



The
Himalaya
Borderland

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THE HIMALAYA BORDERLAND

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PREFACE

The Himalaya Borderland is the first book to study in its totality the southern half of the Himalaya borderland, comprising the North-East Frontier Area (NEFA), Bhutan, Sikkim, Nepal, Uttarakhand (Uttar Pradesh), Kinnaur, Lahul and Spiti (Himachal Pradesh), and Ladakh (Jammu and Kashmir). Tibet, which constitutes the northern half of the Himalaya borderland, is beyond the framework of this study and I have dealt with it in detail in the companion volume, *The Government and Politics of Tibet*. This is entirely a general study, and hence I have deliberately dispensed with all such trappings as footnotes and references. I hope it will create the necessary awareness of the social, economic, and political situation in the Himalaya.

I have concluded this study with a few observations, but I have not advanced or refuted any geographical, anthropological, or historical theories. I have presented my facts in as simple and straightforward a manner as possible. The reader may consider them for what they are worth and form his own judgement.

The bibliography lists only select works of relevance to this study. The material collected from the literature on the Himalaya, which is enormous, has been supplemented by my own findings gathered as a result of my extensive geographical, anthropological, and historical researches in the entire Himalaya, culminating in my participation in the Mount Everest expedition in the spring of 1952.

I have used the collective name *Himalaya* (Him, snow, plus *alaya*, home) in place of the commonly used *Himalayas*, which is a double plural and a grammatical monstrosity. Indeed, to use the word *Himalayas* is as absurd as referring to

Englishmen as the Englishes or using the word *alphabets* for two or more letters and characters of an alphabet. Moreover, *Himalayas* jars on ears accustomed to the euphony of Sanskrit words and phrases. It is curious that it is only in English that the name suffers a corruption. In all the other languages of the world, including other Western languages like French and Russian, it is what we in India have called it from time immemorial.

Two more spellings that I have used may also call for an explanation. They are *Kumaun* and *Lahul*. I have preferred them because phonetically they are more approximate to the names they represent than the usual *Kumaon* and *Lahaul*, and much less misleading.

Much has gone into the making of this book. I wish to thank the officials of the Government of India who have been or are in the Himalaya. Several of my friends in the Himalaya border countries have given me valuable advice and assistance in my work there. I am especially beholden to F.C. Badhwar of the Himalayan Club (New Delhi) and Ranjit Rai of Rai & Sons (New Delhi) for their generous help in my programme of exploration and mountaineering in the Himalaya. Of course, for the blemishes as well as the point of view in the book, only I am responsible.

RAM RAHUL

At Sinha

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Prof. J. C. Sinha

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CHAPTER ONE

INTRODUCTION

THE HIMALAYA, especially the central ridge of that mountain system which marks the southern limit of Tibet, stands astride the landmass of Asia for 2,500 miles from Assam in the east to Jammu and Kashmir in the west, including the kingdoms of Bhutan, Sikkim, and Nepal. With its magnificent skyward sweep, peak rising above peak for over a hundred miles from the foothills in the south to the crest line in the north, it is easily the most dominating land feature of the world. It is inextricably woven with the life and legends of India. According to Hindu tradition, it is the "throne" of the gods. Kalidasa, the great Sanskrit poet, calls it *devatatma* or the divine-souled. The sages and thinkers of India have always derived their inspiration and spiritual strength from the Himalaya. The Buddhists, the Hindus, and the Jains have always looked upon the Himalaya with the greatest awe and veneration and have established there such sacred shrines and places of pilgrimage as Brahmakund in Assam, Pashupatinath in Nepal, and Amarnath in Kashmir. The holy Kailash and Manasarovar have been familiar to all the people of India from time immemorial. There were great cultures and kingdoms flourishing in ancient Assam, Nepal, and Kashmir when man in other parts of the world was yet to learn the rudiments of civilization. The Himalaya thus has been an abiding factor in the culture and heritage of India.

The Himalaya is the source of India's great rivers like

the Brahmaputra, the Ganga, and the Indus, which, apart from being intimately associated with the country's fascinating myths and mythology, vitally affect the life and economy of the people of its northern plains. It has lent the country the prominent features of its climate and seasons. It has, further, stood as a bulwark of our security. Its formidable, impassable central ridge has always protected us from invasions from the north. It has preserved our social life undisturbed and exerted an integrating influence on the social structure in India. It has also always served as the geographical, ethnological, and political divide between India on the one hand and Central Asia and China on the other. Of course, while the rugged character of the terrain checked the mass movement of people, the mountain passes and valleys always allowed slow penetration for purposes of pilgrimage and trade. During the heyday of Buddhism, monks from Assam, Nepal, and Kashmir crossed over the Himalaya to spread Buddhism in Central Asia, China, and Tibet.

The North-East Frontier Area (NEFA) from Burma in the east to Bhutan in the west, a vast territory of mountains and valleys between the plain of the Brahmaputra and the watershed of the Assam Himalaya, may well be called the great north-eastern marches of India. The land route from India to south-western China passes through here. Before the Chinese control of Tibet in the summer of 1951, there always was a flourishing trade between South-eastern Tibet and India over the Rima-Sadiya trail. Bhutan, which lies along the northern boundary of Assam and Bengal, occupies a most important part of the glacis of the Eastern Himalaya. Sikkim is a unique wedge between Bhutan, Nepal, and Tibet. Nepal is the biggest and most important State in the Himalaya. Unlike the other Native States of India, it never became a part of the British Empire in India. The Anglo-Nepalese Treaty of 21 December 1923 designated Nepal a sovereign State with very special relations with the British. The British had no formal commitment to defend Nepal against external aggression, but they main-

tained an unobtrusive tutelage over Nepal. Close bonds of geography and history have always drawn India and Nepal towards each other. Uttarakhand, Himachal Pradesh, and Jammu and Kashmir, marked off by Nepal in the east and by Afghanistan in the west, a vast territory of mountains and valleys between the plains of Uttar Pradesh and the Punjab and the watershed of the Punjab Himalaya, may be described as constituting the great north-western marches of India. Ladakh borders China and the Pamir confines of Russia. The land route from India to Central Asia passes through here. Before the Chinese control of Sinkiang in the spring of 1950, there always was a flourishing trade between Central Asia and India over the Karakoram Pass.

All through history the Himalaya borderland held an irresistible fascination for men of adventure, explorers, missionaries, and administrators on account of its fantastic geographical, ethnic, and cultural diversity. Though the Asians, especially the Chinese and the Indians, had always taken an interest in the Himalaya, the British were the first to realize the vital role of the Himalaya in the politics of Central Asia. They used all their tact and diplomacy to wean the Himalaya border countries away from Central Asian influence either by annexing them or by extending their protection to them. It is only after they left the scene in the summer of 1947 and the Chinese occupied Tibet in the spring of 1951 that these countries became susceptible to territorial, political, and ideological encroachments from the north.

In India there was not much awareness and understanding of the importance of the Himalaya borderland. There was very little curiosity about its astonishing geographical and ethnic peculiarities. There was no serious study of its economic, political, and social situation either. It is only certain recent developments in Central Asia, especially the Chinese invasion of India in the winter of 1962 and the continuing Sino-Indian confrontation on the border, that have brought the Himalaya borderland into focus and have made it a subject of great interest.

The entire Himalaya borderland, including Bhutan, Sikkim,

and Nepal, has been the scene of an unprecedented advance in the fields of administration and socio-economic development since India achieved independence and Tibet came under the control of China. The Government of India has given up the old policy of leaving the Himalaya border countries unadministered and undeveloped—and, therefore, isolated—in favour of a programme of modernization which would bring about the advancement of the people without impairing their individuality.

Studies on the Himalaya have received considerable impetus in the country in the post-1947 period owing to important political, social, and economic changes in India and the neighbouring countries. In India in particular, because of the threat to its security from across the Himalaya, they have acquired an importance and an urgency never felt before. It is not only the universities and research institutions that are engaged in the task of opening up the Himalaya and enabling the world at large to see past the veil of mist and snow but also Government Departments and agencies like the Anthropological Survey of India (Calcutta) and the Survey of India (Dehra Dun). Much research of immense practical benefit to the country has already been done. But the Himalaya will never fully reveal itself. There is need to go to it again and again, to involve oneself more and more deeply in its mysteries, to engage in a constant, tireless endeavour to acquire greater and yet greater and more comprehensive knowledge. There is need for extensive and intensive field studies to understand the land and its people, their perils and their problems, their past and their present. Without such studies it is vain to draw up welfare and development programmes. Indeed there is an urgent need to set up an independent institute devoted exclusively to Himalayan studies, along with a museum of anthropological, botanical, and geological collections and a library of manuscripts of cultural and historical importance. This would not only keep up our interest and involvement in the Himalaya but also give them shape and direction.

CHAPTER TWO

THE LAND

THE HIMALAYA comprises a series of parallel ranges stretching curvilinearly between 74°E and 95°E . Its physiography is marked by ranges northwards and southwards of the main Himalaya range and the Brahmaputra, Ganga, and Indus river systems. The central ridge or the crest line of the Himalaya forms the principal watershed between the rivers draining southward into India and northward into Tibet. Owing to structural weakness at places where the curves are sharp, great rivers forge their way southward through the main range and then flow along the alignment of the spurs, making transverse valleys. These are the antecedent rivers, perhaps older than the Himalaya.

The Lesser Himalaya is the Himachal of the Sanskrit tradition. The term *Himachal* now applies not to the entire Himalaya from Assam to Kashmir but to a part of the Himalaya, i.e. the Union Territory of Himachal Pradesh in the Western Himalaya. The Outer Himalaya mountains in the eastern and central sectors rise abruptly from the foothills, known as the *Dooar/Duar* (from the Sanskrit *Dvara*, Gate) or the *Tarai* (marshy lowland) successively. The Duars, made up of sandy and gravel-like material and varying in width from ten to twenty miles, are covered by thick sal forests and are ideally suited for sport. The forests are full of wild elephants. The Duar climate is hot and moist, and so enervating that even those who are native to the soil generally avoid staying in this section of the

country. The Darranga of Northern Assam and the Darbhanga/Dvar Vanga of North Bihar (which borders upon Nepal) belong to a fascinating historical tradition. The Tarai belt, which extends from the Tista River in the east to the Ramganga River in the west, separates the foothills and the great plains of North India. The Darjeeling section of the Tarai is called *Morang*. People also often apply the term *Tarai* to the Western Duars. The narrow, dry, boulder-strewn tract, which lies immediately above the Tarai and below the foothills, is called *Bhabar*. In Nepal, the Bhabar is called *Char Kose Jhadi*, after the belief that the average width of this forest tract is *char kos* (eight miles). *Char Kose Jhadi* is well known for big game, especially the rhinoceros. A five-to-fifteen-mile-wide zone of low hills (made of young soft rocks, including sandstone, shale, and conglomerates) and valleys bordering upon the plains, known as the *Siwalik*, intervene between the foothills and the Outer Himalaya west of the Western Tarai of Uttar Pradesh.

The lesser Himalaya zone leads to the zone of the Middle Himalaya, varying in height from 6,000 feet to 15,000 feet and rising steeply to merge into the third zone, the Great Himalaya.

The Great Himalaya is the *Himadri*, the snowy *Uttarakhand* (Northern Zone) of the Sanskrit tradition. The term *Uttarakhand* now applies not only to the Uttarakhand of the entire Great Himalaya from Assam to Jammu and Kashmir but also to a part of it, i.e. the Uttarakhand Division of Uttar Pradesh. The Great Himalaya, consisting of glaciers and peaks perpetually covered with snow, culminates in the highlands or plateau of Tibet and has the shape of a magnificent arc. Almost all great peaks, from the 25,445-foot-high Namcha Barwa on the Tsangpo (Brahmaputra) bend in the east to the 26,660-foot-high Nanga Parbat on the Indus (Sindhu) bend in the west, belong to this zone. The two great pillars of Namcha Barwa and Nanga Parbat support the great column of Chomolungma or Mount Everest, the earth's highest peak.

There are three distinct types of drainage in the Himalaya:

(1) the major rivers of Assam, Bhutan, Sikkim, Nepal, and Uttarakhand, whether rising from the southern or the northern slopes of the Great Himalaya, have their basins parallel to the radial ridges and hence are transverse to the main range; (2) the rivers of the Punjab and of Jammu and Kashmir run parallel to each other on account of the direction of the Lesser Himalaya but at an oblique angle to the Great Himalaya; and (3) the rivers rising beyond the Great Himalaya have their basins parallel to it until suitable gorges in this barrier enable them to forge their way to the south. The Indus, the Satluj, the Karnali (a branch of the Ghagra), the Arun (a branch of the Kosi), the Manas, and the Tsangpo come in the last category.

Three major climatic zones have been recognized in the Himalaya: (1) the hot and humid zone of the Duar, the Tarai, and the Siwalik foothills; (2) the cooler zone of the Lesser Himalaya; and (3) the snowy cold of the Great Himalaya. Although each of the four elements of weather — temperature, pressure, precipitation, and wind — varies with altitude, temperature is the most important of them all. The relation between altitude and natural vegetation is clearly discernible. Tropical forests occur at low altitudes. These gradually merge into subtropical forests in the central zone. Temperate forests grow at high altitudes. Coniferous vegetation prevails in areas above 12,000 feet and below the line of snow.

NEFA

NEFA, the easternmost part of the Himalaya in India, borders upon Burma in the east, Bhutan in the west, and Tibet in the north. To its south lies the Brahmaputra Valley of Assam. The 21,450-foot-high Gori Chen is among the highest peaks in the territory. The two-mile-broad and seven-and-a-half-mile-long Apa Tani plateau in the Subansiri District, nearly 5,000 feet above the level of the sea and twenty square miles in area, is a unique feature in NEFA. Several great rivers rising in Tibet beyond the Himalaya, like

the Lohit, the Siang, the Subansiri, and the Kameng, pierce the central ridge into India, and several high passes cross it in other places. The land route from India to China passes through here. In the heyday of Buddhism, monks from India frequented this great highway in their mission to promote the culture of India in China: Sanskrit inscriptions in Yunnan so eloquently testify to this noble activity between India and China in those ancient days.

The Pemako Valley, north of Siang, is now a part of Tibet although it lies on the southern side of the central ridge of the Himalaya and is thus geographically an integral part of Siang. Till about a hundred and fifty years ago it was, so to speak, a no man's land, unexplored and uninhabited. Following its discovery by Bhutanese lamas who strayed into the area in the course of a pilgrimage, the first Monpa settlements came up. It became a part of Tibet with the Indo-Tibetan boundary agreement of 1914, which recognized the McMahon line as the boundary between India and Tibet.

The entire area of NEFA, with the exception of the small strip of the foothills, is constituted of a highly mountainous belt comprising spurs radiating southward from the crest line. The pattern is a little varied in Western NEFA, where ridges like the Bomdi La, Se La, and Thag La (*la* means "mountain pass" in the Tibetan language) run parallel to the Great Himalaya. In the Subansiri District spurs take a north-west-southeast turn and run parallel to each other, the intervening valleys being occupied by the tributaries of the Subansiri River. East of the Subansiri District, the spurs assume a north-south orientation and merge into the foothills. West of Longju (9,000 feet), immediately south of the Indo-Tibetan international boundary in Subansiri, the altitude of the peaks varies between 18,000 feet and 21,000 feet. The relief in the Lohit District varies between 2,000 feet and 17,000 feet. The crest line forms India's northern and north-eastern boundary with Tibet. Around the north-eastern curve, there is a gradual fall in altitude till the crest line dips to as low as 9,000 feet. Towards the east, along the Indo-Burmese border, it descends to 15,000 feet and even less

until it averages about 6,000 feet in the southern Patkoi hills.

Several great rivers along with their tributaries, like the Lohit and the Dibang of the Lohit District, the Dihang, the Siyom, and the Yamne of the Siang District, the Subansiri and the Kamla of the Subansiri District, and the Kameng and the Tawang Chu (from *chhu*, which means "river" in the Tibetan language) of the Kameng District closely cut up the entire NEFA territory. The Lohit, which flows westward from Zayul in Tibet, joins the Dibang and later the Brahmaputra north of Dibrugarh. The Dihang-Lohit basin is geologically a disturbed area and lies in a seismic zone. The Lohit and Siang areas were severely rocked during the great Assam earthquake of 1950. The Siang, known as the Tsangpo in Tibet and the Brahmaputra in Assam, after following for a time a latitudinal course, turns southward and enters the Siang District in a village called Gelling. The Siang is known as the Dihang in the lower parts of the Abor (now called Adi) hills. Both names mean "great river." The Siang Valley lies for the most part at a height of 4,000 feet or less, and the river has a number of streams, so that it is not navigable at all. One cannot negotiate it even on a bamboo raft. Its important tributaries in Siang are the beautiful Yang Sang Chu and the Yamne River (with their origin in the 13,000-foot-high Abroka Pass on the Lohit-Siang divide), which joins it from the east, and the Siyom, which joins it from the north-west. The Subansiri River (from Tibet) enters Subansiri at Longju. Its important tributaries in Subansiri are the Kamla, the Khru, and the Sipi. The Tawang Chu from the Mago mountain district joins the Nyam Jang Chu from Lhobrak (Tibet) at Bleting, near the border of Bhutan. The smaller streams swell during the rainy season and occupy low-lying channels.

NEFA experiences a variety of climatic conditions. On an average the territory receives every year about 200 inches of rainfall. The amount of rainfall decreases from east to west and varies on the windward and leeward slopes of the mountains. The hills facing the plains of Assam receive the

full force of the monsoon from the Bay of Bengal. The temperature is higher at lower altitudes in the south and lower at higher altitudes in the north. The climate of the foothills is similar to that of the plains of Assam. Tropical heat, together with heavy rainfall and high humidity in the valleys, makes the climate enervating and thus hard for human habitation. Evergreen forests, especially bamboo forests, cover the foothills. Cane is the most important item of the forest produce. Coniferous forests, especially pine forests, cover the ranges from about 8,000 feet to about 14,000 feet above the level of the sea.

BHUTAN

Bhutan, situated in the Eastern Himalaya, borders upon Assam and NEFA in the east, the plains of Assam and Bengal in the south, Bengal and Sikkim in the west, and Tsang (Southern Tibet) and the Chumbi Valley of Tibet in the north. The 24,600-foot-high Gangkarpunzum is the highest peak in the Bhutan Himalaya. The superb cone of the 23,930-foot-high Chomolhari, a mountain considered sacred both in Bhutan and in Tibet, dominates Bhutan. According to legend and tradition, Tibet's first king, Nyathi Tsanpo, went up from India along the Manas Valley route, the historical highway between Eastern India and Central Tibet. Pilgrims from Tibet to the Hajo shrine near Gauhati in Assam have also always trudged along it.

✓ The name *Bhutan* is derived from the Sanskrit *Bhotanta*, i.e. the end (*anta*) of Tibet (*Bhot*) or the borderland of Tibet. The Bhutanese, however, call their country *Drukyl*, land of thunder. They call themselves *Drukpas* (people of the Druk country). This is because the Bhutanese belong to the Druk Sect of Lamaism, which has been the State religion of Bhutan since 1616, when it was established there by ✓ Shabdung Nawang Namgyal.

The Pele La range, which runs from the north to the south through the middle of Bhutan between the Punakha Valley and the Tongsa Valley, divides the country into two, almost

equal parts, the eastern part and the western part. It also divides Bhutan ethnically and linguistically. The people of Eastern Bhutan, their dialects, and their customs are different from those of Western Bhutan. The 12,000-foot-high Pele La is right in the centre of the range.

There are three distinct physiographic zones in Bhutan. Southern Bhutan consists of a close network of low hills. The strip of the Bhutan Duars is a flat, level strip of country, averaging twenty-two miles in width, running along the foot of the hills of Bhutan from the east to the west. Its chief characteristics are the numerous rivers and streams which intersect it in every direction, and the large tracts of sal forests and heavy grass and reed jungles, in places impenetrable by man. The scenery in the north of the Duars, along the foot of the hills, where the large rivers debouch upon the plains, is very grand and beautiful, especially at the point where the Sankosh River leaves the hills. For five to ten miles before reaching the hills of Bhutan, the land rises gradually. In this tract the soil is only three to four feet deep, with a substratum of gravel and shingle; and in the summer the beds of the streams for some miles beyond the hills of Bhutan are dry, the water reappearing farther down. Owing to the difficulty of procuring water, there are no villages in this tract.

Central Bhutan has beautiful valleys and gentle slopes. The Tashigang, Bumthang, Punakha, Thimphu, and Ha valleys are comparatively broad and flat. The rivers have a general slope from the north to the south, where they eventually join the Brahmaputra River. The Punakha Valley is the least elevated of all the valleys of Bhutan. Rice is the principal crop of this valley.

The general direction of the ranges which separate the valley of Central Bhutan is from the north-west to the south-west in Western Bhutan and from the north-east to the south-east in Eastern Bhutan. North Bhutan consists of high snow-clad mountains which separate Bhutan from Tibet.

The rivers Manas, Sankosh, Raidak, and Torsa drain

Bhutan. The union of the Lhobrak Chu, the Tashi Yangtse, the Bumthang, and the Tongsa forms the Manas, Bhutan's largest river. The Lhobrak Chu, the main tributary of the Manas, rises in Tibet beyond the Great Himalaya. The Sankosh, the Raidak, and the Torsa, known in their upper courses in Bhutan as the Sankosh, the Wang Chu, and the Amo Chu respectively, start either from the Great Himalaya or beyond and flow to the plains of Bengal transversely to the ranges. The Sankosh and its various tributaries drain the Great Himalaya zone between the 24,784-foot-high Kulha Kangri and the 23,000-foot-high Masakang, including the Punakha Valley. The Sankosh is the dividing line between the Eastern and Western Duars as well as between Assam and Bengal. Along with its tributaries, the Wang Chu, which rises on the south-western slopes of the 23,930-foot-high Chomolhari, drains the valleys of Thimphu, Paro, and Ha. It joins the Brahmaputra at Kurigram. The Amo Chu, which rises in the 15,219-foot-high Tang La, drains Western Bhutan and the entire Chumbi Valley of Tibet. The natural avenue for those who would travel from India to Tibet is the one that goes up the Amo Chu Valley. The Amo Chu, known as the Torsa in its lower course, joins the Brahmaputra south of the Alipur Duar. The Dhansiri River forms the boundary between the lower parts of Bhutan and NEFA. The Jaldhaka River, called De Chu in the upper part of its course in the hills, separates Bhutan from the Darjeeling and Jalpaiguri districts of North Bengal.

Bhutan experiences a variety of climatic conditions. The Duars have a tropical climate, and the vegetation consists of bamboo, fern, and palm. Different varieties of flora, pine, and rhododendron cover the higher Bhutan Himalaya. Farther north the temperature is cold. Indeed it is severely so during winter. Most of the Bhutanese peasants have two sets of farms and pastures, one set at higher altitudes and the other at lower altitudes. In the winter they move down to the farms and pastures at lower altitudes; and in the summer they move up to the farms and pastures at higher altitudes.

SIKKIM

Sikkim, situated in the Eastern Himalaya, borders upon Bhutan in the east, the Darjeeling District in the south, Nepal in the west, and the Chumbi Valley and the Tsang region of Tibet in the north. Geographically the catchment area of the Tista River and all its affluents as far down as the northern plain of Bengal, including the entire area of the Darjeeling hills, is a unique wedge between Bhutan, Nepal, and Tibet.

The Chumbi Valley, which is now a part of Tibet, lies on the southern side of the central ridge of the Himalaya. It was a part of Sikkim till almost the end of the nineteenth century. The people and the language of the area are more or less the same as those of North-Eastern Sikkim and North-Western Bhutan and differ widely from those of Lhasa or any other part of Tibet. The Valley is thus very much like the Pemako Valley in Siang in NEFA, which also is a part of Tibet today in spite of its location on the southern side of the Himalayan watershed.

The 28,216-foot-high Kangchenjunga (Treasury of Five Snows) on the natural border between Nepal and Sikkim is the third highest mountain of the world. It is also the most beautiful and dominating feature of Sikkim. Siniolchu and Pandim are among the other beautiful peaks of the Sikkim Himalaya. Kangchenjunga is essentially a Sikkimese mountain. For centuries it has been worshipped both by Sikkimese Buddhists and by Nepalese Hindus. It blocks the heavy monsoon (from the Bay of Bengal), which unburdens itself almost completely in Sikkim. Hence Sikkim is the wettest country in the entire Eastern Himalaya.

The entire country, including the Darjeeling hills, is a closed basin between two parallel and deeply intersected transverse ridges, Donkya La and Singali La, about ninety miles long. The general trend of the mountain system is from the east to the west, but the chief ridges, Donkya La and Singali La, run from the north to the south. The hills rise from the plains of North Bengal. The altitude of the coun-

try varies from 5,700 feet at Gangtok in Eastern Sikkim to 12,300 feet at Gnatong in the north. The permanent snow-line is approximately at 16,000 feet. The Donkya La range, which stretches southward from the culminating point of the extensive mountain mass of the immense 23,190-foot-high Donkya Peak and on which are situated the 14,390-foot-high Jelep La, the 14,140-foot-high Nathu La, and the 16,000-foot-high Tangkar La, is the main feature of Eastern Sikkim. It separates Sikkim from Bhutan and Tibet in the east, forms the boundary between Bhutan and Sikkim for the greater part, and separates the basins of the Amo Chu in the east from that of the Tista River in the west. At Gyemo Chen, the trijunction point of the Bhutan-Sikkim-Tibet boundary, it bifurcates into two great spurs: one runs south-east; and the other, south-west. In the west, the Singali La range, which stretches south from the Kangchenjunga group of peaks, forms the boundary between Sikkim and Nepal.

The Donkya La range is much more lofty than the Singali La range. The drainage from the eastern flank of the Donkya La range is into the Amo Chu, the upper part of the course of which is in Tibet and the lower part in Bhutan. The drainage from its western flank is into the Rangpo, one of the eastern feeders of the Tista. The drainage from the eastern flank of the Singali La range is into the great Rangit River, which feeds the Tista from the west. The drainage from its western flank is into the Tamar River in Eastern Nepal.

The mountain-girdled basin of Sikkim is the catchment area of the headwaters of the Tista River and its affluents, like the Lachung Chu, the Lachen Chu, the Zemu Chu, the Talung Chu, the Rangpo, and the Rangit. The Tista basin, occupying the axis of an overfold, is structurally "inverted," the five peaks of Kangchenjunga representing the core. The Tista drains all of Sikkim, and, after travelling through the Darjeeling District, joins the Brahmaputra River in the Rangpur District. The Rangit, chiefly fed by the rainfall of the outer ranges of the Senchal and Singali hills, is the most important tributary of the Tista.

Sikkim has the typical mountain climate: an increase by a few feet in altitude affects temperature and rainfall conditions. Up to an altitude of 3,500 feet above the level of the sea, rainfall is heavy and temperature relatively high. The climate is tropical, and there are thick tropical forests with bamboo and sal as the dominant species. The temperate zone extends between 3,500 feet and 12,000 feet. The higher Himalaya zone stretches from 12,000 feet to 16,000 feet. Beyond that it is perpetual snow. The onset of the monsoon in the month of May coincides with the southward shift of the Inter-Tropical Convergence. Moisture-laden winds from the Bay of Bengal, after discharging moisture in the Assam Himalaya, travel westward and become the main source of precipitation in Sikkim.

NEPAL

Nepal lies in the Central Himalaya. Historically, before Prithvi Narayan Shah started in 1769 the process of the integration of the entire country between Sikkim in the east, the great plains of India in the south, Kumaun in the west, and the plateau of Tibet in the north, the name Nepal denoted only the area where the present capital, Kathmandu, is situated. This process culminated in the integration of the principality of Bajhang in the summer of 1959.

Sagarmatha (known outside as Mount Everest), Makalu, Cho Oyu, Gauri Shankar, Gosainkund, Manaslu, Dhaulagiri, and Annapurna, all over 26,000 feet above the level of the sea, are among the highest peaks of the Nepal Himalaya as well as the world.

Several rivers rising in Tibet beyond the Great Himalaya, like the Arun in the east and the Karnali in the west, pierce the central ridge into Nepal, and high passes like the 19,050-foot Nangpa La cross it in other places. The Kosi, with its great tributaries like the Arun, is the most important river of Eastern Nepal. The Tamar, the Arun, and the Sun join at Tribeni and form the great Saptakosi, known as the Kosi in Bihar, the third largest river in the river system in the

Himalaya. It drains the Himalaya between the great peaks of Kangchenjunga and Gosainthan. It leaves its mountain home at Chhatra, pierces through the Eastern Tarai of Nepal, and joins the Ganga south of Kursela in Bihar. The Kosi has been changing its course, and consequently there is a heavy charge of silt and detritus in its bed. The Gandaki, with its great tributaries like the Krishna and the Seti, drains Central Nepal. From the junction of the Gandaki with the Trisuli at Devghat, a little north of the Indo-Nepalese international boundary, the Gandaki is known as the Narayani. The great Saptagandaki, with its tributaries, is the most important river of Central-Western Nepal. Sapta (seven) in the case of the Gandaki is a mystical number. The Karnali and its tributaries like the Bheri and the Seti drain Western Nepal. The Karnali and the Kali join each other and flow as Sharada, called Ghagra or Sarayu, lower down. The Sarayu joins the Ganga at Chapra. Of the three main rivers flowing from the Nepal Himalaya, the Karnali is the most navigable in its lower parts in the hills of Nepal.

There are four distinct physical zones in Nepal. The dense forest zone of the Tarai leads to the foothills. The Lesser Himalaya rises gently from the Tarai to about 2,000 feet and then abruptly in steep and almost perpendicular escarpments of the Churia and Mahabharat ranges. The altitude of the Middle Himalaya ranges from 9,000 feet to 15,000 feet.

Temperature conditions in Nepal are of an extremely complex pattern. There is a general decrease in temperature as the altitude increases. Fogs and forests are common in the valleys, and night temperature is below the freezing-point. The south-west monsoon winds are the primary source of precipitation. The average annual rainfall in the Tarai region is fifty inches; in the foothills it is seventy inches. In the higher valleys local variations occur in proportion to exposure. The rain-bearing monsoon winds in the months of June-September also make a difference. The climate of the Tarai region is hot and humid; that of the Lesser Himalaya, cool and humid; and that of the Great Himalaya, cold and

dry. The Northern Nepalese are organized in groups, each in a village, and to every such village there are a number of subsidiary villages to which the members of the group concerned resort in the different seasons, according to the location of their summer and winter pastures.

The natural vegetation zones of Nepal coincide with the physiographic divisions of the country. Dense swampy forests of sal and sisaun cover the Tarai. The southern part of the Middle Himalaya encloses several fertile valleys, including the Bagmati Valley, which is over 200 square miles. The southern part of the Great Himalaya, except for the protected valleys, is bare and devoid of any vegetation owing to the thinness of the layer of the soil and the steep gradients. Rugged, inter-stream divides separate the deep valleys, some of which have, in their lower reaches, broad flood plains which are important for agricultural purposes. Conifers like birch, fir, larch, pine, and spruce are the dominant species in these forests.

UTTARAKHAND

Uttarakhand, which lies in the Central Himalaya between the Kali and Satluj rivers, borders upon Nepal in the east, the plains of Uttar Pradesh in the south, the Mahasu and Kinnaur districts of Himachal Pradesh in the west, and the Ngari region of Tibet in the north. The border areas, which constitute one-third of Uttarakhand, generally consist of wild gorges, barren rocks, and snow. Byans, Chaudans, Darma, Johar, Niti, Mana and Nelang are the only valleys where human habitation is possible.

The border of Uttar Pradesh with Tibet is a range of great altitude. There are several high passes, such as the 16,390-foot Lipu Lek (*Lek* means "mountain pass" in the Nepali language), the 18,510-foot Darma, the 18,300-foot Kungri Bingri, the 16,390-foot Shalshal, the 16,628-foot Niti, the 18,400-foot Mana (Dungri La), and the 17,480 foot Jelu Khaga, which provide passage from Uttarakhand through the Great Himalaya to Tibet. There are several high peaks, such

as the 25,645-foot Nanda Devi, the 25,447-foot Kamet, the 23,360-foot Trisuli, the 23,213-foot Satopanth, the 23,184-foot Dunagiri, the 22,650-foot Panchchuli, the 22,510-foot Nanda Kot, and the 21,640-foot Nilkantha. The slopes and defiles of the lofty snowy ranges abound in ice-fields and glaciers such as the Milam, the Pindari, the Bhagirathi, and the Gangotri, which stretch for miles and miles. The layers of ice, several hundred feet in thickness, bear witness to immemorial centuries. The Bhyundar Ganga, the great valley of flowers, and the Nanda Devi Sanctuary are scenic spots of great beauty in Uttarakhand.

Several great rivers like the Kali, the Bhagirathi, and their tributaries drain Uttarakhand. The Kali, which rises near the India-Nepal-Tibet trijunction, follows a south-westerly course and runs almost at a right angle to the central range. The principal source of the Kali is the glacier, Milam. In its upper course the Kali and its two affluents, the Darma and the Lissar, flow in long parallel beds five miles apart. The Dhauli and Gauri rivers from Darma and Johar join it later. The Alakananda and the Bhagirathi are the most important headstreams of the Ganga. The two unite at Devprayag. The source of the Bhagirathi is the glacier Gangotri in the Gangotri group of peaks. The Ganga enters the plains at Hardwar.

Uttarakhand experiences every grade of climate. The first, the outermost zone, has a tropical climate marked by the sultry heat of the dry summer months and followed by a season of rains and low temperature. The second zone has mild and wet summers and long and severe winters. The third zone comprises high snowy peaks, characterized by long cold winters and short cool summers. Precipitation is in the form of snow. The annual rainfall decreases from east to west. The distribution of climate is also longitudinal. The people of northern fringes have two sets of houses, one for permanent residence and the other for temporary settlement.

Uttarakhand has various types of vegetation. There is a profuse growth of sal trees in the Tarai region. There is a

luxuriant growth of bamboos, *chirs*, *kails* (a kind of cedar), oaks, and silver firs between 5,000 feet and 11,000 feet, where the climate is temperate. The coniferous forests occur at higher altitudes. One can see birch and rhododendron following deodar, pine, and spruce, important coniferous trees, as one moves up.

KINNAUR, LAHUL, AND SPITI

Kinnaur, Lahul, and Spiti, which lie in the Western Himalaya, rugged and mountainous in an extraordinary degree, border upon Garhwal in the east, Jammu and Kashmir in the west, and the Ngari region of Tibet in the north. The highest mountain ridges in Kinnaur run almost south-east and north-west or parallel to the outer range of the Himalaya. The rugged character of the area is conspicuous in every part of the district except in the portion adjoining the Mahasu District. The holy 22,038-foot-high Kailash is the most dominant feature of Kinnaur, even though the 22,280-foot-high Rio Purgyal is Kinnaur's highest peak. There are several passes leading from Kinnaur through the Great Himalaya into Tibet, with an average height of 14,000 feet.

The face of the country is marked by deep river valleys. The Satluj Valley, cutting across the whole district from north-east to south-west, is the longest of these valleys. The right bank of the Satluj River is generally higher than the other, the villages are to be found at a height of 7,000 feet to 8,000 feet. Arable land extends to 11,000 feet. Oaks and pines cover this region. Beyond this are the pastures where the shepherds tend their flocks during the summer months. The broad Baspa Valley, like the Bhyundar Glen in North Garhwal, is the most beautiful valley of Kinnaur. The Tudong, Darbung, and Hangrang valleys are arid and mountainous.

The Satluj, which rises in Tibet beyond the Great Himalaya, enters India by the 11,000-foot-high Shipki La and flows from one end of the district to the other in a south-westerly direction. This river and its upper tributaries drain

Kinnaur. It has different names in different places. The name *Samandar* (from the Sanskrit *samudra*, sea) is popularly used by the southern Kinnauras. The northern Kinnauras call it Langshing, Muksung, or Shungti. The Baspa and the Spiti are the main tributaries of the Satluj. The Baspa flows from the south-east and joins the Satluj at Karchham near the centre of the valley. The Spiti, the longest tributary, flows from the north-west through Spiti and the Hangrang area of Kinnaur and joins the Satluj at Khabo near Namgya. The Satluj issues from the hills at Rupar.

Kinnaur has two climatic zones — the wet and the arid. In Lower Kinnaur summer is longer; and in Upper Kinnaur, winter. During the long winter months, there is frequent snowfall. Owing to the parallel trend of the lofty mountain ranges, only the lower southern parts like Nichar and Sang La receive heavy rainfall. On the higher slopes, precipitation is in the form of snow.

Spiti lies beyond the Great Himalaya. The mean elevation of Spiti is 12,000 feet above the level of the sea. All along its eastern and north-eastern boundary run mountains which are a continuation of the Ladakh range. The 20,108-foot-high Shila peak is the most dominating feature of Spiti. Passes like the 16,000-foot-high Bhaba, the 17,000-foot-high Mana, the 21,000-foot-high Manirang, the 15,754-foot-high Soma La (between the Parbati Valley of Kulu and the Pin Valley of Spiti), the 13,500-foot-high Rohtang, the 18,300-foot-high Parang La, and the 17,470-foot-high Tagalang La provide access to Lahul and Spiti from Kinnaur, Kulu, Chamba, Kishtwar, Zangskar, and Ladakh.

The Spiti Chu, the main river of Spiti, rises in the glaciers of the 15,300-foot-high Künzum Pass on the Lahul-Spiti divide and runs for seventy miles through Spiti proper in east-south-east direction, for it flows through Tibet, enters Kinnaur at Sanjham, and ultimately pours its waters into the Satluj at Namgya, south of the Shipki La. The Pin River, the main tributary of the Spiti, rises in the Bhaba Pass on the Kinnaur-Spiti divide. Spiti and Pin are the main valleys of Spiti.

Spiti is in the arid zone and experiences extremes of cold, snow, and desiccation. Summer is short and mild owing to the height; winter is long and severe. During the summer months a thin atmospheric insolation in the day and rapid fall of temperature at night cause disintegration of rocks. Most of the winter precipitation is in the form of snow.

Spiti is barren for the most part. What little vegetation there is, is thin and patchy. Owing to the severe climate, scanty precipitation, and intense cold, there are hardly any forest tracts. All that one can see is a stunted growth of birch, poplar, and willow along the rivers and streams. There are meadows and pastures here and there high up on the slopes. Shepherds from Chamba and Kangra go up to Spiti along with their flocks of sheep and goats during the summer months.

LADAKH

Ladakh, the northernmost part of the Himalaya in India, is more than half of the total area of the State of Jammu and Kashmir. Ladakh is also India's largest district. The Karakoram and Kunlun ranges in the north and the Zangskar range in the south provide Ladakh with natural boundaries. The Karakoram range constitutes Ladakh's northern boundary with Central Asia. There are no such formidable barriers in the east and the west.

The south-east and north-west mountain ranges run parallel to each other. This is the most striking feature of Ladakh. The Karakoram range has the largest number of giant peaks in the world. This great massif has several high cols, which connect India and Central Asia. The great caravan route from Leh to Yarkand lies over the 18,290-foot-high Karakoram Pass and the 17,480-foot-high Sasser La. The eastern end of the Karakoram range is connected with the western end of the Kunlun range, which skirts the Lingzi Thang-Aksai Chin plateau on the northern side. The Ladakh range, starting from the Indus-Shayok confluence and extending beyond the eastern frontiers of Ladakh, divides the

district into two parts. This unbroken chain traverses through Zangskar and Rupshu and through Chumurti in Western Tibet.

The direction of the mountain ranges determines the course of the rivers. The Indus, the longest river in the Himalaya, rises near Manasarovar in Western Tibet and flows westward, entering Ladakh near the frontier village of Demchok. The Shayok River, the principal tributary of the Indus, rises in the glaciers of the Eastern Karakoram. From the point where it issues till it reaches the village Shayok, it runs west-south-west. Then, after going with the Nubra River, it flows almost parallel to the Indus until their confluence west of Khapalu. The Zangskar River, which rises in the vicinity of the 16,047-foot-high Baralacha La, meets the Indus at Nyemo. The Waka, Suru, and Dras rivers, which rise in the north-western glaciers of Zangskar, are also important tributaries of the Indus.

Climatically Ladakh is located entirely in the Great Himalaya zone and is known for its extreme aridity. Great extremes of heat and cold and excessive dryness, chiefly because of the height of the landmass, characterize Ladakh. Its general aspect is extreme barrenness. The dryness of climate increases with height. Rainfall is scanty. Winter is long and severe. Most of the precipitation is in the form of snow and varies from place to place. At Leh it is only a few feet, but at Kargil and especially at Machoi in the Dras Valley but close to the 11,570-foot-high Zoji La, it is up to twenty feet a year.

Natural vegetation is scanty. The birch, the poplar, and the willow are found along the water courses. The poplar is the most valuable source of wood in the country, especially in the construction of bridges and houses.

The entire Himalaya borderland from NEFA in the east to Ladakh in the west comprises a mountain complex with parallel ranges both in the east-west and in the north-south direction. There are three distinct climatic zones according

to the altitude zones. NEFA, Bhutan, and Sikkim are in the wet zone. The Singali La range between Sikkim and Nepal works as the great barrier for winds from the Bay of Bengal. Hence the maximum precipitation on Mount Kangchenjunga on the Singali La ridge. Nepal and Uttarakhand are in the middle zone, neither too wet nor too dry. Kinnaur, Lahul and Spiti, and Ladakh are in the dry arid zone. Summer is short; winter, long and severe. The severe cold and the heavy snow cause hardship to animals and people alike. Climatic and physiographic conditions determine the economy of the people, the types of animals on which they live, their migration and settlement patterns, and many other aspects of life. The rivers in the Himalaya facilitate, rather than inhibit, the movement of the people during their summer and winter migrations. They determine not only the areas where the people may live, but also the routes of communication between India and Central Asia.