root parasite *Sapria himalayana*. This was again recently collected by the botanists who took part in the Dapha Bum Joint Scientific Surveys Expedition, 1969.

These forests contain several kinds of bamboo, *Bambusa* sp. and *Dendrocalamus* sp. that grow in immense clumps. Another easily recognised group of plants are the palms. These include *Caryota urens*, *Livistona jenkinsiana*, *Didymosperma nana* and *Zalacca secunda*. The notoriously prickly long climber forming thickets within the forest is the cane or *Calamus* which is also a palm. Selected kinds of bamboos and palms are often grown in a semidomesticated way in the vicinity of villages and hamlets to have them handy for various domestic purposes.

Subtropical evergreen forests occur at higher elevations from about 1000 m to 2000 m. These forests are not so dense or impenetrable, which have more modest-sized trees. The components are *Cinnamomum*, *Lindera*, *Magnolia*, *Quercus*, *Castanopsis* and *Pyrus* along with *Talauma*, *Sterculia*, *Mesua*, *Callicarpa*, *Rhus* and *Kydia* of the other smaller tree genera. The undergrowth in these forests is composed of *Oxyspora*, *Melastoma*, *Polygonum*, *Fagopyrum*, *Osbeckia* and *Clerodendrum*. Occasionally there are ground orchids like *phaius* and *calanthe*. In many areas there are gregarious growths of *Hedychium*, *Alpinia* and *Amomum* as also *Forrestia* and *Musa*. Here also the forest floor has a dense growth of varied ferns and fern-allies, *Selaginella* and *Lycopodium* spp. In some areas, particularly in stream beds, the scouring rush or *Equisetum* is also seen. Along the

forest margin may be seen the larger ferns like *Angiopteris evecta* and the tree-ferns *Cyathea gigantea* and *C.spinulosa*.

Above 2000 m the woody vegetation tends to be sparse in the large areas of grassy land. The dominant woody plants are the *Rhododendron*, quite striking when they are ablaze with their gaudy flowers. Others are *Eurya*, *Photinia*, *Pyrus* and *Quercus*. There are scattered clumps of *Vaccinium*, *Gaultheria* and *Berberis* as also of *Rubus* and *Rosa*. In the forest floor, there are numerous herbs of the family *Ranunculaceae*, *Rosaceae*, *Fabaceae*, *Lamiaceae*, *Acanthaceae* and *Asteraceae*.

Above 4000 m the mountain face looks almost bare. The woody vegetation in scattered clumps consists of characteristic coniferous kind including *pinus wallichianue*, *Abies densa* and *Taxus*. There are also *Rhododendron*, quite stunted and scattered.

Further up the mountain tops support an alpine vegetation composed of tussocks of dwarf grass, *Festuca* with scattered herbaceous species of *Rheum*, *Arenaria*, *Sausurea* and *Sedum*, amidst extremely stunted dwarf miniature bushes of *Rhododendron anthopogon* and *Rhododendron nivale*.

Consequent on various developmental activities and increased interference with the balance of nature in these forests, strange weeds have begun to intrude and invade the original vegetation. A striking example of this (which has now become a menace) is the *Asteraceae* climber *Mikania micrantha* which scrambles up trees and shrubs and shrouds them, slowly strangling them to their death. Valuable timber trees are affected by this virulent and noxious climber. Another example is *Eupatorium odoratum* which can outgrow native herbs and thus rob them of their due space for survival.

The local tribal inhabitants thrive on the many tubers, foliage, flowers, fruits and seeds, all harvested from the forest. Their economy is based largely on the forest products. They use the foliage of palms and the screw-pines for thatching, bamboo and cane for building and fastening, and for containers for their many domestic needs. The picturesque spiderweb-like suspension bridges slung across numerous streams and rivers, that need a steady head and firm feet to negotiate, are all cleverly constructed of bamboo and enormously long cane strands obtained from the local forests. The people also grow in a semi-cultivated way maize, paddy, *Coix*, *Eleusine*, *Ipomea batatas*, *Amaranthes*, *Shuteria vestita*, *Faqopyrum esculentum* and *Perilla ocimoides*. The highly valued medicinal plant *Coptis teeta* (the dried rhizome is sold as Mishmi teeta) is also grown on a considerable scale as a semi-domesticated plant.

Efforts have been made to beautify the district headquarters at Tezu with introduction of exotic trees like *Jacaranda* and *Eucalyptus*. However, native trees like *Gmelina*, *Adina*, *Albizia* and *Talauma* can also be put in as avenue trees. The gardens in the township contain introduced species of *Musa*, *Tapioca*, *Hibiscus* and *Murraya*.

## FAUNA

The fauna of the district is rich and varied. It includes some rare species of wild animals and birds. Zoo-geographically, the district lies in the Indo-Chinese sub-region of the Oriental Zoo-geographical Region, but some elements of Indian sub-region and palaeoartic region are also represented in this area. The district receives a large number of migratory species of birds that breed in the north of the Sino-Himalayan area. Birds of Indian sub-region are also well represented. The fauna of the district are classified under the following heads.

*Birds (Aves)*

The alluvial plains at the foot of the hills extending from Sadiya to Tezu is preferred by several species of babblers, chats warblers (Muscicapidae), bulbuls (Pycnonotidae) mynahs (Sturnidae), king-crows (Dicruridae) and quails (Phasianidae), especially the little Bustard quails *Turix sylvatica* (Desfontaines) is quite common in scrubs, grasses and in the neighbourhood of cultivation. In the lowland boggy and marshy area, along the river course, pools and tanks, some game-birds such as the swamp partiridge *Francolinus gularis* (Temminck), the cotton teal *Nettapus coromandelianus* (Gmelin), the whistling teal *Dendrocygna javanica* (Horsfield), *D. bicolor* (Vieillot), the spotted duck *Anas Poecilorhyncha* (J. R. Forster) and the comb duck, *Sarkidiornis melanotos* (Pennant) are found throughout the year. With the advent of the rainy season, the population of waterfowls increases to a considerable extent. Moreover, during this time visiting waterfowls pour in from the north. Not only the ducks, geese, teals and pochards are seen in the streams, rivers and the stagnant pools etc. but the waders too are found. The lowland jungle on the slopes of the hills is the home of the kaleej pheasant (*Lophura leucomelana lathan*) and the red jungle fowl (*Gallus gallus ssp diceous* Bonnaterre).

The steep precipitious hill slopes bear lofty dense evergreen jungle comprising enormous forest trees covered with creepers and mosses. Rattan brakes, wild bannanas, tree ferns and bamboo clusters are predominant and goat-weed and spiny creeper loops grow at the forest edge. Here one meets the peacock-pheasant *Polyplectron bicalcaratum* (Linnaeus), the little bush-quail *Turix sylvatica* (Desfontaines), the Scimitar babbler, *Pomatorhinus schisticeps* Hodgson, Wren-babblers, such as *Napothera*, *Pnoepyga*, *Spelaeornis*, the slaty-bellied ground warbler, *Tesia elivea* (Mc Clelland), a great variety of flycatchers (Muscipapidae) etc. The high trees in the forest edges and the trees in cleaned space in dense forests serve as perch and nesting place of hornbills, commonly the rufousnecked hornbill, *Aceros nipalensis* (Hodgson), the great pied hornbill (*Buceros bicornis linn*) and the white-throated brown hornbill *Ptilolaemus tickelli* (Blyth). The presence of these birds in the forests can be detected

by the whirring sound they produce during flight. The other groups of birds that are observed are barbets (Capitonidae), woodpeckers (Picidae), trogons (Trogonidae), orioles (Oriolidae), spiderhunters and brilliantly coloured sunbirds (Nectariniidae).

In the montane type of forest the rufousthroated partridge (*Arborophilla rufogularis*) (Blyth), the redbreasted hill partridge (*Arborophilla mandellii*) (Hume), the blood pheasant *Ithaginis cruentus* (Hardwicke), the Blyth's tragopan (*Tragopan blythii*) (Jerdon), the Temminck's tragopan (*Tragopan temminckii*) (J. E. Gray) are commonly found. About 4000 metres and above scaly thrushes (*Lophophorus sclateri* Jerdon), eared pheasant (*Crossoptilon crossoptilon*) (Hodgson) are found in suitable places. In the higher altitude over 4500 metres, the Tibetan snow cock *Tetraogallus tibetanus* (Gould), Tibetan partridge *Perdix hodgsoniae* (Hodgson) are observed among alpine scrub and the dwarf rhododendron searching for food among mosses and lichens. Besides the pheasants, some other birds of resplendent plumage that reside in higher altitudes such as the great himalayan barbet *Meglaima virens* (Beddaert), the chestnut-headed ground warbler *Tesia castaneocoronata* (Burton), the striped throated minla *Minla strigula* (Hodgson) and the tit-babbler *Alcippe cinerea* (Blyth), the ibisbill *Ibidorhyncha struthersii* Vigors are found along torrential stream waterfalls which break the monotony of the dense forest.

During the winter, concentration of bird population increases to a greater extent by the augmentation of the migratory birds from the northern Asia. From the Himalayas and Tibet, the brahminy duck *Tadornua ferruginea* (Pallas) visit the river waters. The common teal (*Anas crecca* Linnaeus), the mallard (*Anas platyrhynchos* Linnaeus), the gadwall (*Anas strepera* Linnaeus), the garganey (*Anas querquedula* Linnaeus), the shoveller (*Anas clypeata* Linnaeus) are common holarctic and palaeartic waterfowls that visit the watered area. The wintering waders are the red shank *Tringa totanus* Linnaeus, the green sandpiper *Tringa ochropus* Linnaeus, common sandpiper *Actitis hypoleucos* (Linnaeus).

The presence of the white-winged wood-duck (*Cairina scutulata*) (S. Muller) in this area which is a rare bird today may also be mentioned. It was reported to be common in eastern Assam and Arunachal Pradesh some 50 years ago in streams and pools canopied by shaded trees and creepers in the deeper parts of forests. The monal pheasant (*Lophophorus sclateri* Jerdon) and the Temminck's *Tragopan temminckii* (J. E. Gray) are scarcely seen, although half a century ago the picture was altogether different.

### Mammals

Of the wild mammals the following are the more important ones.

Among the carnivores, the tiger *Panthera tigris* (Linnaeus) and leopard

*Panthera pardus* (Linnaeus) are frequently met with. The former inhabits humid evergreen forests while the latter prefers the rocky terrain. They are nocturnal in habit. The jungle cat (*Felis chaus* Guldenstaedt) inhabits the drier and more open parts of the country keeping more to grass lands. The golden cat (*Felis Temmincki* Vigors & Horsfield) lives in rocks. The larger Indian civet (*Viverra zibetha* Linnaeus) is a solitary creature sheltering in bushes or scrub jungles while the common palm civet *Paradoxurus hormaphroditus* (Hodgson) is more abundant in warmer forests. It is diurnal and feeds on birds and smaller mammals. The Himalayan black bear *Selenarctos thibetanus* (G. Cuvier) is occasionally found. It is an undesirable neighbour as it destroys larger quantities of crop and at times kills cattle.

Different kinds of deer of which the principal varieties are the sambar (*Cervus unicolor* Kerr), the flog deer (*Axis porcinus* Zimmermann) and the barking deer (*Muntiacus muntjak* Zimmermann). They live in the thickly wooded hills. The sambar feeds mainly at night and retires into heavy cover at day break and does not usually come out till dusk. The hog deer favours grass jungles by the bank of rivers. It comes out to feed early in the morning and the evening and shelters in the long grasses during the hot hours of the day. The barking deer is diurnal in habit. The secrow *Capricornis sumatensis* (Bechstein) favours the elevation between 2000 and 3000 metres and are solitary creatures. Herds of wild buffaloes (*Bulalus* Linnaeus) are found north of Brahmaputra. The wild boar (*Sus scrofa* Linnaeus) lives in the grassy and bushy jungles of this region.

The Indian elephant (*Elephas maximus* Linnaeus) is fairly common, especially at the foot of the hills.

Among the other common mammals the Assamese macaque (*Macaca assamensis* Miclelland) is abundant in the forests while the langur *Presbytis pileatus* (Blyth) inhabits the southern portion of the district. Both of them are found in small or large troupes and sometimes cause heavy damage to the crops.

The Chinese pangolin (*Manis pentadactyla* Linnaeus) is an interesting mammal. It has protecting scales on the upper part of the head, the back, on the whole tail and the outer sides of the limbs. It lives in burrows made by itself and sleeps with its head between the forelegs and its tail firmly folded over it. It feeds on termites and the ants.

Among smaller mammals the insectivores and the rodents are very common. Rats are responsible for causing heavy damage to cultivation and several kinds of human diseases, such as plague, rat-bite fever etc. The common varieties are long-tailed tree mouse (*Vandeleuria oleracea* Bennett), the common house rat (*Rattus rattus* Linnaeus), the white bellied rat (*Rattus niveventer* Hodgson), the fawn coloured mouse (*Mus cervicolor* Hodgson) and the bamboo rat [*Canomys badius* (Hodgson)]. Various types of squirrels, namely Pallas's squirrel (*Callosciurus erythraeus* Pallas), the



Irrawaddy squirrel [*Callosciurus pygerythrus* (Geoffroy)], the giant flying squirrel [*Petaurista petaurista* (Pallas)] and the Malayan giant squirrel (*Ratufa bicolor* Sbarmann) are found at different heights. They feed on fruits, leaves, buds etc. The flying squirrel has parachute like membranes on both sides of the body between the fore and the hind limbs and glides through the air smoothly and swiftly downwards.

The shrews are also not less economically important. They are helpful to mankind in eradicating a large varieties of obnoxious insects. But they are equally destructive to plantation as they cut down the roots of plants at the time of burrowing. The common tree shrew (*Tupaia glis* Diard), the eastern mole (*Talpa micrura* Hodgson), the long-tailed shrew [*Soriculus leucops* (Horsfield)], the house shrew [*Suncus murinus* (Linnaeus)] and the burrowing shrew [*Anourosorex squamipes* (Milne-Edwards)] are of common occurrence.

Lagomorph like mouse hare [*Ochotona pusilla* (Pallas)] is also found.

Many kinds of insectivorous bats are found in old premises, caves and forests. The most commonly occurring species are the himalayan horse shoe bat [*Rhinolophus perniger* (Hodgson)], the Indian pipistrelle (*Pipistrellus coromandra* Gray), the Indian pigmy pipistrelle (*Pipistrellus mimus* Wroughton) and the mustachioed bat [*Myotis muricola* (Hodgson)]. Another variety occasionally occurring is the Indian false vampire, (*Megaderma lyra* Geoffroy) which is a blood sucking bat, feeding upon the blood of small pipistrels etc.

### Reptilia

Very scanty information of the occurrence and distribution of the reptile fauna of the Lohit District is available. So far only one species of black krait (*Bungarus niger* Wall) of the family Elapidae is recorded. But considering the occurrence of about 42 species of Chelonia, lizard and snakes in the adjoining districts of Siang and Tirap, it may be surmised that these species of reptiles are likely to occur in the Lohit District also.

The following is an account of reptiles found in the Siang and Tirap Districts :

Only one species of Chelonia [*Kachuga kachuga* (Gmelin)] of the family Emydidae is represented in the Siang District.

Fifteen species of lizards found in the Siang District include five Gekkonids of the family Gekkonidae [*Gymnodactylus khasiensis* (Jerdon), *Hemidactylus brooki* Gray, *H. bowringi* (Gray), *H. frenatus* Schlegel and *Platyurus platyurus* (Schneider)]; four agamids of the family Agamidae [*Ptyctolaemus gularis* (Peters), *Acanthosaura minor* (Gray), *Calotes jerdoni* Gunther and *Draco maculatus* (Gray)]; three skinks of the family Scincidae [*Lygosoma indicum* (Gray), *Lygosoma courcyanum* Annandale, and *Mabuya macularia* (Blyth)]; and one lacertid of the family Lacertidae [*Takydromus sexlineatus* (Daudin)]; one anguid of the family Anguidae

[*Ophisaurus gracilis* (Gray)] and one varanid of the family Varanidae [*Varanus bengelensis* (Daudin)].

The snakes of the Siang and Tirap Districts are represented by 26 species and out of these only four species, one krait [*Bungarus niger* (Wall)] and one coral snake [*Callophis macclellandi* (Reinhardt)] of the family Elapidae and other two species of pit vipers [*Trimeresurus monticola* (Gunther)] and [*Trimeresurus gramineus* (Shaw)] of the family Viperidae are highly poisonous.

The harmless snakes are numerous and are represented by 22 species under two different families, i.e. Typhlopidae and Colubridae. The Typhlopidae (blind snakes) family is represented by two species only [*Typhlops diardi* (Schlegel) and *Typhlops jerdoni* (Boulenger)]. The small wormlike snakes of the genus Typhlops are specialised for burrowing. Other harmless snakes belong to the family Colubridae and consist of the following species :

- Elaphe porphyracea* (Cantor)
- Elaphe mandarina* (Cantor)
- Elaphe taeniura* (Cope)
- Blythia reticulata* (Blyth)
- Boiga gokool* (Gray)
- Dendrelaphis gorei* (Wall)
- Ahaetulla prasinus* (Boie)
- Natrix piscator* (Schneider)
- Natrix khasiensis* (Boulenger)
- Natrix platyceps* (Blyth)
- Oligodon albocinctus* (Cantor)
- Oligodon erythrorhachis* (Wall)
- Ptyas mucosus* (Linnaeus)
- Ptyas korros* (Schlegel)
- Pseudoxenodon macrops* (Blyth)
- Psammodynastes pulverulentus* (Boie)
- Pareas monticola* (Cantor)
- Liopeltis frenatus* (Gunther)
- Sibynophis collaris* (Gray)
- Trachischium monticola* (Cantor)

#### *Protochordata and Amphibia*

As no authentic record of amphibians existing in the Lohit District, the amphibians recorded from the Siang District may be mentioned here, for they are likely to occur in the neighbouring region of Lohit too. Different kinds of amphibians have been recorded from the Siang District. Some of these are purely arboreal and the rest are aquatic, semi-aquatic and terrestrial. The arboreal forms are found on the under-side of leaves, inside the holes made on tree-trunks, under barks and bushes. The variety which is found inside bushes is commonly known as bush-frog, the examples

of which are *philautus arqus* and *Philautus tuberculatus*, and those which are living on trees are known as tree-frogs, e.g. *Rhacophorus maculatus himalayensis*, *Rhacophorus maximus*, *Rhacophorus naso*, *Rhacophorus microdiscus*, *Phrynoderma moloch* and *Megalophrys kempi*.

*Rana limnocharis limnocharis* (the paddy-field frog), *Rana liebiqii* (Himalayan bull frog), *Rana alticola*, *Rana gerbillus*, *Staurois afghana* (Himalayan stream frog) and *Micrixalus borealis* recorded from the area are found either in or near the water or in such a place where sufficient moisture is present to keep the skin of the frog wet.

The purely terrestrial amphibians are toads which need to go to water only during the breeding season. The toads possess numerous glands on the skins, and the secretion of glands keep the skin moist.

The Himalayan Toad (*Bufo himalayanus*) has been recorded from the Siang District.

*Mollusca*

Phylum	Mollusca
Order	Mesogastropoda
Family	Cyclophorcidae

- Alycaeus borahma* Godwin-Austen
- Alycaeus lohitis* Godwin-Austen
- Diorix urnula* Benson
- Diorix urnula* Var. *globosa* Godwin-Austen
- Pterocyclus brahmakundensis* Godwin-Austen
- Rhaphaulus assamicus* Godwin-Austen
- Rhaphaulus blanfordi* Benson

Order	Stylommatophora
Family	Corillidae

- Plectopylis brahma* Godwin-Austen
- |        |               |
|--------|---------------|
| Family | Ariophantidae |
|--------|---------------|

- Macrochlamys terminus* Godwin-Austen

*General Non-Chordata*

Phylum	Annelida
Class	Chaetopoda
Order	Oligochaeta

- Drawida Kempfi* Stephenson
- Drawida nepalensis* Michaelsen
- Tonoscolex oneilli* (Stephenson)
- Desmogaster ferina* Gates
- Pheritima diffringens* (Baird)
- Perionyx excavatus* Perrier
- Perionyx modestus* Stephenson

*Dichogaster bolau* (Michachen)

*Dichogaster saliens* (Baddard)

*Fresh Water Fish*

Order

Cypriniformes

Family

Cyprinidae

*Tor putitora* (Ham)

*Chaunius chaunio* (Ham)

*Labeo dero* (Ham)

*Semiplotus semiplotus* (McCl)l

*Schizothorax plagiostomus* Heckel

*Puntius terrarupagus* (McCl)l

*Rasbora daniconius daniconius* (Ham)

Family

Cobitidae

*Noemacheilus manipurensis* Chaudhuri

Family

Nandidae

*Badis badis* (Ham)

*Insecta*

Order

Dictyoptera

Family

Blattidae

*Paranauphoeta* sp.

*Homalophilpa ustulata* Sauss

*Trichoblatta sericea* Sauss

*Pycnoscelys surinamensis* (L.)

*Stictolampra plicata* (Navas)

*Salganea morio* Brunn

*Panesthia stellata* Sauss

*P. laevicollis* Sauss

*Hebardina concinna* (Haan)

*Blattella germanica* (Linn)

*Salganea morio* (Burm)

Order

Orthoptera

Super Family

Grylloidaa

*Velarifictorus lohitensis* Tandon & Shishodia

*Oecanthus indicus* Sauss

*Homoeoxipha lycoides* (Walk)

*Pteronemobius taprohanensis* (Walk)

Family

Acrididae

*Cantantops pinguis innotabilis* (Walk)

*Stenocatantops splendens* (Thumb)

*Xenocatantops humilis humilis* (Serville)

*Trilophidia annulata* (Thunberg)

*Chondracris rosea* (De-Geer)

*Acrida exaltata* (Walker)

Family

Pyrgomorphidae

*Atractomorpha crenulata* (Fabr)

#### Acarology

*Amblyomma testudinarium* Koch

*Boophilus microplus* (Ganestrini)

*Dermacentor auratus* Supino

*Haemaphysalis cornigera* Neumann

*Haemaphysalis davisii* Hoogstraal, Dhanda & Bhat

*H. formosensis* Neumann

*H. hystricis* Supino

*Ixodes ovatus* Neumann

#### Diptera

Family

Muscidae

*Stomoxys calcitraus* Linnaeus

*Haematoleia (Bdellolarynx) Sanguinoleuta* Austen

*Lyberosia exigua* de Meijere

*Orthellia fletcheri* Emden

*Orthellia claripennis* Malloch

„ *coerulea* Weidemann

„ *challeyes faceta* Enderlein

„ *indica* (R.D.)

*Atherigona destructor* Malloch

„ *bituberculata* Malloch

*Musca domestica* Linnaeus

„ *Sorbens* Wiedemann

„ *ventrosa* Wiedemann

„ *conducens* Walker

„ *crassirostris* Stein

„ *malaisei* Enderlein

„ *gilesoni* P. & C.

„ *lusaria* Wiedemann

Family

Syrphidae

*Paragus rufiventris* Brunetti

„ *indicus* Brunetti

*Syrphus transversus* Brunetti

„ *balteatus* De-Geer

„ *serarius* Wiedemann

- Eristalis tenax* Linnaeus  
 „ *solitus* Walker  
*Sphaerophoria nigratarsis* Brunetti  
*Asarcina aegrota* Fabricius  
 „ *ericetorum* Fabricius  
*Baccha amphithoe* Walker  
*Chrysotoxum leaphyrus* Walker  
*Melanostoma orientale* Wiedemann  
 „ *univittatum* Wiedemann  
*Sphegina tristriata* Brunetti  
*Megaspis zonatus* Fabricius

#### CLIMATE

The climate of the district is largely influenced by the nature of its terrain. There are high hills and snow-capped mountains, deep ravines and wide valleys intersected by innumerable streams and rivers. Except in the south-western corner of the district, the elevation ranges from 2,000 m to 4,000 m with mountain ridges and peaks rising to 4,500 m to 5,000 m (15,000 to 17,000 ft) above the sea level at many places. As a result, the climate is cool and highly humid in the lower elevations and in the valleys, and intensely cold in the higher elevations.

The winter prevails during the months from late November to early March. The period from March to May is the pre-monsoon season and it is one of frequent thunderstorms followed by the south-west monsoon prevailing from the month of June to about the middle of October. The second fortnight of October and the month of November may be termed as the post-monsoon or the transition period. During the months from November to March precipitation, mostly in the form of snowfall, occurs in the northern areas. As a result, cold air may cause considerable drip in temperature everywhere.

#### Rainfall

The average annual rainfall in the south-western part of the district, where the elevations are comparatively lower than that of the other parts, is 4,500 mm to 5,000 mm (177" to 197"). The rainfall may be much more heavy in the north and eastern regions. The amount of rainfall is likely to be less in the higher mountainous regions due to snowfall. As the rainfall of the area is greatly influenced by the mountain system, sharp variations and contrasts in the amount of rainfall from place to place are possible. The variation in rainfall from year to year is, however, not significantly large. Most of the rainfall is received during the monsoon. The period March to May is marked by heavy showers and thunderstorms.

The district of Lohit as a whole falls in the heavy rainfall area. The rainfall charts are at Tables I and III appended to this chapter.

### *Temperature*

As stated before, the winter sets in towards the end of November and continues till early March. The coldest months are January and February, but the degree of coldness varies from place to place due primarily to altitude. On many days during this season the minimum temperature may fall below the freezing point particularly in areas above 1,500 m (5,000 ft). The temperature rises steadily after February. As in Upper Assam, there is no summer season in the district. The temperature is generally lower in the period March to May than in the south-west monsoon season, and a moderately cool weather prevails in the lower regions. The period July to August is the warmest part of the year. With the disappearance of the south-west monsoon early in October temperature begins to fall rapidly. The Tables II and III at the end of this chapter gives information about temperature.

### *Humidity*

Humidity is high practically throughout the year, decreasing only slightly in the winter months.

### *Cloudiness*

In the post-monsoon season the sky generally remains clear, although at times it becomes lightly clouded. During the winter season the morning sky is covered with fog, which disappears as the day wears on, leaving sometimes a thin layer of cloud in the afternoon. The clouding increases in the afternoon during the period March to May. In the south-west monsoon season, the sky remains overcast with heavy cloud.

### *Winds*

Winds are generally light, increasing slightly in the monsoon months. Strong winds with thunderstorms may blow occasionally during the period March to May.

### *Special Weather Phenomena*

Cyclonic storms, which sometimes move from Bay of Bengal to Assam, seldom affect the weather in this district. Thunderstorms occur frequently in the months from February to June and in the early post-monsoon period. The thunderstorms occurring particularly during March to May are similar to the norwesters of Bengal, and are often violent. Fogs appear frequently in the post-monsoon and winter months especially in the valleys.

TABLE I  
ANNUAL RAINFALL AT DIFFERENT PLACES OF LOHIT DISTRICT

(in centimetre)

Sl. No.	Rain gauge stations	1969	1970	1971	1972	1973	1974	1975
1	2	3	4	5	6	7	8	9
1.	Tezu	247.03	379.99	272.00	293.42	349.00	370.00	301.00
2.	Chaglagam	235.65	309.29	186.00	219.62	65.00	NA	NA
3.	Wakro	281.81	414.50	324.00	358.35	346.00	145.00	356.00
4.	Sunpura	186.84	278.69	206.00	223.00	230.00	233.00	NA
5.	Walong	96.12	200.20	76.07	103.20	132.68	103.00	88.00
6.	Namsai	204.75	265.70	323.08	218.80	209.27	288.00	165.00
7.	Chowkham	198.59	290.22	249.08	236.00	250.00	297.00	213.00
8.	Kibithoo	72.18	183.81	78.07	112.00	132.00	212.00	145.00
9.	Hawai	122.64	203.05	42.00	192.70	222.00	232.00	200.00
10.	Roing	NA	321.40	395.00	384.00	364.00	391.00	NA
11.	Anini	NA	295.90	163.45	214.30	211.00	274.00	NA
12.	Hayuliang	NA	NA	NA	NA	377.00	469.00	370.00
13.	Desali	NA	NA	222.00	294.00	369.00	386.00	NA
14.	Dambuk	NA	NA	632.00	537.00	659.00	622.00	NA

NA = Not available.

Source : Statistical Hand Books of Arunachal Pradesh, 1973-74 and 1975-76.

TABLE II  
MONTHLY MAXIMUM AND MINIMUM TEMPERATURE

(in centigrade)

Month	1 9 7 2				1 9 7 6			
	Tezu		Walong		Tezu		Walong	
	Maxi- mum	Mini- mum	Maxi- mum	Mini- mum	Maxi- mum	Mini- mum	Maxi- mum	Mini- mum
1	2	3	4	5	6	7	8	9
January	25.61	4.6	25.3	09.30	27.0	5.0	NA	NA
February	26.9	5.1	25.0	0.5	28.0	9.0	NA	NA
March	32.5	10.1	29.6	4.0	30.0	7.0	26.0	1.0
April	31.3	11.8	28.1	3.6	33.0	12.0	25.0	1.0
May	34.6	13.7	32.0	7.2	34.0	15.0	26.0	5.0
June	36.1	12.7	35.0	10.8	35.0	17.0	31.0	10.0
July	37.3	21.7	35.0	15.0	37.0	22.0	32.0	10.0
August	36.9	20.5	35.0	10.5	35.0	22.0	31.0	10.0
September	35.7	19.3	32.0	10.4	35.0	21.0	35.0	0.0
October	34.7	13.5	34.5	5.0	32.0	14.0	36.0	1.0
November	31.4	8.9	28.1	0.2	34.0	11.0	26.0	1.0
December	29.1	4.7	25.8	0.5	26.0	5.0	21.0	6.0

NA = Not available.

Source : Statistical Hand Books of Arunachal Pradesh, 1973-74 and 1975-76.



TABLE III  
TEMPERATURE RAINFALL AND HUMIDITY IN LOHIT DISTRICT  
YEAR--1974

	Temperature (Centigrade) Maximum - Minimum		Rainfall (mm)	Humidity (Percentage)
January	25.3	- 5.0	28.8	91%
February	28.3	- 5.7	6.2	88%
March	31.1	- 8.9	68.6	90%
April	33.3	- 11.7	70.6	84%
May	37.1	- 17.3	108.8	73%
June	35.5	- 10.9	117.4	93%
July	35.1	- 19.6	338.4	97%
August	37.7	- 20.5	132.8	93%
September	35.7	- 19.7	32.6	88%
October	35.7	- 16.1	96.8	75%
November	22.1	- 18.7	2.0	90%
December	23.9	- 14.6	28.6	77%

Source : Regional Meteorological Centre, Alipur, Calcutta.