

THE HIMALAYAN BEAS BASIN



KANGRA VALLEY

Towering Dhauladhar stands guard over the whole length of the valley
In the foreground is the celebrated temple of Vajreshwari Devi

THE HIMALAYAN BEAS BASIN

A Study in Habitat, Economy and Society

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By

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BANARAS HINDU UNIVERSITY
VARANASI

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To
Banaras Hindu University
for
The Promotion of Learning
and
To All
Who Love the Himalayas

Foreword

By

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The Study of Himalayan Region as a whole or in part has received so far scant attention of scholars much less of Geographers. Its geographical study has been baffled on account of remote location, difficult terrain and want of large scale maps. It is indeed very creditable for Dr S L Kayastha to have undertaken the present study of the Himalayan Beas Basin. The study is a unique one and has come from a person who belongs to the area.

It is, therefore, with great pleasure that I write this foreward to the geographical work which presents for the first time a comprehensive and scientific account of a Himalayan region. Dr Kayastha has made a pioneer study of Himalayan geography. The book is the result of intimate personal knowledge and detailed field work. It was originally presented as a Ph D thesis and earned high commendation. The fresh approach to the study of geographical regions makes a definite contribution to the geography of India.

I am confident of its real value to the geographers, scientists and planners and I trust that others in the field will emulate this achievement.

Preface

Although the Himalayas are a conspicuous landmark of India yet scientific knowledge of the conditions of the habitat, economy and society remains vague. There is hardly enough authentic literature. There have been few attempts at making a systematic study and research of the geography of this large area extending from Kashmir to Assam. For obtaining a clear picture regional monographs are necessary. This book is an attempt to meet this need.

The book has emerged out of the Ph. D. thesis which I presented at the Banaras Hindu University in 1957. In 1962-63 the University Grants Commission Government of India sanctioned funds for its publication. The offer came at a time of a very busy academic term and full time could not be spared for this work. However, materials from various new surveys and the census reports etc. have been incorporated. In addition my own observations and field surveys since 1957 have been included. District hand books of census reports were not available at the time of publication for detailed study of 1961 population characteristics. Effort has been made to make the account vivid by providing numerous maps, diagrams and photographs. It made by me. All the maps, diagrams and photographs could not be given to restrict the size of the book. I have made use of various unpublished reports, accounts and maps and also of published material having some bearing on the subject. Only those works are given in the bibliography which are referred to in the text. Library facilities for geographical research work on Himalayan regions, really speaking, do not exist and to obtain access to various books and reports frequently called for patient and arduous search and resourcefulness.

In a work which covers such a broad field of study, none is more conscious than I myself of the numerous omissions and I would be grateful for constructive criticism and suggestions. Some of the materials are somewhat marginal to geography but they help to illuminate the study of the area. In order that each part may read as a whole, there is bound to be some minor repetition of material given elsewhere in greater detail. Much of the printing had to be rushed through during February and March 1964 and in spite of careful printing and proof reading there may have remained some errors.

There are numerous problems which are unanswered. This is partly in the character of the pioneer work such as this. There is much scope for further work in view of the extensive area and new developments and scholars in the field may profitably engage themselves in this work.

I would feel amply rewarded if this study of the Himalayan Bear Basin helps the geographers, scientists, administrators and planners in providing a better understanding of its 'Habitat Economy and Society'.

In the preparation of this book encouragement and assistance has been received from numerous persons and sources for which I feel to express sincere thanks. I am particularly grateful to Prof R L Singh for his able guidance in the preparation of this book. I am thankful to my colleagues especially Dr U Singh, Dr A S Jauhari and Shri N Prasad for their helpful suggestions. I had the advantage of discussing with Dr Jauhari a number of points relating to the general set up and certain other aspects of the book and with Prof D K Chakravarty regarding the Geological map. Shri Amrit Lal, Shri Om Prakash, Shri Ved Prakash, Shri Balraj, Shri Rajeshwar Kumar and Shri Harinder Singh also assisted me during my field work. I am very grateful to my father, Shri M R Kayastha for inspiration and the benefit of his rich experience of Bear Basin. Thanks are due to Dr M S Krishnan, formerly Director of the Geological Survey of India for allowing the use of library of the G S I and to the officers of the Irrigation, Roads and Buildings, Electricity, Forest, Agriculture, Horticulture, Fisheries and Industries Departments of Punjab and Himachal Pradesh for their cooperation in the collection of data and other information and to the Deputy Commissioners of Kangra, Mandi and Chamba for the use of their office libraries and records. I thank Prof V S Agrawala for use of his personal library, and to the staff of University library, Indology College library and Bharat Kala Bhawan library of Banaras Hindu University for placing all available materials at my disposal. I thank Shri Vishwanath for the preparation of the index and Shri Shambhu Prasad for the inking and lettering of a number of maps and diagrams. I take the opportunity of thanking Dr K N Lal and Shri Lakshmi Das for keen interest in the publication and printing of this book. I thank my wife Kusum for much help in so many ways during the writing of the thesis and the preparation of this book.

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S L KAYASTHA

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Introduction

The Himalayan Beas Basin lies in the Punjab Himalayas where a succession of hills, valleys and mountain ranges make up the Himalayan region. River Beas which gives name to the basin rises near the Rohtang pass in the Pir Panjal range of the lesser Himalayas. The Siwaliks veil this basin from the plains of the Punjab. In early history the group of small states between Sutlej and Ravi was known as the land of Trigarta. The Himalayan area was famed as the Dev Bhoomi or the land of gods. Streams of pilgrims, Buddhist monks, merchants and travellers from Central Asia, China and Tibet travelled across to Kulu, Zahor, Kangra and the plains of India. From different parts of India pilgrims come to pay their homage in the temples of Nagarkot (Kangra) and Jwalamukhi. However due to remote location the area has remained somewhat aloof, obscure and undeveloped.

The Himalayan Beas Basin is an area of great natural charm and geographical interest. The author was attracted to its study firstly for the great interest which the area, its economy and society offered for the student of geography, secondly because the area had not been studied by any geographer before and thirdly because of the deeply tender human consideration with which he looks upon the area where he was born and where he has been living for a long time.

The region comprises parts of three Himalayan districts of Kangra, Mandi and Chamba. At present its administrative set up and economy are somewhat disintegrated due to its divided administration under two states Punjab and Himachal Pradesh, hence the unity of both has been proposed in the Himalayan Beas Basin.

The present work embodies a definite geographical approach. The author is of the opinion that in the Himalayan area the basin of the river forms a natural geographical unit having a large measure of economic and social coherence. This concept offers a new opportunity to coordinate management and development of various resources. The study provides for the first time a comprehensive treatment of the habitat, economy and society and of their interrelationships in the Himalayan Beas Basin. It offers a fresh approach to the study of Himalayan regions. Various surveys, new data and information and their cartographic representation illuminate the geography of the Himalayan Beas Basin. The

author has provided a fairly detailed study of the numerous features of the Habitat. He has been able to point out and explain the anomaly of high rainfall in Kangra Valley. Contrary to common belief the study significantly reveals that the livestock is far in excess of the available resources and the pressure of animal and human population on cultivated area has reached the saturation point at the present stage of development. The general impression that one gathers is of vast empty spaces and a large scope for further settlement. It was with this impression that a large number of displaced persons came here after the Partition but they gradually left on account of lack of adequate means of sustenance. Therefore a plea has been made for the development of the area. There is undoubted scope for intensive mixed farming, tourism, horticulture, various crafts and small scale industries. Provision of more and better roads and greater availability of hydroelectric power will help to stimulate much economic development. Suggestions based on personal survey have been made for agricultural and industrial development and a more diversified economy. The various type studies also based on personal survey of Himalayan villages and a Himalayan town, the agriculturist Ghurths and the pastoralist Gaddis, present for the first time an intimate and critical appreciation of the habitats, economies and societies in the Himalayan Beas Basin. Similarly the study of hydrology, tourist industry, demographic features and delimitation of Himalayan districts and other aspects whose account is given in the book and in the published papers are first attempts in their study. Type studies of villages of Daulatpur and Gadiarah and of the Ghurths and Gaddis present a clear picture of the agricultural economies of various regions ranging from the southern hill country to the northern hill country and from the valley area to the mountainous region. Thus the study of the Himalayan Beas Basin provides a perennial interest in the study of the everchanging action and reaction between its habitat, economy and society.

The study is divided into three parts. Part I deals with the habitat and essays to give in detail a vivid and systematic picture of the geographical setting of the Himalayan Beas Basin. In Part II a comprehensive study of the economy has been made. This helps in establishing the relationship between the habitat and numerous features of economy. The last part comprises the study of the society. Herein demographic features, human habitations and dwellings, social structure, behaviours and reactions have been studied and various environmental conditions noted. The study has been further supported by type

studies of rural and urban settlements and agricultural and pastoral societies. Finally conclusions arrived at from the preceding study have been given.

This fascinating study could not have been possible without extensive fieldwork and personal knowledge of the area. For many years the author had the benefit of close contact with this beautiful area and the interesting people who live in these charming valleys and rugged hills and mountains. Thereby he has gained an intimate knowledge of the area, the life and problems of the people. In an area of such difficult terrain where means of transport are inadequate and restricted and other facilities of travel meagre the field tours have often entailed long and difficult treks on foot but there could not be any greater reward for this painstaking work than the intimate knowledge thus gained.

The knowledge of Himalayan regions and their problems is vital more so in the light of recent developments on the Himalayan border. This fact is corroborated by a significant statement made by the Defence Minister of the Government of India in the Rajya Sabha in September 1963. Those who control the Himalayas will control the plains of India. We have to defend our country in the Himalayas.

Thus a clearer understanding of the Himalayan Base Basin will prove to be of interest not only to the geographer but also to all those interested in this less known and lesser understood part of India.

THE HABITAT.

Location, Relief, Hydrography and Geology

A. SPATIAL RELATIONSHIPS

Geometrical Position :

The Himalayan Beas Basin extends from $31^{\circ} 25'N$ to $32^{\circ} 45'N$ latitude and from $75^{\circ} 35' E$ to $77^{\circ} 50' E$ longitude (Fig 1)

Area :

The Himalayan Beas Basin appears like an irregular rectangular mass with its length

running east to west and breadth north to south. At its maximum length it is about 138 miles and at its maximum breadth it is about 70 miles, so that the length is nearly double of breadth. The average length is 118 miles and the average breadth is about 56 miles. It encompasses an area of 5,639 sq miles. The Himalayan Beas Basin includes parts of three Himalayan districts: i.e. Kangra,

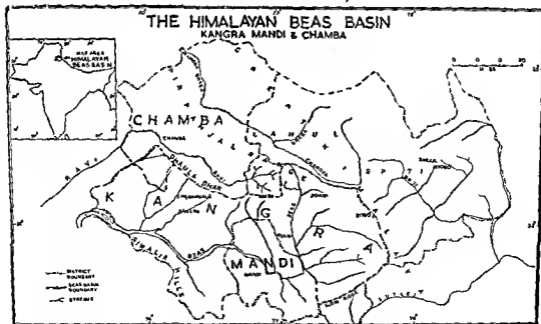


Fig 1

Mandi and Chamba¹ The area includes 4 188 sq miles of Kangra (Punjab) and 1 450 sq miles of Mandi and Chamba (Himachal Pradesh)

Boundaries

The Himalayan Beas Basin lies in a remote hill country to the north east of Punjab plains Its boundaries are well demarcated (Fig 2) To the north the high Dhauladhar range with an average elevation of nearly 12 000 ft separates the Beas Basin from that of the Ravi the Pir Panjal range with an average elevation of about 16 000 ft forms the divide between the waters of the Beas and the Chandra Bhaga, in the north east and east, the Great Himalayan range with an average elevation of 18 000 ft serves as a water parting between the Beas and the Spiti, in the south-east the Jalore ridge with an average elevation of 9 000 ft demarcates the basin of the Beas from that of the Sutlej, in the south west and north west the Siwalik hills with an average elevation of

2 000 ft and spurs from the Dhauladhar range separate the Beas Basin from those of the Sutlej and the Lower Ravi Thus the boundary of the Himalayan Beas Basin is topographically well marked being delimited by natural boundaries and thus constitutes a homogeneous Himalayan District²

B SURFACE CONFIGURATION

General Shape

Adjoining the plains of the Punjab in the north east lies the Himalayan Beas Basin, where a succession of mountain ranges valleys and hills make up the Himalayan tract (Fig 3) The Himalayan Beas Basin lies in the Punjab Himalayas, in the western section of the Himalayan range. The river Beas from which the basin takes its name rises near the Rohtang pass of the Pir Panjal range and traverses the region collecting in its course the entire surface drainage As a whole, it constitutes an

1	District	Area in sq miles 1951	Area in sq miles 1961	Area in Himalayan Beas Basin
	Kangra	8 975	4,904	4,188
	Mandi	1 690	1,673	1,200
	Chamba	3 135	3 135	250
		13 730	9,558	5 638

(Source Census of India 1951 Vol VIII, Part II—A 1953 pp 372, 416 420) and Census of India—1961 Paper No 1 of 1962, Pp 40 56

In 1961 Census, area of Kangra district is reduced due to the separation of Lahul and Spiti as a border district.

² For a detailed study see Singh R. L. and Nayastha, S. L. The Himalayan Beas Basin—A River Basin Concept in the Delimitation of Himalayan Districts Paper read before the 18th International Geography Congress, Rio de Janeiro Aug., 1954 & published in National Geographical Journal of India, Vol. II Part IV December 1956 pp 180-197

Since the publication of this paper Lahul and Spiti have been made into a separate border district. It had been suggested that Mandi be merged with Kangra (For an interesting discussion see 'Whether Kangra in Greater Punjab or in Greater Himachal Pradesh—Memorandum submitted to the States Reorganization Commission, New Delhi, by Kangra Sewak Sabha New Delhi 1954)

HIMALAYAN BEAS BASIN

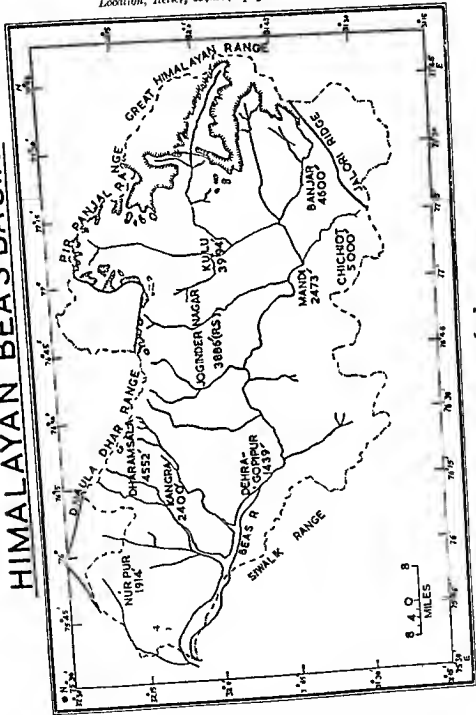


Fig 2.

oblique and asymmetrical basin to the Great Himalayan alignment¹. The Siwalik hills veil this area from the plains thus making it somewhat remote and obscure.

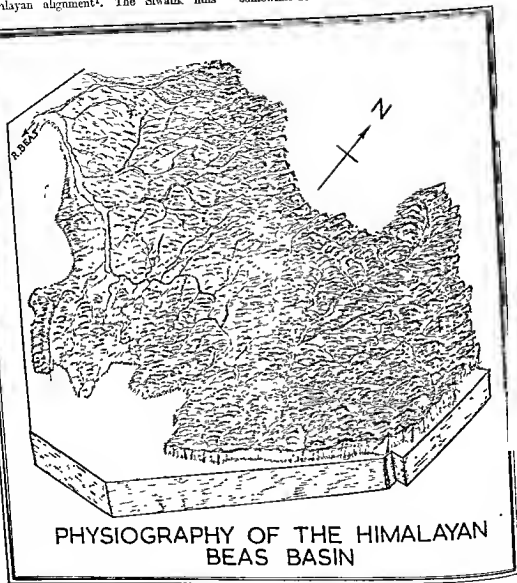


Fig 3

¹ Burrell, S. G. and Hayden, H. H., 'A Sketch of Geography and Geology of the Himalaya Mountains and Tibet'. Part III. Delhi, 1924, p. 118.

The white snow clad peaks are the most prominent landmark. Dhauladhar range looks in supreme majesty over the Kangra valley (frontispiece) while the Pir Panjal range and the Great Himalayan range stand guard over the Kulu Valley. The majestic array of hoary peaks is visible from far and wide. The peaceful valleys below are interspersed with numerous streams, fields and quaint homesteads. The rolling downs are strewn with boulders which are a characteristic feature of the valleys. Seen from a vantage point, the lower hills appear like ripples of the sea, suddenly arrested and frozen into stone. The low valleys provide fascinating contrast with the rugged lofty snowy mountains. No scenery presents such sublime and delightful contrasts¹.

Orography.

The general elevations vary from about 1500 ft in the lower valleys to 6000 ft in the higher valleys. The crests of the high ranges attain to a height of 15000 ft and in the Great Himalayan Range in the east exceed 20000 ft. To the north and north east are high and rugged snowy Himalayan ranges. South of the Kangra, Kulu and Suketi Valleys is in general the broken hill country cut by deep ravine beds. The entire region is divided into two unequal parts by a south easterly bifurcation of the Dhauladhar range. To the east is a highly mountainous region and constitutes the area of the Upper Beas and

its affluents. To the west is a comparatively less mountainous tract which constitutes the middle valley of the Beas and the area drained by its tributary streams.

A study of the north to south (Fig 4) and east to west (Fig 5) cross sections reveals some of the prominent features of the area. As we approach from the Hoshiarpur (Fig 1) in the Punjab plains towards the Kangra Valley the country rises gradually and the first prominent landmark is the low hills of the Siwaliks (2000 ft average elevation). The Soti river makes a wide low valley with characteristic features of the 'Chos'. Then again the slope rises somewhat rapidly along the escarpment of Chhampurni range (3000 ft. approx elevation) whence the country gently descends on the leeward side to the Beas Valley (about 1000 ft elevation) which is rather narrow in extent. There is ascent from here to the broken hill country (average elevation 2000 ft) cut by deep ravines which gradually rises towards the hills south of Kangra Valley. The slight depression represents the vale of Kangra (2400 ft average elevation) which is a longitudinal trough. Streams issuing forth from the northern Dhauladhar range cut across the valley. Then there is a gentle convex slope towards Dharmasala (4552 ft). There is a broad shoulder at 7500 ft elevation but further north after a few miles the rise is almost perpendicular.

¹ Barnes G. L. quoted in Kangra District Gazetteer V - Part 3 Lahore 1906 p 4

² The expression 'Chos' means a stream or torrent flowing through r from the Siwalik hills with n the Punjab (Vide Punjab Land Preservation (Chos) Act 1900 Punjab Act II of 1900 as modified upto 1st July 1944). Literally 'Chos' connotes a bed of loose boulders, gravel and sand in cutting rapid erosion.

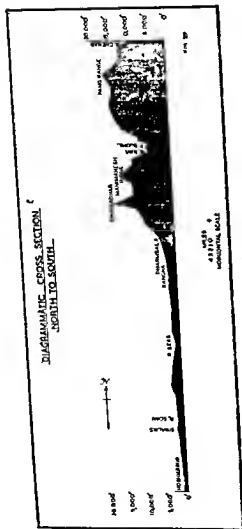


Fig. 4

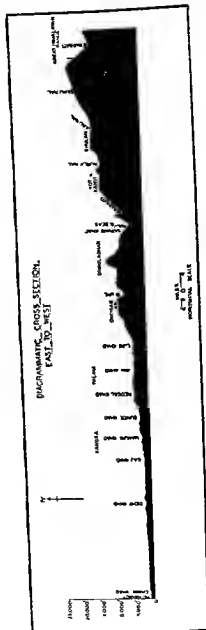


Fig. 5

Proceeding from Pathankot eastwards (Fig 5) there is a descent to the bed of Chakki khad. Then is gradual rise through the broken hill country of Nurpur. Beyond that there is undulating country cut by numerous hill streams. From Kangra there is a distinct rise to Palam valley and water courses descending from the Dhauladhar range cut transversely across this. Gaj Manuni, Manjhi, Banganga, Neugal, Awa and Yuni represent some of the major streams of this well watered tract. From the bed of the Luni there is a steep ascent to a wide hill range, Ghogar Dhar¹. Then there is a fall to the river Uhl and again rise to a broad shoulder of Dhauladhar range. From here the rise is rapid but there is a gradual descent on the leeward side to the bed of the Beas river in Kulu Valley. Across Kulu valley further eastwards lies the highly mountainous tract interspersed with the courses of various hill streams like the Parbati, the Hurla and the Suni. The higher regions stand like a massive wall and attain to a height of 20 000 ft above sea level. They are covered with snow and glaciers in the upper parts.

Slope Analysis

Elevation of Cham (Valley)	2 817 ft
Elevation of Peak near	
Indradhar Jot	15 124 ft
Difference in Elevation	12 277 ft
Horizontal distance	9 Miles

The slope rises 1,361 ft approximately in one mile or 1 in 3.9 or absolute slope is 25.4%. This indeed is a very steep rise. Like absolute relief the average slope² map (Fig 6)

shows a pattern of descending order from north and east to south and west. The average slope ranges from 0° to 24.93°. Generally areas of high relief also exhibit the highest degree of average slope i.e. above 15° in the North and East. High mountain passes show less degree of average slope than the average highest. The eastern half with high average slope extends like a protecting arm in the north over the western half with lower average slope.

The Dhauladhar range descends in steps to the Ravi Valley. Some of the prominent features of the area are further revealed by the transect diagram (Fig 7).

Ranges and Valleys

The region is highly mountainous and is crisscrossed by numerous mountain ranges and river valleys. All the three ranges of the Himalayas i.e. the Great Himalayas, the Lesser Himalayas and the Outer Himalayas are represented in this region (Fig 8). The ranges are not properly explored and several peaks are still unnamed. The region may be studied under the following heads:

- (1) The Southern or the Siwalik zone
- (2) The Central or the Zone of hills and valleys
- (3) The Northern or the mountainous zone

The Southern or Siwalik Zone

This consists of low hills and they lie between the plains and the valleys. Their average elevation is 2 000 ft. Siwaliks were known to the ancient geographers as Mainak.

¹ In hill dialect Dhar means range e.g. Dhauladhar—The White range

² The average slope of the area has been calculated on the basis of 9 sq. mile minutes units

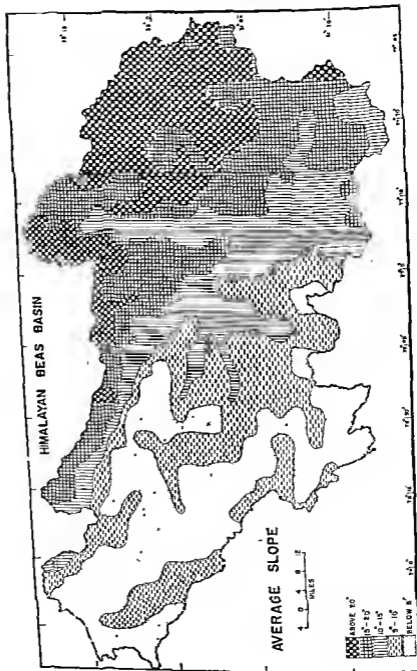


Fig. 6

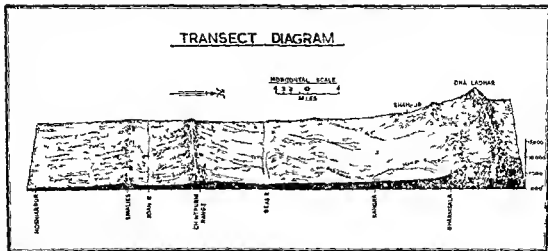


Fig 7

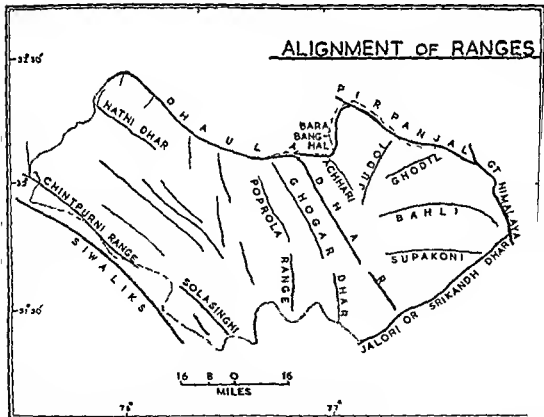


Fig 8

Parvat¹. In Hindu mythology the Siwalik range of hills is considered as the edge of the roof of Shiva's dwelling in the Himalaya². The Siwaliks are recent in origin as is evident from the highly unconsolidated materials that compose them and on account of which they easily lend themselves to erosion. Although topographically they belong to the mountains but geologically they are associated with the plains. Hathu Dhar is a low range running parallel and to the south of Dhaula dhar range. Highest point in it is 5,256 ft above sea level. It maintains an almost continuous course from Rehi in Kangra to the Ravi. Near its eastern extremity a spur from the Dhauladhar joins it almost at right angles forming the boundary between Kangra and Chamba. Like other ranges it has a scarp face on its southern flank and a dip slope on the northern.

The second range of hills is the Chintpurni range. This rises abruptly from the plains adjoining it and the slope is too steep for cultivation. There are however some level tracts on the top and though the sides are uninhabited and occupied by underwood the crest is dotted with sparse habitations. The northern flank towards the Beas river offers gradual and comparatively easy descent. Occasionally the hills subside into undulating knolls scarcely higher than the level of the valleys. The crests are nearly 3,000 ft

above sea level. Sola Singh Dhar along with Gaumukhi and Ramgarh Dhar occupy the southern fringe and continue a north-west—south-east alignment further south-east of Chintpurni hills. The highest elevation is 3,812 ft above sea level.

The Central or the Zone of Hills and Valleys :

There is a gradual rise in elevation towards Dhauladhar range and the Pir Panjal range in the north, and the Great Himalayan range in the east. The series of parallel ranges are divided by longitudinal valleys the general direction of which is from north west to south-east, the only exception being the Kulu valley which runs transverse to the main alignment. Near the plains the features of hills and valleys are somewhat distinct but beyond the Chintpurni range, hills and dales intermingle. The valleys have been raised to the dignity and stature of enclosing hills and the hills depressed to the level of subjacent valleys³. Often the hills dissolve into gentle slopes and platforms of tablelands and valleys become convulsed and upheaved so as to be no longer distinguished from the ridges which environ them. Detached pieces of hills with bold outline are marked here and there like Kali Dhar over Jwalamukhi. The heights of the ridges and the intervening valleys increase in elevation progressively as they recede from the plains.

1 Law, P. C., *Mountains of India—Historico—Geographical Study*, Calcutta Geographical Society, Publication No. 5, 1944.
 2 Burrard, S. G. and Hayden, H. H., *A Sketch of Geography and Geology of the Himalaya Mountains and Tibet*, Part II 1933 Delhi, p. 9.
 3 Kangra District Gazetteer, Lahore, 1926, p. 2.

Elevation of Selected Places

Name of Place	Height in feet above Sea level	Location
Bharwan	3 203	Ridge
Jwalamukhi	1,958	Valley
Gumbar	3 721	Ridge
Kangra (Near Fort)	2 994	Valley
Bhawan	3,270	Valley
Pathur Fort	4 596	Ridge
Snowpeak at the Head of Ban Ganga Stream	16 033	Mountain peak

Thus we see that as we proceed from the Chintjurni range towards the Dhauladhar the successive ranges and valleys continuously increase in elevation

A valley is distinctly traceable from Shahpur on the banks of the Ravi to Dhatwal on the border of Bilaspur. It runs through the entire length of Kangra through Nurpur, Dehra and Hamarpur. The surface is rugged and broken and is scarcely 5 miles broad in the south east where it is little more than the ravine bed. The Beas intersects the valley at Nadann, near which it expands but further it becomes narrower and uneven.

The hills of Mahal Mori exhibit a bleak and barren aspect. The general aspect of successive ridges appeared to Vigne as 'Agitated sea suddenly arrested and fixed into stone'.¹

The Jalori or Srikandh Dhar in the south east bisects Saraj from east to west. It

projects as a spur from the main range dividing the waters of the Sutlej from that of the Beas.

Further westwards the Sikandar Dhar runs from the border of Suket and runs northwards for about 50 miles. It is cut through by the gorge of river Beas north of Mandi town. Its average elevation is about 6,000 ft. The Paprola range shuts out Bir Banghal from Kangra Valley. This range after crossing Binunt at Paprola runs on to Mandi where it acquires the name of Sikandar Dhar. Ghogar Dhar runs from north west to south east to the right of Uhl river. It is a spur from the Dhauladhar range.

Kangra Valley is a longitudinal trough and lies at the foot of Dhauladhar range. The valley proper extends from Shahpur in Kangra tahsil to Baijnath in Palampur Tahsil. The length of the valley is nearly 20 miles and the average width is about 6 miles. Towards the eastern end the valley extends in continuous slope from the northern hills to the bed of river Beas. Near Kangra low tertiary hillocks encroach and reduce the width of the valley. In the north western portion the valley is still more confined. The valley is much dissected by ravines. The level of the valley varies from 2 300 ft to 4 000 ft above sea level. In reality it slopes rapidly downwards from the foot of the range. In spite of the broken character of the valley the slope permits the water from the hill torrents to be run on to the fields for irrigation. From the human point of view, it is the most favourable tract. The contours

of the valley are pleasantly broken by transverse ridges and numerous streams which descend from the northern mountain range.

In Mandi the only area which can be called by the name of plain is the Suketi Valley.

The valley of Beas extends from the lower extremity at Hajipur (400 ft.) eastwards to Dehra Gopipur (1 423 ft.) Nadaun (1 670 ft.) Sunjanpur Tira (1 834 ft.) Mandi (2 473 ft.) and Larji (3 224 ft.) From Larji the valley runs northwards along the Beas to Kulu (3 994 ft.) and Manali (6 000 ft.) Since the Beas river is not navigable except at certain ferry points there is not much physical unity throughout the valley. The river often runs through deep gorges with mountains dipping down pretty steeply to its sides. The valley of Beas in Kulu is somewhat open. At Nadaun also the valley again opens out. As the river flows in a deep bed the water of Beas is not used for irrigation. Wherever the bed is low and wide it is strewn over with sand and gravel.

The Northern or Mountainous Zone

It consists of mountains and spurs of the Lesser and the Great Himalayan ranges. Between the Great Himalaya and the Siwalik hills is enclosed a region of intricate system of ranges called the Lesser Himalaya. They are the result of 'not of one but of many movements of the earth's crust'. The whole region has been subjected to successive compressions. Notable amongst the ranges of the Lesser Himalaya represented in the Himalayan

Beas Basin, are, the Dhauladhar range in Kangra and the Pir Panjal range in Kulu.

Dhauladhar² forms the most striking range (Plate—Frontispiece). It branches off from the Great Himalayan range near Badrinath. It is intercepted by the Sutlej at Pampur and the Beas at Larji and by the Pavi south-west of Chamba. From Rampur on the Sutlej the range runs in a north-west to south-east direct on up to Larji dividing Sara into two parts. Further, it forms boundary between Mandi State and Kulu and then turns abruptly westwards near Bangahal. Near the eastern extremity the offshoot that forms boundary between Mandi and Kulu is crossed by the Bhabu (9 400 ft.) and Dulchi (6 760 ft.) passes. Another offshoot at the western end passes through the hill station of Dalhousie. In the east, the northern flank impinges against the southern flank of Mani Mahesh range a bifurcation of the Pir Panjal, and the clash between the flanks results in the mountain knot of Bara Bangahal. As mentioned earlier the lesser Himalayan range is oblique to the Great Himalayan range and thus the basin of the Beas is disposed obliquely with regard to the Himalayan alignment. Dhauladhar has a north-west to south-east alignment and is about 120 miles long in the Himalayan Beas Basin. In the west it drops down to a ridge of small elevation. Near Dalhousie its average elevation drops to 6 000 ft. Dhauladhar forms an effective boundary between Kangra and Chamba for 36 miles. Its

¹ Barrard, G. and Harden, H. H., op. cit. p. 97

² Ibid. p. 37. Dhauladhar means the White Range as also exemplified in usage Dhaul Ganga—The White Stream.

mean elevation is 15 000 ft Unlike other parts of the Himalayas, the rise of the Dhauladhar is somewhat abrupt an absolute elevation of more than 12 000 ft above the valley spread out at its feet The view is uninterrupted and majestic (Frontispiece) No scenery in the Himalayan Beas Basin presents such an absolute contrast

The Pir Panjal range lies from north west to south east along the headwaters of Beas river and acts as a water divide between the Beas and the Chandra It is crossed by the Rhotang pass (13 000 ft) and the Hamta Pass (14 000 ft) The range bends towards the Dhauladhar range near the source of Ravi and the clash of flanks as already stated creates the mountain knot of Bara Bangahal The peaks of the Pir Panjal range are on an average more than 16 000 ft above sea level and some attain to a height of 20 000 ft and over In kulu the mountain system is lofty in north and east Spurs descend from the main ranges which frequently end in escarped bluffs A spur from the Pir Panjal separates the Beas from the valleys of Malana and Parbati and ends in a bluff 8 000 ft high crowned by the temple of Bijh Mahadev Similar offshoots separate the valleys of Malana and Parbati, Parbati and Saunj and Saunj and Tirthan In fact there are numerous high ridges between the courses of the streams

The Great Himalaya range runs along the eastern boundary and separates the catchment area of the Beas from that of Spiti and Sutlej rivers It is a massive mountainous tract not yet fully explored because of its

formidable character The horizon is hoary with an army of majestic peaks some of them still unclimbed Several peaks are over 20 000 ft above sea level There are many peaks of interest to the mountaineer There is only one pass the Pir Parbati pass (15 754 ft) at the head of Parbati river Both the Pir Panjal and the Great Himalayan ranges are regions of high mountains snows and glaciers In the Dhauladhar range the snow and the glaciers are not so extensive

Thus the northern and eastern mountainous region demarcates the Beas Basin from that of Ravi Chandra Spiti and Sutlej and by nature of its very rugged terrain constitutes a difficult mountainous region of snow glaciers forests and streams and confined Valleys

Altitudinal Zones

A clearer picture of the relief of the Himalayan Beas Basin can be obtained from the map showing altitudinal zones (Fig 9) East of a line passing through Baijnath and Mandi the region is highly mountainous and with the exception of the Beas Valley up to Kulu lies in general between 4 000 ft and 20 000 ft above sea level while west of it is for the greater part less than 4 000 ft high except for a narrow fringe of mountain range in the north about 4 miles wide which has an average elevation of 15 000 ft For a detailed classification the region can be conveniently divided into six altitudinal zones

(1) Zone of less than 450 metres (roughly below 1 500 ft) This low lying area lies in the south west largely in Nurpur and Dehra Tahsil and a small portion lies in

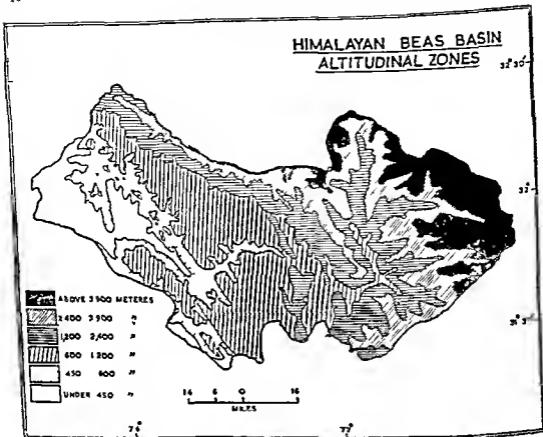


Fig 9

Hamirpur tahsil (for administrative divisions see fig 10)

(ii) Zone of 450—600 meters (roughly 1,500 ft.—2,000 ft.) It lies in the south and south west mostly in the northern part of Nurpur Tahsil and central part of Dehra Tahsil. Some of the area of Hamirpur and Kangra Tahsils is also included.

(iii) Zone of 600—1,200 metres (roughly 2,000 ft.—4,000 ft.) This is the biggest zone. It occupies south Bhattiyat, most of central and southern Kangra and Palampur, more

than 2/3 of Hamirpur, a large part of Mandi and Sarkaghat considerable parts of Joun dernagar and Chachiot and a small area of Kulu valley. From the human and economic point of view, this is the most important zone.

(iv) Zone of 1,200—2,400 metres (roughly 4,000 ft.—8,000 ft.) It occupies a narrow tract on the slopes and spurs of northern and eastern mountain ranges. This zone occurs in Bhattiyat Kangra Palampur, Joginder nagar, Chachiot and Kulu and only to a small extent in Sarkaghat and Mandi.

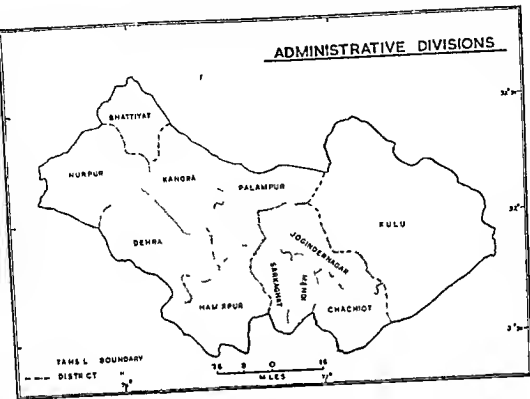


Fig 10

(v) Zone of 2 400–3 900 meters (roughly 8 000 ft –13 000 ft) It represents a successive rise from the previous zone but its area decreases. This zone has small extent in Bhattiyat, Kangra, Palampur, Chachiot and Jogindernagar and considerable area lies in Kulu.

(vi) Zone of more than 3 900 metres (roughly above 13 000 ft) It is the northern most zone occupying a very narrow fringe in Kangra and Palampur but large area in Kulu is no doubt the most mountainous tahsil of the Himachal Pradesh.

We may further simplify by dividing the entire region into 3 zones as follows

1 The Lower Zone

Its elevation ranges from less than 1 500 ft to 2 000 ft above sea level. It represents the south western region of low lying hills and valleys.

2 The Middle Zone

It constitutes the zone of higher valleys, ridges and spurs. Its average altitude varies from 2 000 ft to 8 000 ft above sea level. Economically this is the most important zone.

3 The High Zone

Its altitude exceeds 8000 ft above sea level. It is the zone of mountains which are with few exceptions beyond human settlement.

In general the zones rise in elevation from south to north as also from west to east.

C HYDROGRAPHY*

Detailed studies of the hydrography of various rivers and river basins in India have been carried out only in a few cases. Proper and systematic records of river discharges are lacking. The correct understanding of the flow regime and river behaviour is essential for the efficiency of irrigation and control of floods.

To reach a correct understanding of the hydrography of a river it is necessary that a proper knowledge of the drainage basin—its topography, geology, vegetal cover, the drainage channel, discharge data, the occurrence of precipitation and its disposal must be made.

The Beas is mentioned in the ancient history of India. Reference to it is found in *Pg Veda* (7500 BC) where it is known as *Arjū Kiyā*¹. Greek historians called it *Hypasis* (300 BC to 140 AD)². The present name Beas is derived from the Sanskrit name *Viparā*³. According to local legend the name of sage *Vyas* is associated with the site of its source where the sage is said to have performed penance.

Beas Basin—Area, River Pattern, Topography Gradient etc

The Himalayan basin of the Beas (Fig 11) covers an area of 5638 sq miles

Name of River	Himalayan area included in catchment Basin ⁴ (in sq miles)
Sutlej	18,500
Jehlum	13,000
Chenab	10,500
Beas	5,600
Ravi	3,100

Of the five rivers of the Punjab only Ravi has a smaller drainage basin.

The greater part of the Beas basin lies high up in the mountains and the valleys. The Beas takes its rise in the Pir Panjal range at the Rohtang pass near the headwaters of the Ravi at a height of about 13000 ft (nearly 4000 metres). It is a small stream at the source and takes its first water from a small spring *Beas Pihū* though some distance away large quantities of water are added by melting snow and glaciers. The river already swollen by large tributary streams pierces the Dhauladhar range at *Larjū* 70 miles from its source. It records an average fall of 120 ft a mile up to *Larjū* 75 miles from its source. After this, the gradient becomes gentler and is

* For a detailed account see Kayastha, S. L., *The Himalayan Beas Basin—A Hydrographical Study*. The National Geographical Journal of India, Vol. I Part I Sept. 1933 pp 11—20. Printed in the Indian Journal of Lower and River Valley Development Vol VI No 6, 1936 pp 5—14.

1 Purandhar C and Hayden, H H., op. cit. p. 233

2 Cunningham A Sir *Annals of Geography of India* 194 p 19

3 Dave J R., *Beas* *Bharat Journal*, January 2, 1936 pp. 60—62.

4 Barrard, R G and Hayden H H., op. cit. p 15



Fig II

the valleys below it is hardly more than 10 ft per mile. South of Larj the Beas crosses through a steep defile below Mandi (Fig 12) The tributary streams of the Beas make intricate patterns like a bunch of ferns (Fig 11) The main trunk has about 16 important tributaries. The main stream is like a crescent the dip of the crescent being off 1/3 of Mandi and Kangra proper. The western tip runs northwards towards the

undulating country of south Kangra. The river assumes four directions—in the beginning it flows southwards then it runs westwards in its middle course in the valley from Nadaun it turns northwesterly and a few miles above Naushera it turns south westwards. In Mandi and Kangra it is a river flowing up the map.

In the upper catchment area the chief tributary streams on the right are Solang

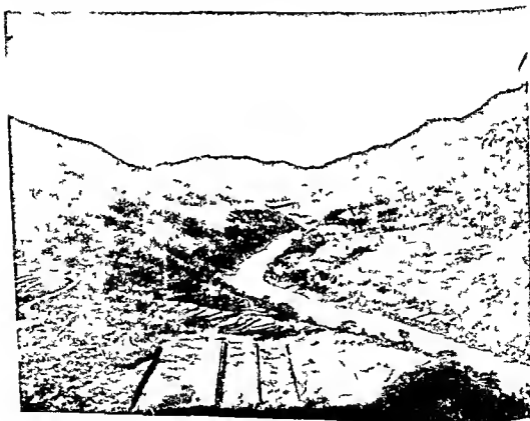


Fig 12 BEAS VALLEY

View of Beas Valley below Mandi. The river is swift and the valley is narrow. A narrow road runs parallel on the right bank.

Manasu, Sujon, Phojal, and Sarvari while on the left are Parbati, Malana, Hurla, Samy and Tirthin. The Parbati is almost as large a stream as Beas itself. The catchment of Beas extends up to Jalori ridge which constitutes the southern boundary of Upper Beas.

Almost the entire drainage of Mandi district of Himachal Pradesh falls into the Beas river. From Mandi the river takes a northerly turn and along its course receives the waters of Uhl, Luni, and Rana on the north bank and Bal, Suleti and Bakar on the south bank. The transverse gorges of the Beas above and below Mandi and Parallel and opposite directions of the flow of streams very much resemble the drainage pattern found in the Jura mountains in south eastern France¹.

The river enters Kangra proper at Sanghol. Here the main affluents are from the snowy Dhauladhar range. They are Binur, Iwa, Neozal, Buner or Ban Ganga, Manu, Bated Dahr, Jabbar and Chakk; on the north bank and Lunkar, Kunsh and Man on the south bank. Each of these tributaries is swelled by accession of many petty rivulets. The south bank tributaries are few and unimportant. After flowing through the vale of Naddun and the longitudinal Jaswin dun the river reaches Nurthal (1,000 ft above sea level) where the liberated river sweeps around the base of low hills of the Bawalik and runs in an uninterrupted course. South

of Pathankot, the river makes a large loop, the Beas sweeps round and after long parting again approaches within 16 miles of Ravi. Ultimately the river joins Sutlej at Hanke in the plains.

The boundary² of the basin is well demarcated by lofty ranges of mountains in the north and east and hill ranges in the south, south west and north west (Fig 13). The snowy mountains contribute large quantities of meltwater to the volume of flow in the Beas. The river flows through Kulu valley (average height 4,000 ft), Mandi (average height 2,500 ft), and Kangra (average height 2,000 ft). The fall from source to Larji, a distance of 75 miles, is 125 ft in a mile, from Larji to Sanghol it is 1,080 ft and from Sanghol to Nurthal, the fall is 1,920 ft. There is a total fall of 12,050 ft from the source to the point where the river debouches on to the plains. Thus the upper reaches have very steep gradient. There is a spectacular fall of 6,000 ft in 9 miles from the source to its junction with Solang. In the middle and lower reaches the gradient is gradual. Between Mandi (2,473 ft) and D-hra Gopipur (1,439 ft) there is a fall of approximately 1,000 ft in a straight distance of 45 miles and in a river course of approximately 65 miles. Average Bed Slope for the whole drainage basin³ is 1/400 source to Larji is 1/42, in valleys is 1/528 and over the plains is 1/5000.

1 Bome S. C. Excurs to Ladki forms in the Upper Beas Valley
Geographical Review of India Vol XVIII March 1951 No 1 p 29

2 A detailed description of the boundary of Himalayan Beas Basin is given earlier.

3 United Nations Publication Bangkok, 1952. Proceedings of the Regional Technical Conference on Flood Control in Asia and Far East p 112

HIMALAYAN BEAS BASIN

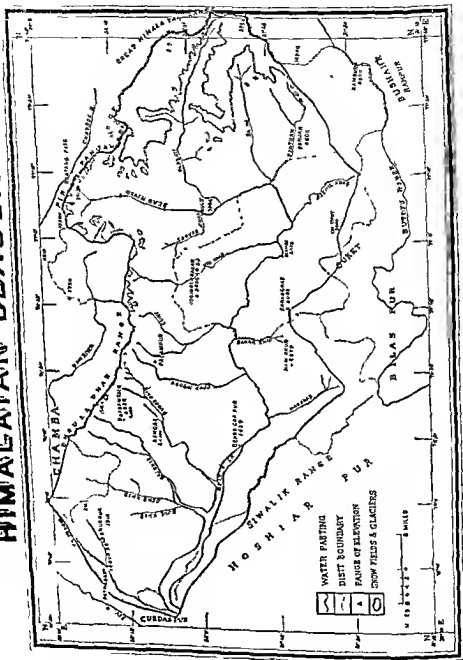


Fig. 13

The river course is transverse to the general direction of the mountain region. Below Mandi the river enters the middle valley stage and tortuosity increases.

Beas to Harike¹

Direct distance	1,74,000 ft
Main stream distance	1,93,000 ft
Tortuosity	12%

In the upper reaches of the river the rocks are mostly hard crystalline and metamorphic, constituting the major portion of Kulu and Saraj. South of these metamorphics sedimentary rocks extend. Lower down the rocks are more recent, less resistant to erosion and extending from the Siwaliks to the base of Dhauladhar range.

Climatic Influences

The catchment area lies in a difficult terrain and generally no rainfall recording stations are found there. The average rainfall is often assumed chiefly with reference to that recorded at stations outside the main catchment area and the data about rainfall or run off is based on rather limited knowledge. A small number of rainfall stations are located in tahsil and district headquarters. Taking an average of 8 stations per 1,000 sq miles, there should be at least nearly 45 recording stations in the Beas Basin. Statistics of precipitation should be available for the adjoining areas also. There is wide variation of rainfall. Towards Kulu it is only about 10" but westwards it increases to about

120" near the foot of the Dhauladhar. Chief amounts fall in July, August and September and cause floods and erosion. Winter rains also make considerable contribution. Average precipitation over the hill catchment area is 43.1" in summer and 13.2" in winter.² Rainfall also decreases away from the mountain ranges. The southern parts of Dhauladhar are amongst the rainiest parts of India and the torrents are greatly swollen during rains. Mountain glaciers and snow add their quota to the northern affluents. Although snow survey has not been made and it is very necessary that it should be made, there is no doubt that these glacial rivers of ice are contributing large quantities of water. Musso³ has made some scientific studies of glaciers of Dhauladhar, Barsa Bangahal, Pangri, etc. Melting of snow begins towards the end of March and forms the main source of water till June. With the onset of heavy downpours of summer monsoon variations in flow and general rise of water raise problems of flood and erosion and point to the necessity of more stations for the scientific rainfall and snow record so that advance information about floods could be given as is done in the Tennessee Valley in USA.⁴ Relation between the meteorological and the hydrological phenomenon is well marked.

Vegetal Cover

Forests cover the slopes and inner valleys of the mountains and hills. But due to

¹ S. F. Bhakra, December 1970 Report, Punjab P.W.D. Irrigation Branch, p. 170.

² United Nations Flood Control Series No. 1, Bangkok, 1953, p. 28.

³ Musso, Giovanni. Gli scosci E. Fenomeni Glaciali Del Bacino D'Indo E Della Valle Delli Ubbi (Bacini Delli Basi).

Hi. Ind. Del Punjab. Series of Reports on the State of the Punjab, 1967.

⁴ J. J. Entell, David E. T.V.A. Penguin, 1941, p. 1.

grazing lopping extension of terraced cultivation and other undesirable forest practices the original cover had been greatly modified. The measure of a river's efficiency is its average flow and this happens only where the vegetal cover is fairly preserved. The ideal catchment area can be defined as one which is 'completely clothed in either forest or grassland where the natural vegetation has been preserved undisturbed and has been allowed to build up a deep soil profile'. As a result of grazing lopping and other forest usages there is disappearance of the forests, the devastation of pastures and wholesale erosion of soil². There is heavy runoff from illclothed or bare surfaces as is illustrated below.

Kind of cover	Loss of water	Loss of soil
Forest	1	1
Grass	27	32
Bare land	120	800

Natural vegetation not only provides for regular supplies of water but also ensures against rapid runoff, soil erosion and floods. More important than climate, soil and slope in the control of runoff is the condition of plant cover. According to Medlicott³, forest destruction is resulting in increased burden of detritus from soft tertiary rocks of lower hills upon the streams before they enter the area of deposition. A large quantity of detritus is left behind obliterating the

condition of slope and resulting in accumulation of sand for which there is no water power to carry it further.

Discharge and Flow Regime

Beas occupies second place amongst the Punjab rivers for ratio of discharge to area.

Name of River	Order of magnitude	Humidity in area in sq. mi. in the catchment basin	Total discharge of water in one year (estimated)	Ratio of discharge to area taking that of Beas to unity
Indus	First	1 03 800	9	0.3
Sutlej	Second	18 500	3.5	0.6
Jehlum	Third	13 000	5.5	1.3
Chenab	Fourth	10 500	5.0	1.6
Beas	Fifth	5 600	2.5	1.3
Ravi	Sixth	3 100	1	1.0

Ratio of discharge to Ravi

The average annual discharge does not appear to have direct relation to the actual size of the catchment basin. Only in the case of Ravi the smallest basin has also the smallest discharge. Discharge differences of annual flow have far less significance than the seasonal differences that reflect the incidence and variation of precipitation over the mountain catchment areas.

1 Gorrie R. M., "The Feconomic Importance of Changes in Plant Cover" Journ. Ind. Bot. Soc. 1937 Vol. XVI, No. 4 p. 211.

* Glover Sir H., Erosion in the Punjab Its Causes and Cure 1914, Lahore p. 89.

2 Medlicott H. P., Sketch of the Geology of the Punjab 1853-64 Calcutta, 1888 p. 10.

4 Burward, S. G. and Hardten H. H., op. cit., p. 1 a.

DISCHARGE AND VARIATION OF DISCHARGE OF BEAS AT MANDI PLAIN¹

Months	Mean monthly discharge in cusecs			% above and below 20 years average (1923-42)	
	Maximum	Minimum	Average	Above	Below
January	8,431	3,266	4,641	Plus 62	Minus 30
February	12,257	3,097	5,691	" 115	" 46
March	10,361	3,333	6,350	" 63	" 48
April	12,373	3,499	7,528	" 64	" 54
May	16,706	4,027	9,663	" 73	" 58
June	27,310	9,209	15,055	" 81	" 39
July	69,010	13,314	40,516	" 70	" 67
August	129,574	17,724	61,302	" 111	" 71
September	65,456	16,169	30,081	" 118	" 46
October	31,029	6,812	10,337	" 200	" 34
November	7,622	4,311	5,548	" 37	" 22
December	6,933	3,831	4,839	" 47	" 20

The author collected the data of nearly 15 years about the mean monthly, maximum and minimum discharges of the Beas and this data has been utilized in the hydrographical study.

There are about 5 gauge sites and three discharge sites on the Beas, gauge sites are at Larji, Mandi Hill, Pang, Nandera and Beas railway bridge and discharge sites are at Dehra Goppur, Sujjanpur Tira and Mandi Plain. At Larji, the lowest discharge during the winter of 1942 was 1,782 cusecs while the maximum discharge was 5,697 cusecs and maximum surface velocity was 4.07 ft per second. In summer the maximum discharge was 19,039 cusecs and surface velocity was 14.29 ft per second, the minimum discharge was 4,223 cusecs. The movement of the

bed here is within narrow limits. The entire reach of the river between Mandi and Larji is punctuated with frequent rapids, up which no navigation craft can be towed. Observations are being made to ascertain available supplies in the river Beas in connection with the proposal for the dam on the river. In some cases the variation in seasonal discharge is as great as 50 times. Some observations on storage sites are made at Haripur on Banganga, Nurpur on Jabbar Basa on Gay, Bagrur on Dehr and Chakki road bridge on Chakki. Flood warnings are issued from Dehra Goppur to the heads of the civil authorities and others concerned.

It is also being explored whether it should be possible to divert supplies of water from Beas to Sutlej. This will

¹ Hanwar Sam, The Role of Glaciers and Snow on the Hydrology of the Punjab, Central Board of Irrigation, Govt of India, pub No 36

augment the supplies of water for Bhakra dam¹ Sir Alexander Cunningham put the minimum discharge of the Beas at not less than 3 000 c ft per second² However there are great variations in volume of flow The high flood is about 300 000 c ft per second The highest recorded flood is 3 84 000 c ft per second (1912) The dominant discharge of the river is about 70 000 c ft per second³

Silting and scouring depend on the nature of the monsoon also Large quantities of sand silt and pebbles are carried downstream especially during the rainy season when the raging streams present a muddy appearance In a sample survey⁴ the mean diameter of the river bed material and shoals was given as 0 16 to 0 18 mm and 0 13 to 0 18 mm respectively During rainy season even boulders of considerable size are carried downstream

In the Beas the regime changes in the river vary with the seasonal variations of flow (fig 14) January has the lowest average flow of 4 611 cusecs Rain at this time is very little and the meltwater from snow and glaciers is meagre The flow is greater in drier months of March April May and June because of large quantities of melt

water The level of the Beas rises and as early as June the ferry bridge at Dehra Gopjur has to be disbanded In June the average flow is 15 055 cusecs The highest average flow is in the rainiest month August when as much as 25" of rainfall takes place at various places in catchment areas The region on the southern flank of Pir Panjal and Dhauladhar has the heaviest summer rainfall, therefore the river with a large catchment

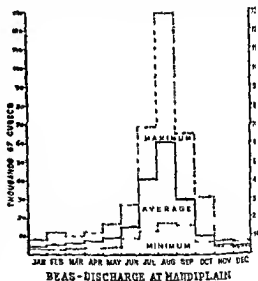


Fig 14

1 Since 1936 when these observations were made Beas Project has developed into a real ty 10 ft high dam will be constructed at Pan loh This will be used to divert water through a combination tunnel which it is stated will be one of the largest in the world This will divert Beas river water into Satley to augment the reservoir capacity of Bhakra and will be completed in 19 0 3-50 ft high earthen dam 2 1 miles from Mukerian at Pong will be constructed It will develop power and supply water for irrigation A power plant of 240 m v will be constructed Nearly 50 000 persons will be displaced by submergence of land and they are to be allotted land in Bikaner Canganagar and Ja salmer in Rajasthan (data taken from reports in the Statesman Delhi, dt 7 and 8 July 1967)

2 Burrard, S G and Hayden H H 1934 op cit p 933

3 United Nations Proceedings Tech Conference on Flood Control in Asia and Far East Series No 3 Bangkok 1954 p 111

4 Ibid p 110

area in this tract will have greater summer discharge. The greater unit area discharge of the Beas as compared to Ravi can be explained thus. In October the level of water begins to fall rather rapidly. From an average flow of 30 081 cusecs in September, it is reduced to 10 337 cusecs in October. Till February, discharge is small amounting to an average of 5 631 cusecs. During autumn, the flow is largely the result of preceding monsoon rainfall mostly in the form of seepage. Floods occur in Beas usually in late August and September. Flood of September 1930¹ resulted in damage to 300 villages in the plains.

River Channel Developments

In B.C. 327, the Beas flowed as an independent river and its channel ran parallel to that of Sutlej. It appears that the upheaval of the land of Rajputana sea offered an obstruction and caused it to deflect westwards to join Marud Vardha (united course of Chouab and Jhilmu). Evidence from old maps² shows that Sutlej was also deflected westwards till it captured Beas at Hanke. In the upper catchment areas there appears to be likelihood of the water parting between Beas and Sutlej to recede further to the north i.e. the southern drainage basin will be more and more captured by the tributaries of the Sutlej. Sutlej flows in a deeper bed than the Beas. According to Burrard and Hayden³ the bed of Beas is 500—700 ft higher than that of Sutlej at corresponding points. Increased

depth of trough would mean greater erosive power to the tributary streams. The water parting between the Sutlej and Beas would further retire towards north (to Beas side). Some changes in the course of Beas have been marked in Dist Doab.

Below are given heights of selected places indicating curve of gradation of Beas river.

Place	Height in feet*	Reduced height in ft above Hanke
1 Rohtang	13 000	12 700
2 Manah	6 000	5,350
3 Kulu	3 994	3 314
4 Mandi Hill	2 173	1,823
5 Sujanpur Tira	1 637 16	987 16
7 Blehu	1 561	911
7 Dehra Gopapur	1 323 52	673 52
8 Pang	1 099 21	419 21
9 Mandi Plain	694 35	31 35
10 Hanke	600	

* (1 and 2 represent actual heights above level. The height of Hanke is interpolated. Rest of the heights are zero P. L.)

The diagram (Fig. 15) shows that up to Kulu the river pursues a torrent track and from Kulu to Pang it follows a middle valley course which is evident from its wide and braided channel and below Pang the river flows over a relatively plain course.

Suggestion for Development and Control

The river is being studied for over 15 years and model studies are being carried out on the Hydraulic Research Station Malakpur.

1 Hanley, C. L. and Sehgal, S. I. A Review of Recent Floods (19 0) in Punjab with suggestions for short term and long term Measures. Flood Control Series No. 3. C. S. P. B. at on Bangkok 1932 p. 216.

2 Cunningham, Sir Alexander. Ancient Geography of India. 1914. Map 1, facing p. 120.

3 Op. cit. p. 97.

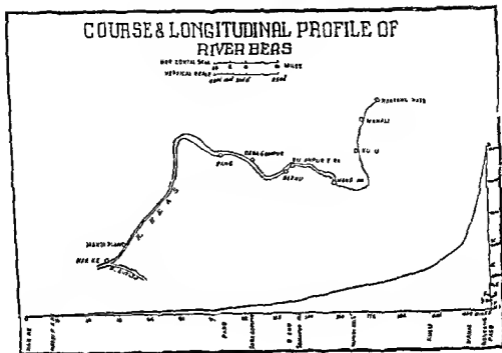


Fig 15

Punjab Models of rivers are very useful and have been used with considerable success in India for over 20 years in studying most of the problems of river courses floods and irrigation. A great deal of information on the conditions in the catchment basin is not available. Much of that is known is divided amongst the forest, agricultural, meteorological and geological departments. Unfortunately no single authority can supply the entire information for the whole river basin as regards rainfall, temperature, vegetal cover slopes landuse, discharges etc. The entire drainage basin of the Beas falls within the Himachal Pradesh and Punjab and with the joint coordinated efforts of both govern-

ments complete investigations can be made. A river is an organic whole and the drainage basin of the river is the natural topographic unit. The problem of land use irrigation, floods, forests, hydroelectric power and water supply are inter connected. Therefore there is need of a unified authority to study these problems. The meaning of such coordination can be understood by the benefits obtained in the Tennessee Valley in U.S.A. and by the D.V.C. in India. Detailed surveys of catchment areas are necessary. The field party should include a hydraulics engineer, a geologist, a forest officer, an agricultural officer, a soil conservation officer, a meteorologist, a geographer, an economist and an

administrator Air surveys can also help in determining conditions in the river basin. The geographer with his knowledge of regional concepts and cartographic skill can greatly assist in the work of river basin management. Such centralized knowledge can save large sums of money by helping to prevent damage by erosion and floods, and by formulating schemes for irrigation and water power. Thus the author feels to suggest a more rational and scientific policy for the maintenance of healthy catchment conditions in the Beas Basin. The present period of observation is small, from which, conclusions can be considered only tentative, and moreover there are so many conflicting and variable factors at work. Even the records of the gauges depend solely upon the sense of duty of the low paid staff¹, and are seldom reliable. In USSR great attention is paid to the study of life history of the rivers which enables them to predict future developments². Several streams have plentiful supply of water during rains and it could easily be stored by constructing small dams at suitable places. Water of Beas is little used for irrigation and dam sites exist at Larji, Biehu Dera Gajipur and Pang. Although at present a highly improbable project, but not beyond the imagination of modern science and technology, is the suggestion for the construction of a tunnel approximately 1 miles long at about 10,000 ft

near Rohang pass to divert the water of Chandra river to Beas and also at Marlu pass in Chamba (Himachal Pradesh) a 5 mile tunnel at 7,700 ft to divert the waters to Ravi. The conditions of a river are properly revealed by hydrographical studies. The length of period over which the necessary hydrological observations must be taken depends on the physical conditions, but for many regions it is not less than 20—30 years³. Just as weather forecasting involves study of weather types so also river regime types need careful study to know river behaviour. The river basin and its waters constitute an integral whole and should be managed for the benefit of maximum number of people. The solution of river problems often lies in the catchment area. These comparatively remote areas have received less attention and the author feels that greater study of various hydrographical problems of the Beas Basin is necessary but this would require a comprehensive organization as suggested earlier.

D GEOLOGY AND STRUCTURE

Owing to its situation in a remote corner, the area has so far remained neglected by Geologists. But the pioneer works of Medlicott (1864), whose memoir will remain a classic for all times to come, Middlenuss (1887-1890) who paid particular attention to the geology of the Kangra area during his tour after the Kangra Earthquake. Pilgrim and West (1928)

1 Harlan H. Borrows, Charles C. Coily, G. D. Hudson, L. Ackerman and G. White have already helped in this direction. D. Brown and V. I. Isterov—River Basin Planning—Geographical Opportunities. *Annals AAG* Abstract, Vol. XLV, No. 2 June 1953 pp. 170-171.

2 L. O. T. A. W., Regime level Changes on the Indus System, 1st Punjab Irrigation Branch Paper No. 18 Class B. 1941.

3 Shree Flood Control Series III U.S. Pub. Bangkok, 1952 p. 18.

4 Lyovitch M. I. *Hydrology and Utilization of Water Power*. Paper presented to International Geographical Seminar Aligarh Moscow 1953 p. 2 and Published in Proceedings, 1953, pp. 491-504.

who extensively surveyed the Simla area and Auden (1933, 1936) who did extensive work in Simla, Garhwal, Almora and other parts of the Himalayas, have considerably increased our knowledge of the Himalayan geology and have been very helpful to the author in the investigation of the present area. Besides, the work of a brilliant amateur, Colonel MacMohan (1883, 1887) in Chamba area is worthy of mention in this connection. Lately, Messrs Kohli and Boileau of the Geological Survey of India have done some work especially with reference to the possibility of oil prospecting.

Still there are large areas (Fig. 16) lying chiefly in the eastern part of Kulu Sub-division which remain unsurveyed, incomplete as has been the study of the Sub-Himalayan Tertiary, the examination of higher mountains is still unadvanced and only general indications can be given here.

Lithology :

The Himalayan Beas Basin comprises an area of great interest in the Himalayan geology. It gives a complete display of the Sub-Himalayan system of Tertiary rocks, and the most favourable exposures of series of crystalline limestone, slates and schists belonging to the Pre-Cambrian groups of the Himalayan zone.¹

Two broad stratigraphical zones can be distinguished. These are also coincident with the geographical zones of the northern mountains and the lower hills.

Firstly, the outer or Sub-Himalayan zone is composed of sediments, for the most part of Tertiary age. They also include some sub-recent deposits.² Although this area is some 200 miles to the south-east of the Potwar, it lies across structural zones similar to those in the Jhamat-Khushalgar area in Potwar.³

Group	Sub-Himalayan Zone	Himalayan Zone	Approximate foreign equivalents	
Aryan Group	Siwakh Series } Upper Siwakh Middle Lower (or Nahani)	Kasauli Dagshai Sabathu	Eocene	Tertiary
Purana Group		Krol Series Carboniferous System Simla Slates Old Schists Gneisses & Crystalline Limestone	Algonkian Precambrian Archean	

¹ Medcott H. B. "Sketch of Geology of the Punjab, Calcutta, 1883, p. 23.

² Kanera District Gazetteer Vol. VII A, op. cit. p. 17.

³ Gill, William Daniel, "The Tectonic of the Sub-Himalayan Fault Zone in the Northern Potwar Region and in the Kanera District of Punjab", Quarterly Journal of Geological Society of London, Vol. 107, 1951.

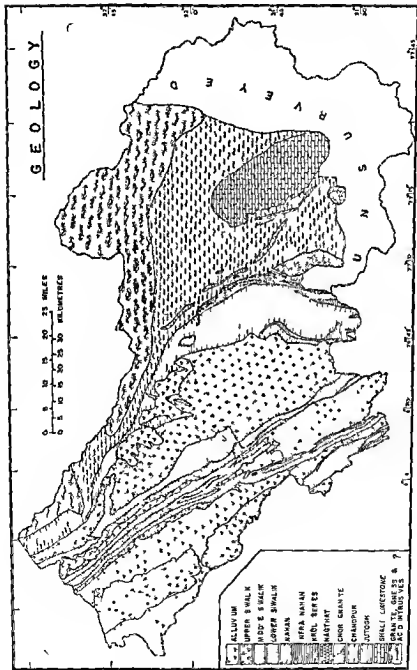


Fig 16 [After Medlicott, Milhemss, Pilgrum, Haylen, Holland & Gully]

Secondly the Himalayan zone comprising mostly of the ranges known as the lesser Himalaya together with the line of high peaks which is composed of granite and other crystalline rocks and some sedimentary rocks.

The following classification was worked out in the Kalka Simla Area¹

Upper Siwalik -

The upper or Siwalik Series is the first rock group met with in passing from the plains into the Himalayan foothills (Fig. 17) and takes its name from the Siwalik hills which are composed of various members of this series.² The Tertiary rocks are found from the Siwaliks

in Hoshiarpur to the base of the Dhauladhar range. The rocks consist of loosely aggregated conglomerates, sandstones, red and purple clays and shales. The deposits are of immense thickness 69 thousand feet.³ These deposits are sharply marked off from the extensive recent deposits still in the process of formation along the foot of the Himalayas, except where little or no disturbance has taken place, distinct line of division does not exist, only a small number of fossils have so far been found in this area. Extensive deposits of younger and older alluvium are found in Kangra, Palampur, Nurpur and Dehra Talwals.

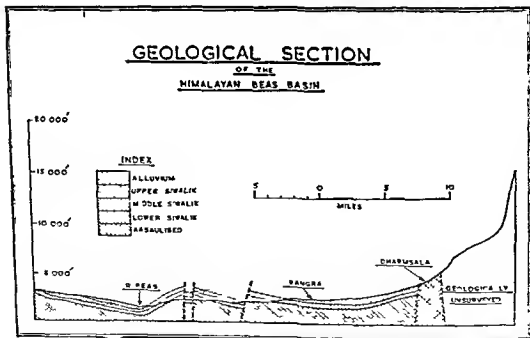


FIG. 17

¹ Ibid., p. 12.

² Barrard, S. G. and Hayden, H. H., op. cit., p. 39

³ Ibid., p. 39

Both the Upper Siwaliks and the recent deposits are of sub aerial origin¹ Rain and running water are the chief agencies which even today are at work transporting material from the mountains and depositing it on the plains Also where the rivers debouch the Siwalik deposits consist of coarse conglomerates, whereas in the intervening areas soft earthy beds predominate² The Upper Siwalik Sedimentation has been studied by Raju and Dehadra³ According to them 'The Study of heavy minerals assemblages of Upper Siwalik sediments in parts of Punjab suggests two basins of deposits One of them lies to the north east of Jwalamukhi region comprising the Jwalamukhi over thrust block, the Paror anticlinal area of Dharmasala and parts of Nurpur area The basin may be conveniently called the Lambagraon basin in which upper Siwalik conglomerate and pebbly beds were deposited The second Upper Siwalik basin (Conveniently called the Soan Sutlej Basin) appears to be a major one comprising the Bharwan Janaur Sikra and other areas to the south west of Jwalamukhi These two above mentioned Siwalik basins appear to have been separated from each other by a series of northwest southeast running basinal highs probably corresponding to the present day Mastagrah Bhal and Changartala anticlines''

Middle Siwalik and Lower Siwalik The Upper Siwalik conglomerates are underlain by thick deposits of soft, barely coherent sandrock lying upon a harder but similar sandstone⁴ These two sub divisions which are known as Middle and Lower Siwalik series bear internal evidence of fluvial origin Fossils are therefore rare but remains of mammals have been found⁵ Here and there the Middle Siwalik rocks contain small masses of lignite which have frequently led to expectation of coal but they have been merely found to be isolated pockets of carbonized wood⁶ or in a few cases patches of drifted vegetable matter⁷ These deposits are very small and therefore of little economic value

The Nahan deposits consist of more indurated rocks as compared to the Middle Siwaliks The sandstone can be dressed into blocks

The lithological character of the three stages in the Beas Basin may be represented by conglomerate sandrock and sandstone These are the more predominant types⁸

Kasauli stage is well marked in the area The Srinur series are marked by outcrops along the foot and lower slopes of the Dhaula dhar Dharmasala stands on an anticlinal sandstone spur of this formation A fault

1 Langra Gazetteer Op. cit. p 13

2 Medlicott H B Records G S I Vol IX, 67 (1876)

3 Raju A T R., and Dehadra P V Upper Siwalik Sedimentation in Parts of Punjab Quarterly Journal of the Geological, Mining and Metallurgical Society of India March '67

4 Middlemass C. S. Memoirs G S I Vol XXIV Pt 2, 1890

5 Burrard and Hayden op cit IV p. 790

6 Medlicott H B Memoirs G S I Vol III Pt 2 14 1864

7 Mallet F P Memoirs G S I Vol XI 46 1875

8 Burrard and Hayden op cit Pt IV p 291

separates this series from the Siwalik series, and it is along this fault line that the epicentre of Kangra earthquake (1905) was situated. Sirmur series was first critically examined by Medlicott¹ in Simla region.

Kasauli deposits consist of grey or purple sand stones. Dagshai deposits also consist of grey or purple sand stones but with bands of bright red or purple homogeneous clay. The Sibathu deposits consist of greenish grey or red gypseous shales with bands of limestone and sandstone.

The whole of the Sirmur series appears to be one perfectly continuous and conformable group of deposits.

Himalayan Zone :

To the visitors of hill stations it is the most familiar, yet at the same time the least understood of all the Himalayan rock groups and its classification according to Burrard and Hayden², 'still constitutes the greatest and most insoluble of the problems of Himalayan geology'.

Two broad groups may be distinguished

- (1) Metamorphics—consisting of granite, gneiss and crystalline schists
- (2) Fragmented rocks of sedimentary Origin—Consisting of slates, quartzites, conglomerates and limestones. These have not yielded a single trace of any undoubted organic remains.

The absence of fossils renders it impossible to correlate various rocks of different areas, since correlation by lithological characters is

unreliable for sedimentary rocks. Therefore a large number of rock groups have been established under local names.

Gneissose granite is of intrusive origin. Biotite granite forms almost all the high peaks of the Himalayan range and is commonly called 'Himalayan Granite'. Tourmaline and Hornblende granite also occur. The associated crystalline rocks are merely representative of adjacent sedimentary systems and contact metamorphism is responsible to a great extent for their formation³. Granitic boulders are found strewn over the valley areas (Fig 18).



Fig 18 Granitic Boulders near Kangra

The sedimentary rocks of the Himalayan area consist of a number of unrelated groups denoted by local names. This belt of unfossiliferous deposits separates the crystalline axis from the band of Sub-Himalayan rocks and occupies the greater part of Lesser Himalayan ranges. Jutogh series rocks are moderately metamorphosed.

¹ Medlicott, H. B., Records G. S. I. Vol IX, 63 1876

² Op. cit., p. 288

³ Ibid., p. 290.

Generally, the main constituent rocks of Himalayan group here consist of limestones, shales slates and schists with gneissose core of the main ridge. Lt General C A Macmohan¹ made an extensive study of the structure of Dhauladhar. He was of opinion that gneissose granite was intruded into older rocks at the end of Eocene or early Miocene period.

In Kulu a broad central zone of crystalline unfossiliferous rocks forms the axis of the Himalayas. The crystalline rocks are composed partly of intrusive granite and partly of gneisses schists and other metamorphic rocks. Mandi lies partly on rocks belonging to the Himalayan zone and partly on Tertiary shales and sandstones. Slates, conglomerates and limestone beds belonging to Krol Group occur here. Sandstones and shales of Sub-Himalayan zone belong to the Sirmur Series of Lower Tertiary age and to the Siwalik Series (Upper Tertiary). The most important economic mineral is rock salt whose age is uncertain but it appears to be connected with the Tertiary beds².

Structure and Tectonics

A number of faults are marked. Two of these faults can be traced from Hamirpur Tahsil running farther to the north west. The first one passes by Jwalimukh Kotla, Nurpur and the second one passes from near Bharwan to Pathankot.

They are associated with steep ridges

formed of the hard lower rocks on the upthrow side of the fault (Fig 17) always more or less steeply inclined. Away from the fault line new strata are found whose dip flattens out to a horizontal attitude, forming the Jiswan dun and the two principal duns of Kangra proper. It is not yet settled whether the successive sections of similar rocks are repetitions of the same series³.

Between the Sirmur series and older rocks occurs the Main Boundary Fault. It is a constant feature of the Himalayan tectonic geology. It is marked at Devi dā Galla near Dharmkot and south of Kanara slate quarries. Siwalik deposits do not overstep the boundary line of the fault which therefore marks the original limit of deposition of the Siwaliks. The fault, in fact, was being formed by the deposition of the Siwalik beds and as they were laid down, the Himalayan ranges were pushed forward over them. The main boundary fault is one of the series of approximately parallel faults all of which formed the northern boundary of deposition of the deposits immediately south of them. There is evidence of nappe structure in Mandi Kulu area. The dolomite deposits are not lying at their autochthonous position, but they are allochthonous or rootless on rocks of all ages in a manner similar to what has been observed so frequently by the continental geologists in the Alps. To such a structure the term *Nappe* is applied⁴.

¹ Macmohan C A Lt General quoted in Punjab States Gazetteer Vol XXII A, 1910 pp 15-31

² Mandi State Gazetteer 1901 p 4

³ Kangra Gazetteer op cit. p 12

⁴ Roy S K. An Illustration of Nappes Structure in the Mand State, Punjab II. *Malaya* 1933 G S I Library (K. B. Dhar in 1911 concluded that two thrusts have taken place instead of one. First thrust affected the dolomite and trap rocks, while in the second the older rocks were affected and brought to lie upon the younger ones)

The boundary faults farther south similarly mark the limit of the beds lying to the south of each. The faults Middlemiss² concludes, were thus not contemporaneous but successional.

The Himalayas developed southwards in a series of stages. A reversed fault was formed at the foot of the chain, and upon this fault the mountains were pushed forward over the beds deposited at their base crumbling and forming a Sub-Himalayan ridge in front of the main chain. This process was repeated several times and the cause of the earthquakes in this region may be traced to fault lines which show that crustal equilibrium has not been reached³.

Here it will not be out of place to consider briefly the causes of earthquakes in this region after a detailed study of the earthquake of Kangra had been made in 1900.

The area forms part of the zone of weakness and strain implied by severe crumbling of rock beds in the elevation of the Himalayas within very recent times which therefore has not yet attained stability or quiescence⁴. It is also, according to some, a belt of under load, its rocks being lighter than normal. It lies within the Great earthquake belt which traverses from east to west. According to Auden⁴ the Baluchistan, Kangra and Bihar earthquakes were all connected with areas of negative gravity anomalies and it might seem a sound generalization to

connect the seismic areas with negative gravity anomalies (Fig 19).

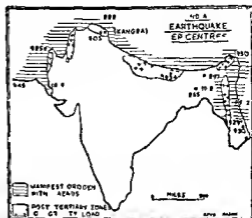


Fig 19

The Kangra earthquake took place on 4th April, 1900. The shock was of exceptional violence in Kangra and Kulu, the epicentral tracts, the centre of concussion being near Kangra. Velocity of earth wave was deduced to be 1.9° miles per second.

Middlemiss⁵ ascribes to the earthquake a deep-seated origin of 21-40 miles. The main shock was sudden and violent but after shocks of slight intensity continued for several weeks. There is no doubt that it was a tectonic quake. The epicentre lay along two well-defined bays of younger Tertiary rocks into older rocks of the Himalayas approximately along the main boundary fault. Slight sinking of one side of the fault provided natural relief. According to

1 Middlemiss, C. S. Memoirs G. S. I. Vol. XXIV Pt. 2 118-119 (1890)

2 Encyclopaedia, Britannica, Vol. XI Chicago 1917 p. 561

3 Wadia D. N. Geology of India 1919 p. 73

4 Auden J. B. The Bearing of Geology on Multipurpose Projects. Geology and Geography Section, Presidential Address, 38th Session Indian Science Congress 1911 p. 9

5 Middlemiss, C. S., Memoirs G. S. I., Vol. XXXVIII, 1910 pp. 335-340

Prof Bose¹, "Isostasy had a share in causing the earthquake. Kangra valley is 3,500 ft above sea level and Dhaultidhar is 16,000 ft. Horizontal distance between the two is 6 miles. Such high gradient leads to rapid and great deposition of rock waste. This continuous loading of Kangra valley implies a state of strain.

The geological effects were not very marked. There were landslips and rockfalls and disturbances of streams, springs and canals.

Kangra, Dharmasali, Nagrota, Palampur, Bhawarna and Sujanpur suffered most. In Kangra, Dharmasali and Palampur every single habitation was reduced, with barest exception, to the flattened heap of ruins². In the area lying within the Beas the Dhaultidhar range, Rihlu and Baijnath nearly

all bridges and irrigation channels were destroyed. Near Kangra every village was destroyed and appeared as a mere rubbish waste disfiguring the landscape³ (Fig. 20). The losses in Kangra, Palampur, Hamirpur and Dehra were estimated at 18,314 human lives and 37,654 cattle.

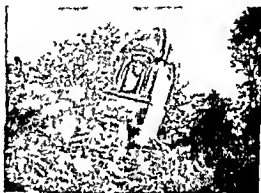


Fig. 20 Earthquake Damage-Kangra

¹ Bose B. K. Causes of Kangra Earthquake. Kangra District Gazetteer, op. cit. p. 47

² Kangra District Gazetteer, op. cit. p. 35

³ The Englishman, Calcutta 15.4.1905

Climate, Flora, Fauna and Soils

A WEATHER AND CLIMATE

The knowledge of climatic conditions of an area or a country is essential for the proper understanding of the conditions of the habitat. Scorching by sun, nipped by frost, buffeted by wind and menaced by drought and flood, man early set himself the task of understanding times and seasons, realizing that such knowledge was essential to his survival.¹ In the Himalayan Beas Basin the inhabitants have made every effort to adapt themselves to the conditions of prevailing weather and climate. But so far there has been no systematic study of these conditions. Rainfall data alone is available for tahsil and district headquarters, temperature, humidity, pressure and wind data are not available.²

Although the area lies north of tropic of cancer, yet its climate is strongly governed by the tropical monsoon rhythm. Stamp³ includes this area in the continental India.

Two main climatic characteristics prevail in this region.

(i) The seasonal rhythm of weather

(ii) The vertical zoning due to differences in altitude

Differences in rainfall are of somewhat greater significance than those of temperature from the point of view of agriculture. Contrasts in rainfall are striking—Dharmasala in the west gets over 100 inches while Kulu has only about 36 inches of rainfall per year. Differences of altitude, aspect and gradient account for these wide and sudden variations. Notwithstanding these differences, summer is everywhere the period of maximum rainfall. The climate of this area is distinguished from that of the more southerly plains by a shorter and less severe hot weather, a somewhat higher annual precipitation and colder and more prolonged winters. The climate of Kulu is positively drier and cooler than that of Kangra and Mandi. Everywhere the rainfall shows a definite physiographic control. Kulu receives much less rain (36") when Jogindernagar, less than 20 miles to its west, receives high rainfall (90") on account of the fact that Kulu lies on the leeward side of the Dhauladhar range. However, there is no rainless month in any part. In all places

¹ Kimble G. and Bush H., "The Weather" London 1944 p. -

² Therefore accounts dealing with these latter conditions wherever given are based on author's observations and supplemented by data obtained from such odd agencies as schools, hospitals, bee-farms and Forest Offices.

³ Stamp, L. D. Asia 1944 p. 199

below 1,500 ft elevation, the heat is excessive during May and June, the mean temperature in shade may exceed 100°F. With the rise of elevation, temperature falls roughly 3°F for every 1,000 ft of ascent. The atmosphere becomes more and more rarefied as the elevation increases and cases of mountain sickness may occur above 10,000 ft with persons who are unacclimatized. The forested areas, northern hill slopes and glens are cooler than the bare slopes and the valleys. Most enjoyable altitude from climatic point of view is between 5,000 ft to 6,000 ft, being neither hot nor too cold. Manali (approximately 6,000 ft) enjoying such elevation and somewhat drier summer (about 20" rainfall during June-September) is the best hill resort.

'Chhoti barsat' (preliminary rains) starts on about 15th June but regular monsoons begin about 15 to 20 days later. Change of season induces change of habitat amongst certain groups of people like the Gaddis who descend to the valleys during winter.

The Indian Meteorological Department has adopted four seasons:

- (i) The Season of North East Monsoons—Cold Weather Season (December-March)
- (ii) The Transitional Hot Weather Season (April-May)
- (iii) The Season of South West Monsoons—Hot Weather (June-September)
- (iv) The Transitional Period of Retreating Monsoons—(October to November)

But the popular division of three seasons is more suitable for the Himalayan Basins. They are:

- (i) *Hyund* or Cold Season (October to February)
- (ii) *Taund* or Hot Season (March to June)
- (iii) *Barsat* or Rainy Season (July to September)

Hyund or the Cold Season

By October the skies become clear and mornings and evenings are quite chilly. Light woollen clothes are worn even in the low valleys. Humidity is low and air is dry and fine. The cold is bracing. Gaddis, the semi-nomadic shepherds who follow the seasonal rhythm descend from the mountain slopes to the valley areas.

The nights and mornings during *Hyund* are very cold especially in the valleys adjoining high ranges but on the middle slopes the conditions are somewhat milder. This is due to the draining of heavy cold air in the valleys on clear nights which gives rise to the phenomenon called 'inversion of temperature'. Kendrew¹ makes mention of the Alpine valleys that become 'traps' of cold air on account of such inversions. White dense fog rises in the mornings from the water courses.

Snowfalls usually occur in December and January although unusual falls may take place as early as November and as late as March. Snow does not lie for any length of

rainfall which causes the temperatures to fall to the average maximum of 92°F in July at Kangra and 85°F in Kulu. With the onset of rains the whole panorama of the landscape becomes fresh and green. The small water channels in the beds of hill stream begin to swell. Springs which had dried up during the hot weather are replenished. Insect life also becomes more active. Mosquitoes are a nuisance, especially in the paddy cultivation areas, where they may breed in the standing water of the fields. The highland people show great aversion for venturing down during the malaria season. They have a belief that smell of 'Dhan' or paddy crop produces fever. Malaria saps much vitality of the already undernourished people. The rainy periods are interrupted by dry breaks of a few days or even weeks. With landslips, broken roads, and turbulent torrents travelling during rains becomes difficult and often hazardous.

Books on climate, and Geography of India¹ often point to the general decrease of rainfall from east to west in the Himalayas, but the anomaly of the high rainfall in Kangra Valley and especially at Dharmasala (116" a year) does not find due notice and explanation even though it represents a striking phenomena. This heavy rainfall is due to the interplay of monsoon currents and the sudden rise and the particular alignment of mountain ranges and hills². Main Dhau

dhara range rises sheer from the valley causing rainfall to increase from 50" at 1500 ft to 116" at 4000 ft. It would be valuable if rain-gauges were installed at several points at high places as possible. Dharmasala lies on a ridge directly across the south westerly currents and is flanked on north west, north and north east by hill ranges. From the valley (3000 ft) there is sudden ascent of 12000 ft or so, up the Dhankadhar range. This particular situation is responsible for very heavy precipitation. In fact, over the area there is general decrease of rainfall from Dharmasala in the north west to Kulu in the north-east (Fig. 22).

Place	Annual Rainfall
Dharmasala	116.77 inches
Palampur	107.19 "
Jogindernagar	90.67 "
Kulu	36.91 "

Again away from the northern ranges the rainfall decreases towards the southern hill country.

Place	Annual Rainfall
Dharmasala	116.77 inches
Kangra	73.74 "
Dehar Gopipur	51.80 "
Hamirpur	51.08 "

¹ Keweenaw, W. G., *Climate of the Continents* 1937 p. 131. Spate, O. H. S., *India and Pakistan* 1904, pp. 44 & 390. Blanford, H. F., *The Climates & Weather of India, Ceylon & Burmah* London, 1899 pp. 96-177.

² For a detailed account see

Kavaatha, S. L., *Precipitation characteristics of the Himalayan Beas Basin*. The Journal of Scientific Research, Banaras Hindu University Vol. VIII (7) 1957-58 pp. 183-189.

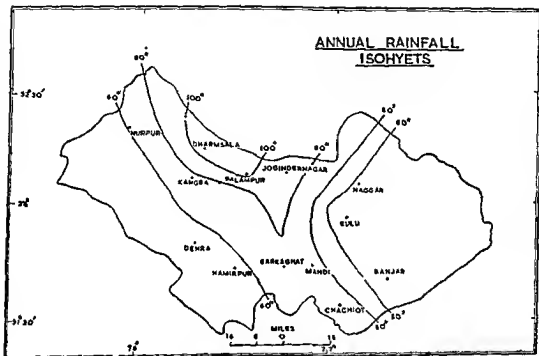


Fig 22

July and August are the rainiest months at Dharmasala as much as 37 to 38 inches of rainfall takes place in each month. Damage by floods, erosion and landslips is widespread. Heavy downpours and unconsolidated strata of lower areas especially lend themselves to

this devastation. Roads and bridges are damaged and communications are rendered difficult. July, August and September receive more than 2/3 of the annual precipitation except Kulu, as is evident from the following table

AVERAGE RAINFALL¹

Place	Total Rainfall (in inches)	Rainfall during summer March Sept		Rainfall during July Sept		Winter Rainfall Oct Feb	
		(inches)	% of total	(inches)	% of total	(inches)	% of total
	1	2	3	4	5	6	7
Dharmasala (Upper)	107.24	92.53	86	81.13	78	11.71	14
Dharmasala (Lower)	116.77	101.02	89	95.15	82	12.75	11
Kangra	73.74	65.70	89	60.72	82	8.04	11
Palampur	102.19	89.14	87	81.59	80	12.75	13
Dehra	51.80	44.90	86	40.87	79	6.90	14
Hampur	51.58	44.63	86	40.79	79	6.93	14
Nurpur	60.72	51.18	83	46.42	75	9.54	17
Jogndernagar	90.67	79.89	81	70.09	77	10.78	19
Mandi	65.36	57.70	88	48.03	75	7.66	12
Sarkaghat	76.29	68.42	89	58.88	77	7.87	11
Chachiot	70.45	62.26	89	49.92	71	18.19	11
Banjar	41.67	33.03	78	25.27	66	8.61	22
Kulu	36.91	24.91	67	17.42	47	12.00	33
Naggar	46.38	33.78	71	21.92	45	14.60	29

Similarly the number of rainy days is rainy days (Fig 23) although at times 7 also more during this period and on an to 8 inches of rain may fall during 24 average there is one inch of rainfall on each hours

AVERAGE NUMBER OF RAINY DAYS

Place	Total No of Rainy days	No During		
		summer (March Sept)	Rainy season (July Sept)	winter (Oct Feb)
Dharmasala (Upper)	108.4	87.7	72.1	20.7
Dharmasala (Lower)	96.8	79.0	65.0	17.8
Kangra	74.7	58.5	48.6	13.2
Palampur	92.0	74.6	60.4	17.4
Dehra	54.5	44.2	36.9	10.3
Hampur	61.8	49.8	41.7	12.0
Nurpur	59.3	47.0	38.6	12.3
Jogndernagar	84.0	67.0	53.0	17.0
Mandi	98.0	81.0	58.0	17.0
Sarkaghat	62.0	51.0	42.0	11.0
Chachiot	70.0	61.0	50.0	9.0
Banjar	74.6	57.8	40.7	16.8
Kulu	63.7	45.1	28.0	18.6
Naggar	80.1	58.3	39.2	21.8

¹ Figures for average rainfall have been obtained from District Records Office Dharmasala Records Office, Kulu and from Forest Working Plan of March Forests of pt p 6

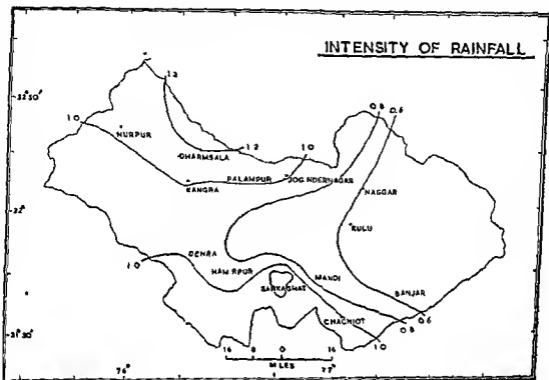


Fig 23

Often there is rain for days together. Numerous water channels flow. Rivers are in spate and washing does not dry. In September the rainfall decreases considerably. The rainy season comes to an end in September when the sky clears up towards the last week and there is practically no rainfall.

Although there are three well marked seasons yet it would not be doing justice if reference were not made to the Himalayan autumn and spring. Both the seasons are delightful (Fig 21). In the hills, the period following rains is not unhealthy as it is in the plains because of the excellent drainage due to the gradient of the ground,

Late September and October are in fact very pleasant and during this period there is plenty of hill fruit. The weather is crisp and exhilarating.

Varying with place and aspect the spring occurs from middle of February to the end of March. It is though short but very lovely. The air is cool and fresh and flowers of myriad hues adorn the valleys and mountain slopes.

Differences of aspect and elevation give rise to differences in climate. Rainfall on the whole is copious and well distributed. The rainfall though plentiful varies from year to year. Crop failures are characterized not

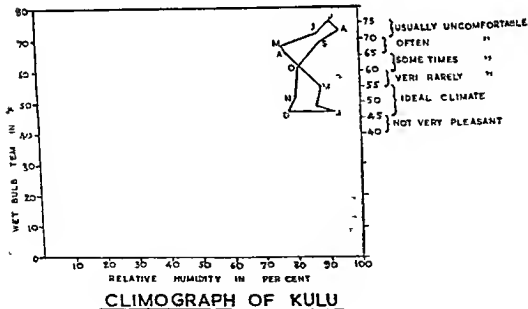
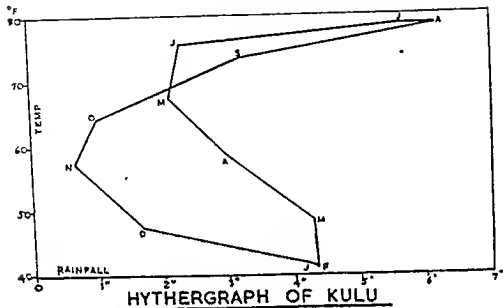


Fig 24

so much by the excess or decrease in rainfall amounts as by the irregular and untimely arrival of rainfall and the intervening long dry breaks. The variation from year to year in total precipitation is also wide. Highest rainfall at Dharmasala took place in 1914-15 when it amounted to 153.7" and lowest in 1907-8 when it was only 48.8". Total rainfall from year to year is also variable.

RAINFALL AT KANGRA

(in inches)

1917-18	50.43
1918-19	72.52
1919-20	65.67
1920-21	57.44
1921-22	99.67
1922-23	73.66

This variation is further accentuated by the late or early arrival of monsoons and long breaks when rain is desirable, or otherwise there may be heavy rainfall when none is wanted. With the rest of the country, the Himalayan Basins also suffers from the vagaries of the monsoons. The four important variations mentioned by Normand² hold true here also—'The beginning of the rains may be delayed there may be prolonged breaks, the rains may end considerably early than usual and the rains may persist more than usual. Thus droughts and floods may follow now and then causing hardship to the peasantry and the populace in general

B NATURAL VEGETATION

General Features :

Owing to the great range of elevation from about 1500 ft to 20000 ft or so, the the Himalayan Basins displays great diversity of natural vegetation (Fig 25). Also rainfall which varies from about 116" a year in Dharmasala to nearly 36" in Kulu exercises influence on the growth and variety of vegetation. Temperature changes due to differences in altitudes are exhibited in the altitudinal range of Himalayan vegetation. The wealth of flora both in terms of variety and produce is indeed great, and truly Calder³ says, 'the Himalayas have a vegetation richer and more varied than any other part of India'

Here we come across every type of West Himalayan flora from high level birch and rhododendron down to subtropical scrub and bamboo of the lowest foot hills (Figs 26 & 27). Forests cover the slopes and inner valleys of the hills and mountains. In the valleys and adjoining hills vegetation rarely forms a continuous block, being separated by fields and habitations. Forests cover the slopes above 3000 ft elevation. They constitute one of the chief natural resources of this mountainous and hilly tract. Deodar, spruce and silver fir occur above 6000 ft below are chir pine and above are the Himalayan (also referred to as Alpine) pastures. Certain bare uplands and mountains are not forested.

1 Kangra District Gazetteer op cit p 31

2 Normand C W B The Weather of India. An Outline of field Sciences of India. Indian Science Congress publication Calcutta 1937 p 6

3 Calder C C An Outline of Vegetation of India. An Outline of Field Sciences of India. Indian Science Congress Association Calcutta 1947, p 72

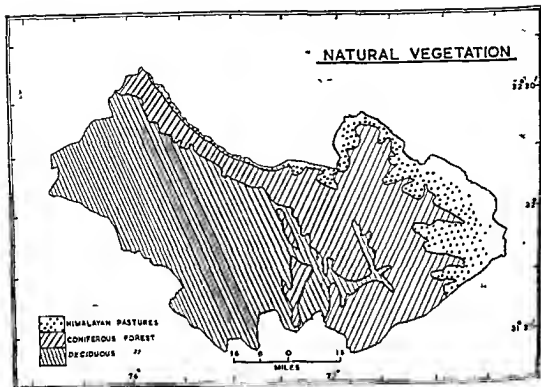


Fig 25

either because they are too windswept or because the soil is too porous, too scanty or otherwise unsuitable. Moreover, the pressure of population on land is great and frequently forests are heavily grazed, lopped and made use of in other ways resulting in the disappearance of forests, the devastation of pastures and wholesale erosion of soil¹. The extension of terraced cultivation is also reducing the area under forest². Therefore

in the Second Five Year Plan³ emphasis has been placed on "the compelling need for retaining an adequate portion of the land surface under permanent forests which are properly distributed and assured of freedom from encroachment, abuse and over use". According to Howard⁴, the minimum area of forest land for the whole country and for each province should be between 20 and 25 per cent. But in the Second Five Year Plan⁵

¹ Glover, S. T., *loc. cit.*, p. 65

² Kayastha, S. L., 'The Himalayan Basins - A Hydrographical Study' *Nat. Geog. Journ. of India*, Vol. I, Sept., 1953, pp. 11-2.

³ Second Five Year Plan, Govt of India, 1956, p. 298

⁴ Howard, Herbert S., 'Post-War Forest Policy for India', New Delhi 1944 p. 2.

⁵ *Op. cit.*, p. 29



Fig. 26 Coniferous Forests



Fig. 27 Bamboo

The National Forest Policy proposes to raise its stand to 33% of the total area; the proportion to be aimed at being 60% in hilly regions and 20% in the plains. Kulu forests are in much better condition than that of Kangra Mandi and Bhattiyat, partly because of their comparative inaccessibility.

Regional Plant Complex

There are four broad zones

1. Scrub Forest—The first

of these is met with in the lower hills and valleys and extends up to 4000 ft approximately. It consists of miscellaneous scrub forest. Trees range from 30 ft high to nuserable broad leaved bushes. The area of demarcated forests is small. Forests are subject to uncontrolled grazing¹ and hence are in a deplorable state. Natural regeneration is difficult in the face of overgrazing, felling and loyping. On account of the nature of the consolidated strata the areas of vegetation rapidly erode and therefore the natural cover requires particularly to be retained as far as possible. Medicott² relates that the forests in the adjoining hills on the borders of Jammu were so thick that Mughal emperors used to hunt wild elephants and rhinoceros. But now the natural vegetation is much depleted. Petty profit of the moment is all that led to the spoilation of these forests.

2. *Clair Pine*—The second zone extends from 4000 ft to about 6000 ft. It contains

¹ Corri, H. M. M. H. State Forest Works, Punjab, 1937, p. 1236, p. 129.
² Medicott, H. B. Sketches of Geology of the Punjab, Calcutta, 1889, p. 10.

chir pine (*Pinus longifolia*) which in the upper limits is often mixed with Pin oak (*Quercus Incana*) which in reality belongs to the upper zone. Damage occurs due to fires and uncontrolled felling. The forest rights of the people are more than liberal and these forests happen to be accessible from the habitations scattered here and there. In the lower part scrub types invade Chul area whenever there is destruction of forest and careful regeneration is not practised.

3 Deodar Oak and Fir—The third zone runs from about 6 000 ft upwards to 12 000 ft. This contains the deodar oak fir and large miscellany of broad-leaved species. Ban oak forms pure stand. Timber is cut for plough wood and other agricultural implements. Heavy grazing by goats and buffaloes does much harm. Deodar occurs usually between 5 000 ft—8 000 ft. Kail occupies large areas and is a prolific breeder. Ground that was previously open grassland has within the memory of living men become occupied by kail. Above occur deodar and silver fir. Silver fir is confined to the coldest sites.

4 Himalayan Pastures—These extend above the zone of forests. They have a wealth of herbaceous growth in early summer and monsoon which dries off later in the year. There are several herbs of economic value. Fodder value of such areas is large

though irregularly utilised and largely wasted. Gaddis who practise transhumance usually make use of these high pastures for grazing their flocks. Milch cattle are also taken there but the practice is not extensive.

Economic Value*

Economically the coniferous forests are the most important because they include kail (*Pinus excelsa*) Chul (*Pinus longifolia*) tor or fir (*Abies pindrow*) and 'rai or spruce (*Picea monoda*) all of which are commercially valuable. All timber eventually finds its way to the Beas river and is floated down to plains. In addition to timber forests yield firewood resin, herbs, bamboos, tanning material, katha, fodder gum and honey etc. Forests ameliorate climate, regulate water supply and check soil erosion. They provide natural habitat for various types of hill and mountain fauna. In addition they have great aesthetic value.

All evidence goes to show that there has been extensive depletion of natural vegetation resulting in grievous losses to the economy of the people. In the Himalayan Beas-Basin conservation of forest wealth constitutes in some respects the most important single item amongst the conservation of natural resources.

The following classes of forests are found for administrative purposes—

- 1 Reserve Forests. They are the absolute property of the Government.

1 Gorrie R. M. Mandi State Forest Working Plan op. cit., p. 11

* Gorrie R. M., Forestry and its Share in Rural Reconstruction. The Punjab Past and Present. Ind. Soc. Con., Lahore 1933, p. 1*

* For a detailed account see Chapters IV (Part dealing with forests and Forest Products) and VI (Part dealing with Forest Industry).

- 2 Demarcated Protected Forests Trees belong to the government and the soil to the people
- 3 Delimited Protected Forests Trees belong to the government and soil to the people They are subject to a closure scheme for regeneration
- 4 Undemarcated Protected Forests Trees belong to the government and soil to the people Cultivation is permitted with Deputy Commissioner's consent They are not closed to grazing
- 5 Unclassed Forests Trees belong to the government and the soil to the people No closures can be made except with the consent of the people
- 6 Ban Muafi Soils and trees are owned by the villagers
- 7 Private Owned by proprietors of tea estates and others

Description of Kangra, Mandi and Kulu Forests.

In Kangra the forests clothe the Dhauladhar range The forests of the main range descend gradually from high lying forests of *Quercus Semecarpifolia*, *Abies webbiana* and *Picea morinda*, through the woods of *Quercus meana* (bin), to that of *Pinus longifolia* and numerous hardwood species that cover the lower slopes Various ridges are covered with *Pinus longifolia* on the northern side and miscellaneous hardwood on the southern side

In Palampur the forests are very much like that of Kangra Sal is found near Andretta Spruce and silver fir occur in

patches all along the Dhauladhar. Deodar is limited in extent

In Nurpur the forests are of three types

- (1) Woods of *Pinus longifolia* in the north,
- (2) Bamboo forests of Damtal and Talara,
- (3) Miscellaneous hardwoods which generally are found mixed with the above and cover extensive areas in the southern portion

The forests of Dehra are either pure *Pinus Longifolia* or the same mixed with hardwoods Bamboo forests occur here and there and form extensive stretches in Dada Siba The only valuable forests in Haripur are composed of *Pinus Longifolia* and are mostly situated on the main ridge and the broken hill country up to Sola Singh range Incendiarism causes much loss to the forests

Brown oak (*Quercus Carpinifolia*) forms fine belts of forests above and to the west of Dharmshala Excellent stands occur in Bhuted Nala and Kareri Bin or white oak (*Q. meana*) occurs from 6000 ft—7000 ft and is most important The wild bamboo is found in almost all the ranges that skirt the plains Besides the wild varieties there are five varieties of cultivated bamboo Mugli and Mohr grow in the valleys and attain size and height not surpassed in Bengal¹ Nal, Boutlu and Phuglu are found in the upland areas The Chir-pine of Kangra is of poorer quality as compared to that of Kulu In hot and exposed situations, the growth of Chir is stunted as in Jwalimukhi where it occurs at 1,600 ft In accessible areas pine has become scarce Some stands are also found in Haripur and Barsar, upper Palam valley, northern slopes of Jwalimukhi hills,

been distinct improvement in the condition of forests. Damage by fires was less common in Mandi forests because of fear of communal punishment during Raja's rule. All timber is hauled in Beas and is collected at Dehra Gopipur and rafted down to wazir Bullhar.

Kulu forests resemble those of the adjacent parts of Kangra and Mandi except that in some respects they are in much better condition. Chil pine is found best in quartzite rock and occurs in Parbat and Tirthan valleys and attains great dimensions probably with few equals in the Punjab¹. It is interesting to note, that abrupt transition from gneiss to quartzite and hence from clay to silver sand due to a fault in Dinkramul results in change of deodar on clay to Chil on quartzite. Wild olive, mulberry and 'shusham' are found on lower levels. Above Chil zone, 'kail' and 'deodar' are found. In upper Parbat and Holla, it is found mixed with silver fir and oak. Extensive forests of common Himalayan oak, are found largely in Huri valley. Other species include alder, birch, tun and elm. Fine woods of alder are found on freshly deposited alluvium and moist landslips. It provides timber and firewood. Above 8,000 ft are forests of spruce and silver fir. They form pure stands of trees attaining to a height of 200 ft and there the beams of sun scarce penetrate the gloom beneath these mighty trees². Associated with them are horse-chestnut, maple, walnut, and ash frequently forming broad leaved woods in moist ravines. Hazel, hornbeam, yew and tul cherry are also

found. At 12,000 ft birch and mauve rhododendron occur in any quantity, associated with them are willows, ash, wild apple, viburnum, juniper and rhododendron. Finally tree growth is replaced by alpine pastures ascending to the limit of vegetation and snow line. Here we find a rich flora of *Primula*, *Mecanopsis*, *Potentilla*, *Caltha* and *aconite* etc. There is dense growth of balsam, umbel, distic and polygnum. These grazing grounds are resorted to by sheep during summer, and also by ponies where the slope is not too steep. Nomads dig medicinal roots and the poacher snares the musk deer secure from the attention of the forest guard. During winter these uplands are a wilderness of snow, a cold wind blows off the mountain work ceases in the forest, till the return of the spring all is dead³. There are many shrubs and plants which provide food, medicines and dyes. Wild strawberry, raspberry and barberry occur. Forests clothe all kinds of slopes from the rounded hills of Saraj to the lofty and precipitous mountains of Parbat ending in the snow clad peaks that guard the sources of this sacred river. It is impossible to include within the limited space the description in detail of the vast flora found in the Himalayan Beas Basin.

Damage to Forests.

Due to several causes damage to natural vegetation particularly to the forests has been large and widespread. Due to increasing requirements of wood and timber during peace and wartime, the fellings have been

¹ Punjab District Gazetteer Q 1 XXX A Pt. II Lahore 1914 p 116

² Trevor C. G., Revised Working Plan of Kulu Forests, Lahore, 1920 p 16

³ Ibid, p 19

Fires do a great deal of harm to 'Chil and 'Kail' forests. They may destroy the forest along with the fauna and render regeneration difficult. Fires may be accidental or deliberate. Occasionally deliberate malice or intent is the cause and offenders are seldom traced. Right holders in the forest are liable to assist in putting out the fire but frequently the opportunity is taken of spreading the fire instead of putting it out¹. Trevor² gives an average of about 700 acres of Kulu forest area which is burned annually due to fires.

Storms and lightning cause damage to trees but such a loss is not much. Hail kills young seedlings and congested pole crops may be ruined by heavy snowfall. Wet snow in February and March does more harm than dry winter snow. Proper cleaning and thinning reduces incidence of damage.

Loppings of fir and 'kail' for fuel and manure, injures the crops of trees and is incompatible with proper forest management. Devastation caused by fungus, *Trametes* jun is due to this mutilation of pine. The heart wood is destroyed and tree remains fit only as fuel. This has done considerable damage in Kangra, Mandi and Kulu forests. Lopping of deciduous trees does not result in the development of fungus and evergreen oaks are lopped for winter fodder. Excessive lopping here too is harmful. Peridromum Cedri is found on deciduar and damages the branches and later the whole tree. Peridromum campanulatum and Brevius causu

harm to alpine *Bercliyella deformans* disfigures and interferes with the general growth of spruce.

Parcupine destroys the bark of the young deodar and eats roots of young walnut plants. Monkeys uproot chil plants and eat young seedlings. Flying squirrels eat unripe cones of Kail and Chil. Birds eat plenty of seeds but it is a trifling loss compared to the good they do by devouring various noxious grubs. Bark boring insects have been known to kill young saplings. To guard against it the forest should be kept clean and the refuse burnt. Various other pests do considerable damage but with supervision and management they are not quite serious.

The damage to forests due to natural and man made causes has resulted in much harm. Indirect effects of deforestation are, micro climatic changes, loss of wild life, landslips, causing loss to property and communications, erosion, lowering of subsoil water and irregular supply of water to streams, sand deposition and silting—all this ultimately causing hardship and a lower standard of living and sometimes even complete ruin. It is said that the decline of Roman empire is a story of deforestation, soil exhaustion and soil erosion³. In the interest of the land and people now and for posterity and to fulfil the tasks set in the Five Year Plans the author would suggest the pursuit of a vigorous and enlightened policy leading to the development and conservation of forests in the Himalayan Bios Bios, where they constitute one of the chief natural assets.

1 Purjab District Gazetteer Vol XXX A Pt. II Kulu and Saraj Lahote 1918 p 118

2 Trevor C G op cit p 113

3 Jacks, C V., Soil Erosion in the Upper Part of the Earth by C V Jacks and R. D White London, 1939 p 23

C. FAUNA

The Himalayan Bear Basin still provides habitation and sustenance for numerous fauna. The mountains, forests and streams, presence of abundant food, shelter and water and large stretches of uninhabited and comparatively inaccessible country provide favourable factors for sheltering many kinds of wild life. Both tropical and temperate fauna are found as a result of climatic conditions which vary from modified tropical to cold temperate according to altitude.

The full description of mammals, birds, reptiles and fishes would make a long list. The brief account will, however, indicate the richness of Himalayan fauna found in these valleys, glens and mountains.

Faunal Families

Mammals Mammals include panthers, bears (black and red), wild cats, hyaenas, jackals, foxes, pine martens, otters, weasels, wild pigs, porcupines, wild sheep and goats, flying squirrels, flying foxes, brown monkeys, grey apes, musk deers, barking deers, gorals, spotted deers, nilgais and hares.

Panthers are common throughout the hills and lay a heavy toll on sheep and goats, cattle, ponies and game animals. Tigers are not indigenous to the area and are seldom met with. The bears are ferocious marauders to the peasant and the grazier. They devour muzz and sheep. The wolf is found in the lower portions of the tract and is becoming scarce. Monkeys ravage crops and fruit. They find shelter in cliffs and forests and in several centres of worship where they are regarded sacred. Porcupines are another

great enemy of the crops. Common otters (*Lutra nas*) and clawless otters (*Lutra leptonyx*) are a menace to fish which they are reputed to kill in large numbers. A few spotted deer (Chital) may be found near Dada Siba. Barking deer is common throughout the hills though their number is much reduced. Musk deer is found near the birch forest level and in spite of restrictions, is mercilessly noosed. Trapping by placing nooses between gaps along long hedges on hillsides resulted in much wanton destruction. Nilgai and black buck are found in low valleys. Goral or Himalayan Chamois is found up to 8000 ft and is falling rapidly to the gun of indigenous poacher who kills on the plea of 'protecting the crops'. Thar (Karih) is however not in much danger of extermination. The same is true of serow (sarao). Iber and barbel are hardly found in Kangra proper though some may be met with in Mandi and Kulu.

The wild bear is the commonest game animal of lower hills. It does great damage to crops. On this account its killing is encouraged. Flying foxes damage fruit crop. Rewards are paid for the destruction of bears and leopards.

Birds

Birds are of both types—residents and migratory. They include game birds, song birds, birds of prey and other numerous small species. Pheasants of all Indian kinds, partridges especially chukor, teal, duck, wood-cock, snipe and pigeons, provide small game. The Himalayan whistling thrush and ouzel make delightful music. Wagtails are in plenty and

the Himalayan Nut cracker gives out raucous notes as he pecks at the pine cones Wood peckers are common in all forests Magpies kingfishers, mynahs cormorants crows, sparrows, cuckoos owls peewits, kites and vultures are found all over

The birds of prey are very numerous and some are useful to the peasant But he looks upon them as 'vermin' and kills them when ever possible

Accipitres (hawk) is well represented in the area Greater majority of the hawks are scavengers and robbers living on rats lizards and grasshoppers and thus render service to the cultivator Only few are capable of killing game The hawk eagles and falcons destroy game

Fish

The streams of Kangra Kulu and Mandi abound in fish¹ Mahseer is found in all streams Other fishes include, Baram kala bans Gidh Kunni Bhangau Barbel Rohru, Mori, Karat, Sanl Pallu Mochi Gungh and Gulguli Brown trout was introduced into Kulu from Kashmir in 1909² Trout is found in Uhl, Beas and many tributary streams like Sujan, Phojar Shird, Sarban Pirbati Sunj and Tirthan

Harmful methods of killing fish and floods are responsible for depletion in the number of fish in all rivers and streams but restocking is done by government hatcheries and several protective measures ensure restocking and continual supply

Insects

Mosquitoes and sand fly are common in lower levels Common housefly flourishes in insanitary conditions Swarms of flies move with flocks and herds Tabanidoc and sto moxys are biting flies and attack horses and cattle Hippobosca prey on horses and dogs Ticks are plentiful, they cause red water in cattle and death by anaemia among lambs Sarcophagus Lancatocolis is one of the worst flies and causes infection Tapeworm and leeches are parasite infections of domestic animals

Reptiles

Snakes are fairly plentiful Lizards, frogs and toads are universal The most poisonous snakes are Kharpa (Cobra) Sankhechor and Ratur Less poisonous types are 'Sotar', 'Bans and Nag The latter is a whitish coloured snake and amongst some is regarded as good omen and its image is worshipped

According to Horn³ Faunistic investigations reveal that the Kangra and Kulu valleys from the meeting places of aquatic animals migrating along the Himalayas from east and from Sind Baluchistan etc on the west This is indeed an important biogeographical conclusion but detailed investigations are necessary to firmly establish its full authenticity

D SOILS AND SOIL EROSION

Soils are our basic resource They support the garment of vegetation which provides sustenance for man and his animals Soils

1 For further details see Chapter IX (portion dealing with Fishing)

2 Punjab District Gazetteers, Vol XXX A Pt II Kulu and Sraj op. cit., p 13

3 Horn S L, Formerly Director Zoological Survey of India, Government of Bombay, 1918

comprise not only the stage but also the source of energy for the vast drama of life which generation after generation of man plant and animal enacts on the earth¹ The soil consists of inorganic (rock and mineral) and organic (plant and animal) substances. A geologically mature soil is usually rich and shows a number of colour gradations from a top soil rich in humus and in fully decomposed mineral particles. Change in the soil physical chemical and biological is continuous and therefore soil is a complex substance in which conditions are never static² Since factors are variable soils differ from place to place. The soils differ from place to place not only in quantity but in quality and in their inherent capacity for serving the needs of man³ The importance of soils is derived from the following considerations

- 1 Geographical—According to relief climate vegetation etc
- 2 Morphological—According to physical chemical and biological characteristics
- 3 Functional—According to productivity
- 4 Social—According to human occupation

The study of the soils of the Himalayan Deas Basin is neglected because of the hilly and mountainous nature of terrain, and the comparative inaccessibility. The mountains and rough hill lands include many areas in which shallow soils overlie their rock formations. The soils are immature and more or less stony with frequent exposures of bed

rock. These soils are known as 'Lithosols'⁴ Although most of the land is rough and rolling there are also areas of smooth and level land with alluvial soils. A great variety of soils makes up these tracts. They have not much in common except their thin stony character and generally rugged terrain. Each local soil strongly suggests the influence of the local rock formations in addition to other factors of soil formation. Igneous metamorphic and sedimentary rocks of many types are involved. On the whole they have developed under copious rainfall and forest vegetation but in the south they have developed under lighter rainfall and scrub forest and the influence of climate and vegetation of their specific environment is apparent. The soils are mostly shallow and incompletely developed. The steep slopes on which they lie retard their development. The rugged and inaccessible areas are covered with alpine pastures and forests. Numerous small farms dot over the smoother gentler slopes offering deeper soil. The general carrying capacity is low except in areas of alluvial deposition which make best paddy lands and carry high population. The flood plains bordering numerous streams consist of sediments of water laid soil material eroded from the drainage area of each stream and deposited on the alluvial fans, and valley floors. They are alluvial soils. The features of the soil are largely determined by the type of material laid down. The

1 Wolfanger Louis A., 'The Great Soil Groups & Their Utilization in Conservation of Natural Resources' New York 1950 p. 25

2 Davis D. H., 'The Earth and Man' New York 1950 Soils pp. 10-183

3 Fuchs, V. C. and Trewartha, G. T., 'Elements of Geography' New York 1949 p. 442

4 The term is derived from the Greek word Lithos meaning rock.

sediments consist of a mixture of materials, but even the best alluvial soils contain small pebbles which are cleared out in successive ploughings. Though their area is small they are the most productive.

People take a utilitarian point of view of soils. They distinguish between lands lying close to or at a distance from the homestead, and between lands that yield one crop or more.¹ The diversity of geology and physiography naturally produce considerable differences of soil but varieties are seldom found coumpled in the lands of a single village, e.g. the soil of Kangra valley is more or less of the same character in all the lowlying villages. In the adjoining hills, the soils of one village closely resemble that of another but between the valley and upland there is marked difference in soils.

In Kangra tahsil the soil is very fertile. It is derived from disintegrated granite mixed with detritus from recent formations and rests on a sub soil of boulder beds. A different type of soil is found further south. The soil is composed of stiff marls mixed with sand which form a light fertile soil easily broken up and comparatively free from stones. It is found in the upland villages of Dehra and Nurpur and a narrow belt of it lies across Hamirpur tahsil from Changar Balihar to Sntley. It is a soil of moderate productive capacity.

Further, in the broken hill country is found soil of low fertility consisting of reddish clay and pebbles. Here the hill sides seldom

produce anything but rank grass or grams and poorer pulses.

In Kulu, the soil of the hill sides is usually glistening with particles of micaceous rock and the forest soils contain much vegetable mould. This soil does not lie deep anywhere except on the alluvial slopes which border the river beds.² In the valley of Beas, the alluvial river terraces are somewhat extensive. However, granitic boulders are spread extensively. Below Sultanpur (Kulu), the lower fields become broader and the soil is composed of reddish and rather stiff loam. There are no wide areas marked by differences of soil as in Kangra and the classification adopted at settlements of Land revenue has followed the variations of fertility due to positions of the fields rather than the physical characteristics of the soil. In the upper valley of Beas the alluvial slopes near the river and its tributaries are much favourable for rice growing. Lower down where water supply is much less secure it is called *halk*. In Simj, alluvial belt is called *niul*. The mid zone up to 7000 ft is called *munjhat* and above it is *Gahar*. *Kutal* consists of steep unterraced hillside where snow lies late. Classification of soils according to irrigational facilities is made as follows.

- 1 Ropa (i)—This has best irrigational facilities. It lies in the centre of irrigated block.
- 2 Ropa (ii)—It is also irrigated and lies at the head of irrigated block. The only advantage is that water is cold.
- 3 Ropa (iii)—This irrigated land is at the tail of supply.

¹ Kangra District Gazetteer Vol VII A op cit, p 278

² Punjab District Gazetteers—Kangra District—Vol XX A, Part II Kulu and Sarni; Lahore, 1918 p 87

4. **Batli**—This is unirrigated soil. Here the main consideration is whether the land is near or far from the hamlet.

Distance from the homestead is an important consideration for all types of land. Lands near the homestead receive more attention including manuring etc., from the farmer. There is grading of soil on the basis of productivity. According to Spate¹ this often takes the form of concentric zoning around the village.

Aspect is also an important consideration in soil productivity—in a wet year sunny slopes fare best and in dry years shady slopes are better. Proximity to trees mean more humus but owing to shade of trees and ravages of wild animals the land is less valued.

In Chamba² people classify lands into two main classes:

1. **Kuhl**—That which is irrigated.
2. **Otar**—That which depends solely on rainfall.

Each of the two classes is divided into three kinds according to situation and nature of land viz **Maidan**—level or open **Oti**—rugged and uneven and **Gaggal**—full of stones. Thus we have six kinds of soil classification prevalent in Bhritiyat (Chamba).

- | | |
|-----------------|----------------|
| 1. Maidani kuhl | 4. Maidan Otar |
| 2. Oti Kuhl | 5. Oti Otar |
| 3. Gaggal Kuhl | 6. Gaggal Otar |

In Mandi³ the classification is similar to that of Chamba.

1. **Kuhl Abi**—Irrigated land
2. **Autar Barau**—Unirrigated land
3. **Nad**—Inferior land

Single **Fk Fash'** and double crop **Do Fash'** lands are usual denominations but it does not mean two types of soils but that one class of field gets more manure and better husbandry than the other.⁴ Inferior land is called **Bilud Banjar**. Middleton⁵ in his final report on land revenue settlement has classified soils as under:

1. **Chah**—Irrigated from wells
2. **Nelri I**—Land irrigated from perennial source
3. **Nelri II**—Land receiving water from non-perennial source or only at certain times

Nad—Inundated land only growing rice crop. Also sometimes called **Sailab**.

5. **Dofash** (Unirrigated)—Bearing two crops a year or three crops in two years.
6. **Ekkfash** (Unirrigated)—Bearing one crop a year.
7. **Bahnd Banjar**—Bearing a crop once in two or three years.
8. **Kharetar**—Hayfield and usual classes of waste.

On the whole the soils are young and immature and any depth in them whatever

1 Spate O. H. K. op cit p 81

2 Punjab States Gazetteers, Vol XXII A Chamba State Lahore 1910 p 770

3 Mandi State Gazetteer 1904 p 42

4 Nad really means all swampy land kept permanently moist by presence of springs vide Middleton L. Third Revised Land Revenue Settlement of the Palampur Kangra and Nurpur Tehsils Lahore 1919 p 10

5 Barua G. C. and Lyall J. E. Report of Land Revenue Settlement of Kangra District Lahore, 1889 p 24

6 Op cit p 15



cultural practices and forest management. The knowledge of soil formations in the catchment area of Beas Basin, is essential for the understanding of certain hydrological features of the drainage channels and for agriculture. This knowledge is also essential for flood control operations¹.

According to Roychoudhary², the aim of soil survey is to (i) Classify and map the different kinds of soils so that agricultural use of the soil resources can be planned and (ii) Apply the result of the research to individual field or tracts of land. With this aim in view an All India Soil and Land Use Survey Scheme has been started in 1958.

The local classification holds good for the present. As Spate³ says, 'It is based on closest observation through centuries of intensive farming and they are the most revealing data from an over all geographical point of view. This is based on productivity of the soil. Clay and humus largely determine productivity, and by judicious soil management, this could be achieved. Repeated applications of farmyard manure and compost and by green manuring the higher humus content can be built up. Failure to do that is full of hazards. It has been established that 'erosion low yields and rural poverty are all symptoms not primary causes of maladjustment between the people and the soil'. To maintain fertility of good soils is essential and that of poor ones should be

increased. Land must be in 'good heart' for the maintenance of prosperous and healthy agriculture.

SOIL EROSION

Widespread and extensive soil erosion has been noticed in the Himalayan Beas Basin. Soil erosion can best be described as the theft of soil by the elements and is the removal of soil particles either singly or in mass⁴. Soil erosion where it has threatened settlements and communications as in Dharna sala and Kulu or important public works such as the Mandi Hydroelectric project on account of severe erosion in the Uhl catchment area has attracted wide notice and measures to control it have been taken even if by fits and starts. In the lower hills excessive erosion has led to increased silt load on streams and development of 'chors' causing *run to agriculture and economy* of the foothill areas and has caused deep concern. But, by and large the problem of erosion passes unnoticed. It is during the rainy season that destruction of roads and bridges and land slips near habitations cause concern to the Public Works Department and occasional accounts are published in the newspapers about the havoc or the Annual Forest P.W.D. and Agriculture Reports make mention about the severity of erosion—but more or less that is all about it. The lone cries of a Gorrin or a Glover are lost in the wilderness. Mad's memory is said to be

1 L. S. J. and Thomas R. V., *Soils of Simla Hills* Abstracts III In I. S. Cong. 1950 p. 366

2 Poydell B. S. P., 'Survey and Planning For Land Use in the River Valley Projects' *Journal of Soil and Water Conservation in India*, Vol. 8 No. 1 1960 pp. 3-46

3 Op. cit., p. 81

4 'Climate and Man', U.S. Dept. of Agriculture 1941 p. 286

5 Coty, P. M., *Soil and Water Conservation in the Punjab*, op. cit., p. 1

short and so also is largely his vision of the future. The problem of soil erosion is more serious and more deep-seated and is worthy of more than a passing notice. Man and beast have contrived to upset the balance of nature. For well-being and stability, man with his milieu of domestic animals must live in harmony with the environment. But here is the story of man who has destroyed large areas of forest, and cultivated steep slopes until water has swept away the soil, and has grazed his flocks and herds on hill sides until the vegetation has been mutilated and destroyed and the earth exposed to the forces of natural elements. The natural balance has been destroyed and the result is erosion, floods, siltation, lowering of sub-soil water and irregular supply of water to springs and streams.

With the destruction of forests, the storm water no longer retained by the protecting cover of vegetation pours on bare earth and rock causing erosion and devastating floods. Much damage has been done and more will follow unless nature's balance is restored. Soil erosion may be described as a creeping death. Land, man and animals all suffer. Arable area is reduced, wasted pastures provide precarious living to livestock and man and animals are underfed. It is estimated that one-fifth of the area in hilly regions, pastures, waste lands and ravines is in an advanced state of erosion.¹

Causes of Erosion

The causes of soil erosion in the Himalayan Beas Basin are numerous but the chief amongst them are excessive deforestation, overstocking of grazing lands and practice of unsuitable methods of agriculture.

Removal of Natural Vegetation

Where the natural vegetation is still intact, there is no erosion. The force of rain is broken by the leaves and the carpet of ground vegetation and humus which soak up rain water like a sponge. But with the removal of natural vegetation the rain falls on bare ground without protected cover or absorbent elements and leads to soil erosion. Great fissures and gullies open up and the soil is rapidly removed. Due to destruction of forests and grasslands over large areas the erosion is widespread in the Dhauladhar range and the southern broken hills country (Fig. 29). It is much less in Kulu where the natural vegetation remains comparatively less damaged. Vegetation has a decided effect on runoff and loss of soil as is illustrated by the following figures:²

Nature of cover	Loss of water	Loss of soil
Forest	1	1
Grass	27	32
Bareland	125	800

In Nurpur the run off plot gave following results:³

¹ Second Five Year Plan op. cit. p. 306

² Kayastha, S. L. 'The Himalayan Beas Basin—A Hydrographical Study' In: Journal of Power and River Valley Development op. cit. p. 9

³ Corrie, J. M. 'Soil and Water Conservation in the Punjab' op. cit. p. 185

damaged these forests and there has been a great increase in soil erosion. Village Forest Societies have been formed to look after these forests.

The pastures are over grazed and the place of valuable fodder grasses has been taken by useless Lamb grass (*Aristida depressa*) various other low nutritional grasses and by unpalatable bushes. Most of them are pastures only in name and serve mainly as an exercise ground for the cattle. Gradually the soil is eroded away and the land becomes waste.

Shifting Cultivation

In certain areas temporary cultivation is practised in forest patches. The trees and bushes are cut and burnt and the seed is sown in the lightly ploughed or raked soil. The yields are good because of the rich humus in soil but soon the heavy rains wash away the top soil and the crops are poor after two or three years and so another plot is taken up. This is harmful practice and causes much soil erosion.

Faulty Methods of Cultivation

Loss of top soil is enormous on steep slopes and returns of crop yields are poorer each succeeding year. Erosion is not only in the fields but it further leads to landslips and stone scree are formed on the slopes below. Potato cultivation causes very rapid loss of soil due to rows being run across the contours without regard to the slope. One of the chief causes of erosion on the cultivated land is the failure to terrace and embank

the fields. The rain carries away the soil and farms are ruined. It is not unusual to see a deserted homestead on a bad land standing as a silent testimony to the one time prosperous farm now ruined by erosion.

Roadside Erosion

Due to cutting of land surface for the construction of roads erosion starts on the roadside. This could be stopped by improved roadside agricultural practices.

Nature of Geological Formations

The rocks of the valley and lower hills consist of alluvium, loosely aggregated conglomerates, sandstones, red and purple clays and shales. These are by their very nature easily erodable.

Nature of Rainfall

Rainfall is heavy during July, August, and September. The rainfall is torrential and each heavy storm is capable of starting a fresh cycle of erosion. Any one who has spent a part of the monsoon at Dharamsala would remember downpours of 8"-10" of rain in one day with devastating effects.

Due to causes mentioned in the foregoing account erosion is a serious problem in the Himalayan Beas Basin and must be tackled earnestly.

Hills in the Nurpur are badly denuded like the Divaliks of Hoshiarpur. These areas were of low economic value and received little attention from the forest department. Sand and boulders are swept into the plains and the valley of Gaj.

1 Glover S. H. Soil Production, p. 11

2 G. L. C. R. M. Soil and Water Conservation in the Punjab, p. 186

In Dehra, erosion is extremely severe and so also in Hamirpur. In Mandi district, the catchment area of Uhl river, on which is dependent the Jogindernagar hydroelectric station is threatened with erosion. The stream carries silt and boulders and puts a limit on the life of reservoir. Therefore, soil conservation measures have been taken there to eliminate this threat.

Again, soil erosion is much seen in Sarka ghat and Jogindernagar. Large landslips can be observed in the vicinity of Mandi town and in undemarcated areas of forest in Chachot.

In Kulu valley extensive slopes are getting eroded in undemarcated forests and

pasture lands. The arable fields near the villages are well looked after and properly terraced and supported by stone walls but those farther away lie on steep slopes and much soil is washed away. Eventually soil becomes too shallow and too sterile to produce crops and throughout Kulu valley there are evidences of abandonment of cultivation. In Saraj soil erosion is particularly severe in undemarcated forests.

The Himalayan Beas Basin constitutes an important catchment area and erosion here means not only loss to the area but considerable devastation in the plains below. It calls for vigilance, and cooperation of all, in undertaking conservation measures.

Natural Regions

The Himalayan Beas Basin may be divided into three well defined natural regions (Fig. 30)

- I The Mountainous Region
- II The Valley Region
- III. The Low Hill Region

In an area of such varied relief, rainfall

and temperature, there are bound to occur several micro regional variations. The broad regions mentioned above display a high degree of homogeneity of relief, climate, natural vegetation and cultural practices. These regions may be further studied according to certain regional characteristics

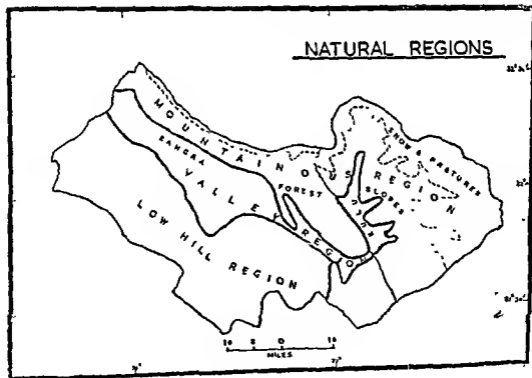


Fig 30

The Mountainous Region

The mountainous region occupies a broad belt of country in the north and east. The region is highly mountainous (Fig 31). Along the northern and eastern boundary is a wall of mountain ranges—the Dhauladhar range in Kangra and Mandi and the Pir Panjal and the Great Himalayan range in Kulu. Numerous spurs descend from these ranges that traverse the valleys below. From the snow capped peaks and glaciers the slopes incline rather steeply and are covered with alpine pastures and forests of mostly coniferous type. The area is rugged and well watered. Winters are cold though summer warmth is enough to permit cultivation on favourable terraced slopes up to nearly 10 000 ft elevation. Precipitation is heavy more particularly on the Dhauladhar range. The tract may be considered a negative area from the point of view of human occupation. It contains no sizable habitations worth mentioning. Population is sparse and isolated homesteads are found here and there. On favourable aspects and easier slopes cultivation is carried on in small patches won by arduous terracing. Forests are the main wealth of the area though pastures are also of importance for grazing. The region can be subdivided into two tracts.

- (1) The Western Mountainous Tract—This consists of Dhauladhar range and its spurs in Kangra and Mandi. Here

the rainfall is rather excessive more than 80" on an average. The mountain range attains to an average of about 15 000 ft above sea level.

- (2) The Eastern Mountainous Tract—This consists of the Pir Panjal and the Great Himalayan ranges and their spurs. Here the rainfall is moderate on an average about 40" and less. The ranges here are higher and it is a much more wild and mountainous country than the similar tract in Kangra and Mandi.

The region as a whole is subdivisible into two parts.

- (i) Region of snow ice glaciers and Himalayan pastures.

This part consists of high elevations above 17 000 ft. Snow and ice cover the highest peaks and numerous glaciers lie on the declivities. Glaciers are far more numerous in



Fig 31 Mountainous Region

Kulu The alpine pastures are grazed in summer and autumn by the itinerant flocks of sheep and goats belonging to the semi-nomadic Gaddis. The area is covered with snow during winter.

(ii) Region of Forested slopes

This area is occupied by forests mostly of coniferous variety. It constitutes one of the richest stands of forest in the Punjab. Here the natural fauna and flora is much more intact than in any other part of the Himalayan Beas Basin and may be considered to be a preserve. Certain areas can be demarcated as National Park Areas as in the valleys of Upper Beas, Ganga Beas and Parbati. Climatically the area is healthy. Although the winters are somewhat severe in the northern parts, it is pleasant for the rest of the year and is free from malaria.

In favourable spots cultivation is done on terraced patches. The fields are too small

The slopes are often such that cultivation leads to rapid erosion though the virgin soil yields good harvests in the first few years. Scattered hamlets are found here and there in forest clearings. Minerals of economic value like slates, salt, building stones and iron ores are found and provide some employment to people. People work in the forest area for cutting of timber and collection of herbs and other forest produce. Population is very thin and is found in isolated pockets. Communications are confined to forest tracks. Man has made highly limited ingress into the region.

The Valley Region

This area occupies the intermediate position between the forbidding northern mountainous region and the southern lowlying denuded hills and agriculturally poor tracts (Fig. 32). The area consists largely of elevations ranging from 2000 ft to nearly 4500 ft. The region

may be subdivided into two main valley areas

- (1) Kangra Valley
- (2) Kulu Valley

1. The Kangra Valley

The area slopes gently from the northern mountainous region. This is a well-watered tract. It has copious rainfall on an average above 60" annually. The streams descending from the snow-covered and forested slopes are perennial and as they come down the slopes their water is diverted by short channels for irrigation. Agri-



Fig. 32 Valley Region

culturally this is the most important tract in the whole of the Himalayan Beas Basin

Economically this is the heart of the Himalayan Beas Basin¹ It has high percentage of irrigated and 'dofash' land and has the highest carrying capacity The area is well served by rail and road communications and has educational and medical facilities From the human point of view it is a most favourable region vying with the Ganges Valley² in its agricultural density

2 The Kulu Valley—Along the upper course of Beas and its tributaries the Kulu valley extends from Manali to Larji The main valley really opens up beyond Bajaura Owing to availability of good agricultural land and irrigation and fine climate it has remarkable concentration of population exhibiting a linear pattern The Kulu valley enjoys a comparatively mild rainy season Summers are cool and winters are invigorating The area is famous for cultivation of fruit

The Low Hill Region

This area consists of lowlying hills uplands and lower valley of the Beas comprising the broken hill country of Nurpur, Dehra Kangra Hamirpur Palam

pur Sarkaghat and Mandi (Fig 33) The general elevations range from less than 1500 ft to over 2 000 ft The ridges are covered with scrub type of vegetation and are highly denuded The valley of Beas is for the most part useless The slopes are covered by sand pebbles and boulders only in the eastern part some good land is available near Nadaun and Dehra Gopipur Streams here are seasonal in character The soil is stony and agriculture is dependent on rainfall Average annual precipitation is below 60", except in Sarkaghat, where it is 76" It an unattractive region Chintpurni and Soli Singh hills separate this area from the plains below On the whole it is a resource-poor area and the population is thin and scattered



Fig 33 Low Hill Region

¹ Kavastha, S. L. Demographic Features of the Himalayan Beas Basin op cit. p 33

² Singh R. L. Population and Its Problems in the Upland of Banaras Int Geog Seminar Aligarh Jan 1946

THE ECONOMY.

Agricultural Economy

A AGRICULTURE AND ITS ASSOCIATED FEATURES

General Conditions *

In the Himalayan Beas Basin, the majority (nearly 87%) of population is engaged in agriculture. In some areas this dependence is absolute.

Table showing Percentage of Agricultural Population

Tahsil	% of Total
1 Kangra	72.8
2 Palampur	89
3 Nurpur	75.4
4 Hanurpur	85.2
5 D.hra	87.7
6 Kulu	97.3
7 Mandi Sadar	81.1
8 Joginderanagar	95.5
9 Chachiot	99.6
10 Sarkaghat	93.7
11 Bhattiyat	94.5
Himalayan Beas Basin	86.8

The area is hilly and mountainous and the land for cultivation is very limited. Of the total, the percentage of cultivated land being only 19.5. The rest is mostly forested or wasteland. In Kulu which is highly mountainous, only 6% of the area is

cultivated. Large areas are unsurveyed (Fig. 31) and in several cases official records are based on land use of only measured area which in some cases, is less than 1/5th of the total. In Kulu only 8.7% of the area is measured for purposes of official land use records (Fig. 31). In the Himachal area of the Beas Basin large areas remain unmeasured. On account of small percentage of cultivated area and large agricultural population, pressure of population on land is severe. Agricultural density is as high as 1,251 persons per cultivated square mile and is higher than even in the Umland of Banaras¹. The carrying capacity of the cultivated land is still more burdened by non agricultural population. The carrying capacity in the case of Kangra rises to 1,718² and in general is high for other tahsils also. This pressure is further burdened by the large number of livestock which the human population is 1,220,948 only the animal population stands at 1,861,403. Thus the incidence of livestock to cultivated area comes to 3 per acre which is again very high. There is no doubt that some of this pressure is off set by the presence of large hayfields, forests and Himalayan pastures but the heavy pressure of animal population has caused destruction of natural vegetation and consequent soil erosion with resultant harm to agriculture.

1 Kayastha, S. L., Demographic Features of the Himalayan Beas Basin, op. cit. p. 39

2 Ibid., p. 23

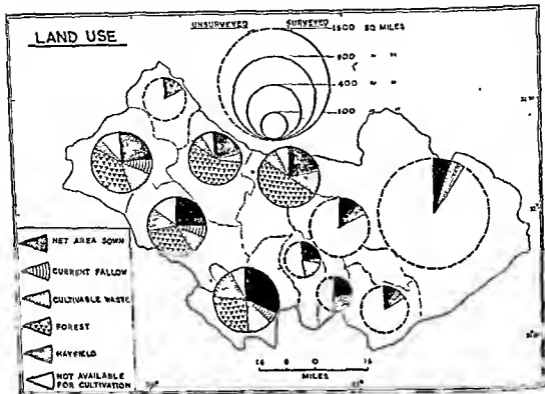


Fig 34

The soils are generally poor. The land is uneven, stony, and on account of heavy rainfall during the monsoons there is considerable leaching. Valleys have the best agricultural land of the region. They present a picturesque appearance of prosperity. The soils are alluvial and facilities for irrigation exist. But such areas are highly restricted. Only in Kangra and Palampur the irrigated area comprises nearly 50% of the total cultivated area. Elsewhere it is small and even negligible. Thus, agriculture over the larger area is dependent for water supply on the natural rainfall which is proverbially uncertain and agriculture often becomes a hazardous pursuit.

In certain areas, particularly in the higher tracts, damage to crops from natural calamities like strong winds, snow fall, and the depredation of wild animals like monkeys, bears and pigs, is considerable. On account of the rugged nature of terrain terraced field cultivation is the rule rather than the exception. The terraced fields are the commonest of the sights (Fig 35). This is an arduous job. Land has to be levelled and cleared of vegetation and stones. Fields are laid out with eagle care to secure every cultivable inch of land that shows wonderful diligence on the part of the peasants. Broad level terraces on both the banks of cañons of the principal streams present a

striking feature. They lend themselves to cultivation but crops depend solely on the vagaries of the rainfall. Large number of stones in the soil render cultivation difficult. The more they are cleared away, the more stones there seem to be. Here and there one may see evidences of the unavailing labour of the farmer.



Fig 35 Terraced Hill Agriculture.

At places masonry retaining stone walls have to be erected. Often such fields are small. Where the slope is rapid the fields are no bigger than a billiard table¹. Due to laws of inheritance, much fragmentation has taken place and holdings are small. Alternative sources of income are few. Unlike Kashmir, cottage industries or other rural handicrafts are not flourishing. The peasantry is poor, quite illiterate but hard working. In such an area means of sustenance have to be earned literally by the sweat of the brow. Here, nature is a stern mother.

Agriculture is carried on by medieval methods. Cultivated area is divided into

fields generally open but in certain parts surrounded by hedges or stone walls about 3½ feet high. Adjoining the house of every cultivator is a small plot of land fenced in with shrubs and trees. This particular enclosure is known as 'Lahri' or 'bast' and being near the homestead gets maximum care and is cultivated like a garden. In higher areas fields are small but lower down where the slope is more gradual the fields are larger (Fig 36). In western portions of



Fig 36 Cultivation in Forest Hills

Dehra and Nurpur Tahsils where the country is less broken and has comparatively gentler slope the fields are bigger and protected by hedges or walls. In irrigated tracts, wide areas bear a double harvest. In Kangra and Palam before one harvest is completely out the light green sprouts of the next crop are visible. The great autumn crops are rice and maize and the spring crops consist of wheat and barley. Unlike the plains in the hills no part of the arable land is specially devoted to growing fodder crops for cattle².

¹ Kangra District Gazetteer op cit., p. 99

² Lyall J. B., Kangra Settlement Report 1873 p. 61

However, all land except bare rock produces grass. Each family cuts the grass after the rains. The best proprietary 'Kharetar' or hayfield is enclosed and given as much attention as cultivated land with which it is equally valuable, if any market town is near¹. In Kulu the higher hamlets have a bleak appearance. The lower riverside hamlets offer striking contrast—here one finds thickets of carefully tended willows, groves of apricot and poplar and broad flat fields of corn.

Steps are being taken, to improve agriculture and the lot of the farmer, by providing better seeds, irrigational facilities and teaching improved methods of agriculture. Possibility of extending cultivation is not much. Keeping of large number of livestock, however, ill bread and ill fed, is indicative of the insufficiency of agricultural produce for the people to live on and not sign of surplus of wealth. The development of agriculture lies on the lines of *Intensive Mixed Farming* where animal husbandry and dairy farming, and horticulture are organically integrated with the economy of the small farm. The natural and economic conditions offer scope for such development. Cultivation together with rearing of dairy cattle, sheep and goats, poultry and beekeeping, growing of fruits and vegetables together with intensification of storage and processing, should form part of this programme.

of intensive mixed farming. To the author, it appears, that although improvements in agriculture would go a long way in offsetting want and poverty yet pressure on agricultural land is more than it can absorb and hence alternative means of gainful employment must be developed.

LAND-USE

The total area of Himalayan Beas Basin is 3,608,220 acres or 5,638 square miles. Out of this, 1,978,388 acres or 3,075.6 square miles or 54.6% is recorded as measured area in the 'Lal Kitabs' or Official Record Books. In Kangra, Palampur, Nurpur, Hamirpur and Dehra the entire area is measured but in the rest of the Tahsils measured area is much less.

Tahsil	Measured Area or Total Area Entered in Office Records	Percentage of Actual Area.
Kulu	90,649 acres	8.7
Mandi	65,991 "	51.0
Jogindernagar	55,706 "	19.5
Chachot	40,075 "	18.0
Sarkazhat	62,322 "	48.0
Blattivat	21,814 "	15.6

Thus if we consider the proportion of cultivated area from the area entered in office records it gives us a wrong idea of land utilization. From office records, it may appear that nearly 63% of the area in Kulu is under cultivation, actually it is

¹ Shuttleworth, H. L., Final Report of the Land Revenue Settlement of the Dehra and Hamirpur Tahsils of Kangra District, Lahore, 1916, p. 10.

² The agricultural experiment at Mandi holds great interest in the field of agricultural development. Under an agreement signed in Delhi on 14-5-62, the Government of the Federal Republic of Germany will provide technical assistance for developing agriculture, horticulture, animal husbandry and dairying in the Mandi district of Himachal Pradesh. German News Weekly—New Delhi, 19-5-1962, p. 1.

not more than 6% (Fig 34) Kangra, Palampur, Nurpur, Hamirpur, Dehra, Mandi and Sarkaghat have adequate cultivated area

Cultivated Area

Tahsil	Cultivated Area as Percentage of Total Area	
Nurpur	30.8	Between 30-40
Hamirpur	37.4	
Dehra	31.1	
Mandi Sadar	32.9	
Kangra	21.6	20-30
Palampur	22.1	
Sarkaghat	27.5	
Jogindernagar	12.3	
Chachhot	13.3	10-20
Bhattiyat	13.7	
Kulu	6	Less than 10

Although the percentage of cultivated area is higher in Nurpur, Hamirpur, Dehra and Mandi Sadar (Fig 37), yet the most productive area lies in Kangra and Palampur Tahsils which have the best irrigated lands. In Hamirpur which has the largest cultivated percentage of area only 2.6% of the area is irrigated which is about the lowest in the whole tract.

The net sown area comes to about 17.2% of the total area for the region as a whole and for each tahsil approximates more or less with the cultivated area except in the case of Nurpur, Hamirpur and Dehra where the percentages of current fallow are 6.9, 6.2 and 5.3 respectively. In Kangra and Palam

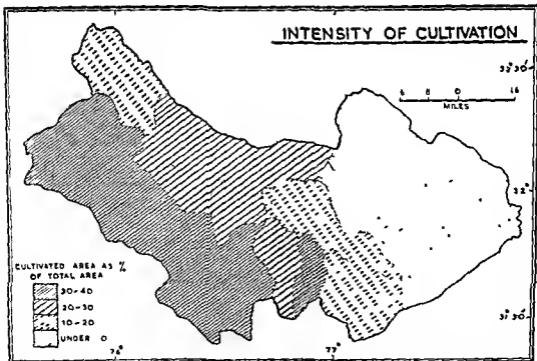


Fig 37

pur more than 20% of the cultivated area bears two crops a year. In Dehra, Hamurpur and Nurpur, 'Dofah' land is much less, on account of very limited facilities for irrigation. In Mandi Jogindernagar Chachhot, Sarkaghat and Bhattivat the area sown more than once constitutes nearly $1/2$, $2/3$, $1/2$, $3/4$ and $4/5$ of the respective cultivated areas. Forests occupy large areas of land. They cover nearly 60% of Kangra, 50% of Palampur, 39% of Nurpur, 28% of Hamurpur, 31% of Dehra, 65% of Kulu, 41% of Mandi District and very large area in Bhattivat¹. Forests are, therefore, most important in land use and constitute one of the main natural resources.

Hay field or Propriety Kharetars (Fig 38) occupy large areas varying from 6% to 13% of the total area. Cultivable waste land varies from 5 to 13% of the total area. This however represents difficult terrain and



Fig 38 Hayfield

there is not much likelihood of extension of cultivated area.

The area which is not available for cultivation, excluding forests and Hayfields etc., varies from 6.9% in Kangra to nearly 16% in Dehra. In Kulu, 91.3% is uncultivated area including forests, hayfields etc.

Thus important features of land use of the Himalayan Beas Basin and its constituent 'tahsils' are the large percentage of forests and uncultivated lands and the small percentage of cultivated area (Fig 39). Nearly $4/5$ of the entire area is uncultivated and on an average 40% of the area is under forests. Although agriculture is the chief means of sustenance for the population, yet it claims only $1/5$ of the entire area². Therefore, misuse of good agricultural land for construction and other purposes is to be deplored.



Fig 39 Forests and Fields

¹ Forest area is noted as unsurveyed in Tahsil Land Use Records.

² For detailed statistics on Landuse see Appendix.

AGRICULTURAL OPERATIONS

Ploughing

First of all the land is prepared for sowing. Ploughings differ with crops. The labour of ploughing is very much arduous owing to the uneven surface of the land and the small size of the fields (Fig 40). Constant turning



Fig 40 Ploughing

and Churning is involved. For sugarcane or cotton the land is ploughed ten to twelve times before the seed is sown. Wheat and barley require about three ploughings and the coarser grains according to their worth. Linseed and peas are thrown into the soil without any preparation at all. The plough is drawn by oxen and it makes a furrow about 3 to 4 inches deep. The soil is not turned over. The ploughman after reaching the end of furrow returns on the same line. The fields appear harrowed rather than ploughed. The second ploughing is on the same lines as the first. In Murpur some improvement is affected by ploughing across the first furrows. A plough drawn by a pair of bullocks in ordinary soil will plough about $\frac{3}{8}$ th of an acre in one day. On stiff

soils half of this may be good day's work. In the rice lands the strain upon the bullocks is so great that they don't last for more than three or four years.

Clod crushing, Levelling, Sowing and Watering

The second operation is the crushing of clods with the help of clod crushers consisting of heavy wooden clubs. Then comes in the heavy horizontal beam of wood which is dragged by bullocks over the field to make its surface smooth and ready for sowing. Harrowing is done only for rice. The field is again ploughed over and the sower follows the furrow. When the whole field has been sown the mahi or leveller is again used to level the surface. Watering is done according to the requirement of each crop.

Weeding

Rabi crops do not require much weeding. For wheat and other spring crops weeding with hoe is seldom practised. If after rain soil hardens it is loosened with harrow and weeds are pulled out by hand just before the crop ripens and are fed to cattle. Weeding is done mostly by women.

Kharif or autumn crops require two or three weedings with hoe as often as weeds appear and the plants themselves have to be thinned.

Manuring

Manure is carried to the fields in bamboos baskets resembling the wicker baskets of the Alps. Cattle, sheep and goat are also penned on the fields. Use of artificial fertilizer is highly limited.

Fencing

Certain paths are kept open for cattle and the fields are carefully fenced with loose stone walls. Stones are available in plenty all over the area. Fences of quick growing thorny plants are set up and where it is not possible dry thorns are used for fencing in the fields.

Crop Watching

Crops have to be watched against depredations of wild animals. The maize crop needs careful watching against bears, monkeys and wild pigs etc. The bear is a regular menace in higher tracts. People will not shoot monkeys but are quite pleased if anyone else does it. A shelter raised on poles is erected as a watch tower. Special gun licences are issued for protecting the crops from the wild animals.

Harvesting, Threshing and Storing

Harvesting is done by hand with sickles where the crop has to be cut. The crop is cut by cultivators with the assistance of neighbours¹. Small sheaves are tied and fifteen or twenty of these are gathered into a bundle and carried to the threshing floor. It is always situated in the open area generally at the corner of a field and is often round in shape and enclosed with stones. The floor is either paved with flags or smoothed over with fine clay and cow dung. In Kulu the floors are not made in the fields but the corn is threshed in the compounds of the houses. The corn is trodden by oxen and the separated grain and chaff winnowed either by throwing

it to the ground from a raised pedestal against the wind or with the help of winnowing scoops. The bruised straw or 'pral' is fed to the cattle and whatever is left uneaten is thrown over the dung heap or used as litter. The straw for use, is stocked in small round stocks which are grouped near the homestead. Maize is threshed by hand as the hard cobs bruise the feet of the cattle. Afterwards the grain is stored in a separate room in the house in big round cane receptacles or 'Perus'. These may be as high as 4½ ft to 5 ft and 2½ ft to 3 ft wide. They are paved with cowdung to stop holes in the canework. Sometimes big wooden boxes are also used for storing grain.

B IRRIGATION**General Considerations**

There is no canal irrigation in the Himalayan Bas Basin nor it is possible to make use of well irrigation in the hilly tracts of this area. But irrigation is carried on by means of Kulis or diversion channels taking their source from the perennial streams (Fig 41).

Rainfall though on the whole abundant often is not available precisely as and when it is required though in the same season it may be excessive in some parts of the country. The percentage of crops damaged or spoiled is often great in barani or unirrigated tracts which is due to inadequate supply of water at proper time. Successful cultivation cannot be assured for any considerable period unless facilities are available for watering crops.

1 A peculiar custom is observed in some places. A sickle is thrown down in the path of a passer by who is expected to step over it and pay a fine. This is apparently for luck and much disappointment ensues if the sickle is avoided.

artificially when necessary¹ It was because of the realization of supreme importance of irrigation that in India it has been practised

from time immemorial to supplement and conserve the rainfall by construction of wells, storage reservoirs and by bunding streams²



F g 41

IRRIGATED FIELDS

The fields are on the left bank of Ban Ganga stream

Indeed the success of agriculture certainly depends in a very large measure upon inter

aba adequate and regular water supply Important reason for low production per

¹ Dast y Bernard *Problems of Modern India* Vol I p 148

² Report of Royal Commission on Agriculture 1928 p 325

unit of land cultivated or labour employed is scarcely uncertainty or irregularity of water supply. It is estimated that artificial irrigation can in general step up production by 26%, in case of rice it is about 50% and 60% in case of wheat. In Kulu the yield per acre of unirrigated rice is 120 seers while that of the irrigated rice is 610 seers. The Advisory Board of Indian Council of Agricultural Research holds that the production of irrigated crops per acre is on an average 50-100% higher than that of unirrigated crops in the same locality.¹ However the benefits of irrigation cannot be measured only by government receipts nor indeed by the area irrigated. The prosperity that it brings to the farmer is a blessing in itself.

Irrigated Area

Fortunately, considerable areas are irrigated in the Himalayan Beas Basin by irrigation channels. In some areas the slope is so considerable that water from the streams can be run on to the surface of land by short approach channels. As a result practically all valley areas and hill slopes in the north which from the south appear to be high hills are copiously irrigated.² Considering the importance of irrigation to agriculture, Irrigation Department was started in Himachal Pradesh in 1931.

The area and percentage of irrigated land for the various Tahsils is given below

		Irrigated Area	
S No	Tahsil	Irrigated area in acres	Irrigated area as percentage of cultivated area
1	Kangra	321 56	53.5
2	Palampur	306 41	49.4
3	Nurpur	124 86	12.3
4	Dehra	151 09	15.1
5	Hamirpur	37 43	2.6
6	Kulu	110 39	17.5
7	Mandi Sadar	51 69	13.3
8	Jogundernagar	96 60	29.8
9	Chachlot	14 99	5.6
10	Sarkaghat	68 74	18.9
11	Bhattigar	61 05	27.7
Total			
Himalayan Beas Basin		110 081	19.9

Nearly 1/5th of the cultivated area is irrigated in the Himalayan Beas Basin. This is well above the percentage of irrigated land for the whole of India in which case it is only 17.5% of the total cultivated area.³ Kangra and Palampur are the most irrigated tracts (Fig. 42). Not only water from perennial streams is available but the slope of the land is well disposed to irrigation. Jogundernagar and Bhattigar come next with 20-30% of its cultivated area under irrigation. These areas also lie to the east and west respectively of Kangra Palampur tract and enjoy almost similar facilities but it would be worth mentioning that the level areas in both tahsils are not as extensive as in the Kangra Palampur tracts. Sarkaghat, Kulu, Dehra, Mandi and Nurpur

1. Manoria, C. B. Irrigation in India—Its Past and Present. The Modern Review, Calcutta, December 1931, p. 5.

2. Middleton, L., op. cit. p. 2.

3. Second Five Year Plan, op. cit., p. 22.

claim 10–20% of their cultivated areas under irrigation. The least irrigated tracts are Chachiot and Hanurpur, the former on account of difficult topography and the latter on account of absence of enough water in the streams which are generally of non perennial nature. Irrigated land is the most valuable from the point of view of agriculture.

Irrigations Channels or Kuhl's—their construction, maintenance and distribution.

Irrigation like terracing is a very difficult task. The river flow that can be used for irrigation depends on topography, flow characteristics, climate and soil conditions of the

region.¹ The difficult terrain of the area requires skill and labour suited to the varying local conditions. The problem of irrigation here is different from that of plains. In the plains, the water is generally lifted from the lower level to the fields. Here gravity irrigation is invariably practised. Various levels and gradients have to be judged without the help of any instruments. The passage should be such that water may flow easily and without much seepage. Irrigation is affected by means of leats or diversion channels locally known as 'Kuhls' from whence 'Kuhl' or irrigated land. They are drawn from the streams, as many as fifteen

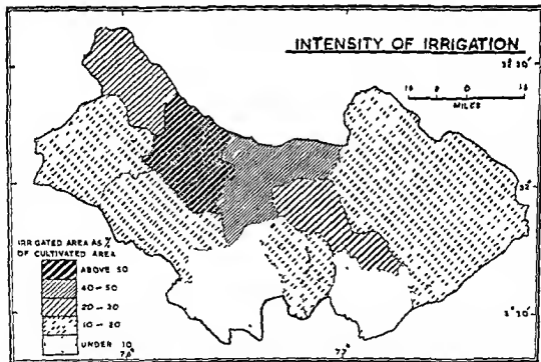


Fig 42

to twenty independent channels being some times supplied from a single stream¹. The country on either banks of the stream rises in terraced succession and water easily passes from higher to lower level. The ditches are merely earthen drains on surface soil. If the rock and soil through which these channels are dug can be worked easily, the labour and cost involved is small but it is enhanced greatly if the rocks are hard and soil is porous. It is difficult to cut across the hard rock though afterwards it is economical as wear and tear is less. Porous soil has to be paved with stones, and slates and impervious clay, to guard against seepage. Wooden flumes and aqueducts are constructed if the water channel has to be led across precipitous rocks and ravines. Huge trunks of deodar and pine trees are sometimes hollowed through the middle lengthwise and used as conduit pipes. Rustic masonry pillars are made to support them if the width of stream is more than one hollowed trunk. Examples of this are met with when one travels by motor road from Kangra to Baijnath. These hollowed trunks may also be used when quantity of water is small and loss by seepage has to be eliminated. In order to fully utilize water supply the author would suggest the use of steel pipes. Villagers should also be allotted cement at cheap rates for construction of small diversion dams and masonry walls.

Tremendous labour and care are bestowed in the construction and maintenance of these irrigation channels because they represent the arteries through which irrigation water—

the life blood of agriculture, flows. Occasionally the running water of Kuhl is also employed to drive water mills.

The head destined to supply the high fields lies deep in the hills a considerable distance above, the water being taken across steep declivities by tortuous channels, constructed and maintained by considerable labour. The lower cuts are easily effected—a hundred yards or less will bring the water upon the cultivated land. The embankments by which supply is drawn into channels are rude piles of stones. Sometimes they may stretch across the stream but more often a favourable bend is selected where the diversion to the channel is assisted by a natural barrier. All the villages which draw supplies from it must help in its construction and repair. The development of these irrigation channels is a testimony to the patient labour, communal cooperation and native skill of the people. They were engineered by the people themselves without any technical help from outside. A few of them were constructed with partial help from the State. Some of the irrigation channels are many miles in length. Most of the irrigation net work is managed entirely by the people—each village supplying labour and its representative to patrol the water course to prevent theft to stop leakage and to distribute water.

Each Kuhl has a staff of Kohls who manage for the maintenance, distribution and repair. When a canal requires repair the Superintending Kohl gives order to Jatah or messenger who goes round with *Dhona* (drummer) to announce and collect labour

¹ Kangra District Gazetteer, op. cit., p. 70

from the villages irrigated by that particular 'Kuhl'. Each family getting share of water, furnishes one person and the whole group marches to the Kuhl, anyone not joining is fined two 'pans' of grain. The 'Bandu' collects these fines. The Superintending Kohh receives grain by way of pay, while others undertake duties in lieu of other labour. The fines are eaten up at a feast held soon after the main work is over. Now the Irrigation Department is taking greater interest in the maintenance of these water channels.

The difference between flood level and low water level of hill streams is considerable. The water supply should not deteriorate during the summer months. This invariably means that a channel in the earlier course must be taken below the flood level. But during rains this portion is often damaged and sometimes entirely destroyed. Annual repairs are a necessary feature and they entail much

labour and expense. In addition to the streams, numerous springs are utilized for irrigation. Some of them supply adequate quantities of water all the year round and are very easily harnessed. Only the water does not carry the fertile silt. The terraces for irrigation are made as level as writing tables. They are parcelled out into numerous fields shaped like irregular trays (Fig 41). Each field is surrounded by small earthen dykes or 'birs' half a foot or so in height. They help contain water within the field. The watering of each field is effected by kicking aside a sod of earth from the 'bir'. When the crop is about to ripen or watering is no longer required the water of 'Kuhl' is diverted-off into the stream.

There are about a thousand Kuhls in the entire area. Maximum number of Kuhls is in Palampur Tehsil it alone having nearly 450. The following are the major Kuhls in Kangra Proper¹

Palampur Tehsil

	Name of Kuhl	Head of Kuhl	Approximate Area Under Irrigation	Approximate Length of Kuhl
1	Kuhl Kirpal Chand	Neugal Khad	6,600 acres	8 miles
2	" Dewan Chand	do	5,000 "	6 "
3	" Fateh Chand	do	3,000 "	6 "
4	" Ram	do	2,000 "	3 "
5	" Pathnubal	do	2,150 "	6 "
6	" Du	do	1,500 "	3 "
7	" Awa	Awa	4,050 "	8 "
8	" Bannu	Bannu	1,100 "	4 "
9	" Maul	Maul	750 "	4 "

Kangra Tahsil

	Name of Kuhl	Head of Kuhl	Approximate Area Under Irrigation	Approximate Length of Kuhl
1	Kuhl Kharuhal	Banoi	150 acres	2 miles
2	" Committee	Gaj	5 500 "	6 "
3	" Gaj	Gaj	3,500 "	5 "
4	" Baj	Gaj	1,100 "	5 "
5	" Chambi	Chambi	2,100 "	4 "
6	" Pakki Dandi	Khoh	1,100 "	6 "
7	" Jhuku	Khoh	800 "	2 "
8	" Harnal	Baner	400 "	4 "
9	" Chari	Chari Nala	2 300 "	8 "

Nearly 415 Kuhls, including the above, earlier developed and designed by a princess supply water throughout the year in Kangra of the Guler family¹ and Palampur tahsils Gaj irrigation was

Dehra Tahsil

	Name of Kuhl	Head of Kuhl	Approximate Area Under Irrigation	Approximate Length of Kuhl
1	Kuhl Ruhai	Gajkhad	4 000 acres	9 miles

Aurpur Tahsil

1	Kuhl Shah Nahar	Beas	100 acres	2 miles
2	" Dehr	Dehr	500 "	4 "
3	" Chakki	Chakki	1 000 "	8 "
4	" Bohal	Bohal	200 "	2 "

Hamirpur Tahsil :

There are no perennial kuhls Inundation kuhls take water from Sukkar, Man and Kunah Khada

Kulu :

Irrigated land is known as 'ropa' The best irrigated land is found on the alluvial

terraces of Beas In inner Saraj ropa' lies in patches on the banks of Sainj and Tirthan Mandi District

Though country is hilly and large tracts defy cultivation yet every stream however small, is made to contribute to irrigation It is not uncommon to see a succession of

50 to 60 fields one above the other on the hillside testifying to infinite patience and capacity for labour on the part of the people (Fig 35) Jogindernagar is most favourably situated for irrigation. The Balh area extending from Mandi to Sundernagar could be provided irrigation by electric pump irrigation from the 'Nallahs'. So far Mandi administration has not been able to make use of more than 30% of electricity at its disposal.

Bhattiya :

It is the most irrigated and agriculturally the most productive of all the tahsils of Chamba. The perennial streams from Dhauladhar range provide copious supplies of water for irrigation.

Under the existing system of irrigation no water rates are charged. There have been proposals to take over the supervision of the 'Kuhls' by the Irrigation Department but the cultivators object to it. They fear that it may be a guise for levying tax on irrigation water. The condition of cultivators called zamindars (not to be confused with the zamindars or landlords of the Indo Gangetic Plains), is too poor. If the Government undertakes all expense on maintenance, repair and construction of new 'Kuhls', then some nominal water rate may be levied. Government incurred an expenditure of Rs 85,894/ during 1949-50, Rs 72,500/ during 1950-51 and Rs 1,91,500/ during 1951-52 in district Kangra alone for repair of 'Kuhls'. The Suklia Har Kuhl a construction near Mangwal was undertaken at a cost

of Rs 3,92,000/- and will irrigate 2,500 acres and yield 25,000 maunds of additional produce¹.

The construction of Sudhartahar distributary taking off from Delita Khad in Nurpur is estimated to cost Rs 11,57 lakhs. It will irrigate 7,500 acres². The water will have to be tapped 9 miles upstream and therefore its construction had remained outside the scope of the cultivators. Irrigation can be improved in Nadaun if a Kuhl head is made 6-7 mks upstream. In Kulu the terrain is very difficult and improvement and development of Kuhls means that irrigation cost per acre will be very high. Since electric supply is easily available from the Mandi Hydro electric Project at Jogindernagar, irrigation by lift with the help of electric pumps could irrigate some Barau tracts and relieve the miseries of crop failures to the poor farmers. The Kuhl heads are constantly washed away or filled with silt and cost of annual repairs is sometimes beyond the means of the villagers. Government must assist in such repairs.

Well and Spring Irrigation

Land irrigated by wells does not exceed 150 acres. Most of it is in Nurpur around Andaura and a little around Jaisinghpur in Palampur. Another class of irrigated land is 'Nad'. This is inundated land owing to the water percolating through it and generally grows only a rice crop.

The province of Punjab after partition has received a much smaller share of irrigated land (20% of the undivided Punjab) but 47% of the population and only 34% of the

¹ Courtesy I B Kangra Sub-division Kangra. Date 1 25-3-53

² Minor Irrigation Schemes. The Statesman, New Delhi July 4 1953

area¹ It is therefore desirable that irrigation facilities must be increased where such facilities could be developed From the snowclad and forest covered mountains descend a thousand and one streams in the Himalayan Beas Basin and with government assistance and local cooperation irrigated area here could be increased by at least 50% In Kangra and Kulu alone 2.18 lakh acres could be brought under irrigation if the entire number of Kulis surveyed could be put on a working basis² Up to 1956 beginning from 1950 the Government has incurred an expenditure of 15.97 lakhs of rupees in repair and improvement of Kulis Such expenditure is sure to lead to larger irrigation and better harvests The available area is thickly populated and deficient in food production The maintenance and development of irrigation facilities is therefore necessary, because on them depends the greater productivity of agriculture and the prosperity of the hill people

C MAJOR CROPS

Almost all the crops of the plains are grown but due to limitations of agricultural land and climate their cultivation is not as extensive However it can be said that the hill cultivator is able to win bread for his sustenance from the not so fertile soil even if it is poor maize or millet bread or just rice Hill agriculture is not so much commercial It is more or less sustenance agriculture Kangra valley is par excellence the producer

of cereals and other agricultural commodities It may be rightly called the 'Granary of the Himalayan Beas Basin' Reference to plentiful agricultural produce is made in a saying current in the hills 'Khane Ko Kangra'—plentiful and good eating is in Kangra

Food grains are outstandingly important Out of 976,136 acres sown annually during both Kharif and Rabi, food grains occupied 844,379 acres or 86.5% in 1951³ (Fig. 43) Pulses come next occupying 65,884 acres or 6.7% Oilseeds occupy 37,577 or 3.8% Only about 3% of the area is devoted to other miscellaneous crops drugs and narcotics spices sugar cane fibres, fruits and vegetables and fodder Thus cereals pulses and oilseeds make up the main agricultural produce covering over 97 per cent of the annual sown areas They meet essential requirements of carbohydrates, proteins and fats of the peasant's diet

There are two main harvests—Kharif and 'Rabi' or autumn and spring crops

Kharif Crops

Cereals

Cereals occupy 443,159 acres or 83% of net sown area during Kharif (Fig. 43)

Maize

Maize or chhalli though of less commercial value than rice is of much greater local importance OF the total acreage under cereals (443,159) during Kharif maize occupies 233,743 acres or more than 50% of the

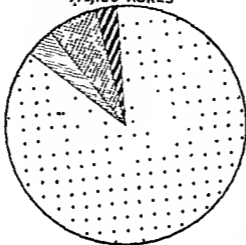
¹ The First Five Year Plan, Government of Punjab 1953 p. 2

² *Id.* p. 31

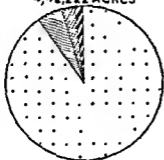
³ Wide data of it is not from Ferrous Record Office District Kangra (Dharmasala) District Mandi (Mandi) and Bhathiyat

CROP DISTRIBUTION

ANNUAL
976,136 ACRES



RABI
4,42,222 ACRES



KHARIF
533,914 ACRES

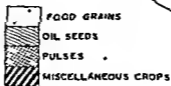
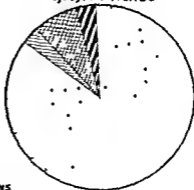


Fig 43

area under cereals. It seems to grow everywhere in the hills. Growing from 1,000 ft to 7,000 ft it is the favourite crop of the people and for six months of the year forms a staple article of food in most tracts. It is considered an excellent food and its merits have passed into a proverb: *Kukri Syran Pathu Pucchyan*¹. Although second in importance to rice in the valleys there is always a small plot of maize adjoining the cottages of the peasantry for their own use while rice is sold to the wealthier classes. For the uplands maize is an admirably suited crop. It is very hardy, its requirement of rain is small and it matures rapidly. In sixty days from the day of sowing the cobs are fit to eat. But it will not keep as weevils prefer it to any other grain and it is a common saying that the life of maize is only a year long.

Maize is sown at the end of June and collected about the end of September or beginning of October before the cobs are quite ripe to guard against damage by wild animals. The land is first manured then ploughed and finally sown. When the young shoots appear above the ground the first weeding is done. When the crop grows high it requires hoeing or loosening of soil. If the crop is thick the plants are thinned out. This is called *Gudni*. The crop requires constant watching at night especially if near or in a forest. Fires are lit to scare away the wild animals and the guards look out from raised pedestals or *Machans*. The produce is generally excellent but it is much sought after by bears, pigs,

jackals, monkeys and birds and hence the practice of gathering cobs before they are ripe.

Thus labour involved in the production of maize is considerable. After the maize crop has been cut the cobs are separated from the stalks and spread out on the flat roofs, verandahs and courtyards. The bright orange hue of the corncobs is a striking feature of the autumnal landscape. After the grain is ripe and dry it is separated from the cobs and stored.

Area under maize varies greatly in different Tahsils (Fig 44) as is evident from the following table.

TABLE
Acreage under Maize (1931)

S No	Tahsil	Acreage under maize	Area irrigated
1	Kangra	16,199	3,609
2	Palampur	20,463	4,046
3	Nurpur	21,730	163
4	Hamirpur	6,061	229
5	Dehra	39,053	180
6	Kulu	19,201	1
-	Mandi	15,740	1,006
8	Jogindernagar	8,600	900
9	Chachnot	9,404	89
10	Sarkashat	12,497	0
11	Bhattiarat	13,670	686
	Total	238,443	11,039

The crop is generally unirrigated and assumes great importance in Barani tracts. It may be noted that maize is grown in all the tahsils but it is the leading cereal crop in Nurpur, Hamirpur, Dehra, Kulu, Bhattiarat, Mandi and Chachnot. Only in Kangra

¹ Proverb means—With maize to feed him, the hillman is strong with a Bathu to lead him, he will never be wrong.

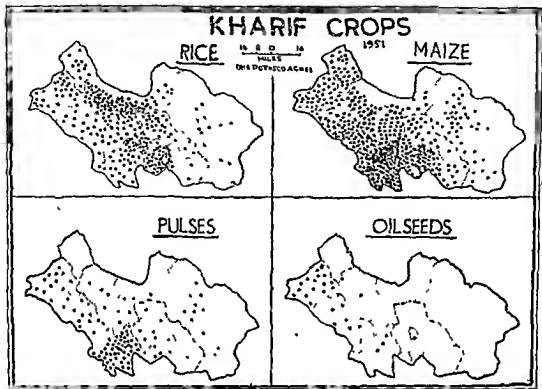


Fig 41

Palampur, Jogindernagar and Sarkaghat, it yields first place to rice. Thus the importance of maize as a cereal is great and crop failure in this would result in famine in the hills. In Kulu and Sarkaghat, the entire crop is unirrigated while in Nurpur, Dehra Hamirpur, Chachnot, Jogindernagar and Bhattiyat irrigation is almost negligible. Only in Kangra, Palampur and Mandi is irrigated acreage considerable though by no means large. In order of acreage under maize the tahsils are—Hamirpur, Dehra Nurpur, Palampur, Kulu, Kangra, Mandi, Bhattiyat, Sarkaghat, Chachnot and Jogindernagar.

Rice :

It constitutes about 40% of area sown under cereals during Kharif. Unlike maize it is mostly an irrigated crop and out of 166,727 acres under rice (Fig 44) nearly 59% are irrigated.

Rice is the staple product of the Kangra valley (Fig 45). With abundance of water is combined, fairly high temperatures during summer. Soil is quite favourable to its growth. Rice is also grown in the irrigated puits of Dehra and Nurpur where the produce though inferior to that of Kangra is still of a good quality. Coarser varieties of rice are

grown without irrigation in the higher parts of the Beas Basin. Nearly sixty varieties of rice are known in the area. The best and most esteemed kinds are Basmati, Begami, Jhinwa Nakanda, Kamadh, Ramjani and Pangari. In Mandi and Kulu other kinds of first quality are Pardesi, Totaram Saha, Sukhdas, Jhawan Dhamkar and Ruhau. Second quality consists of Jandkala Munji, Sali, Munjhara, Matali, Mahuri, Ujla, Jatu, Nikundi, Gyali and Gyasu. Those of the third quality are Sattu, Bura and Kateri. Of coarser kinds grown in Kangra valley the best known are Kathiri and Kolhena and the inferior kinds grown on unirrigated lands are Rora, Kaluna and Dabka.



Fig 45 Rice Cultivation in Kangra Valley

On irrigated land, rice is not sown till the beginning of June. In 'Barani' tracts it is sown in April or May, and the later the sowing the less chance the crop has of reaching maturity. The harvesting is done in the month of October.

There are three methods of cultivation of rice. The simplest is called 'Batar'. In this the seed is sown broadcast in its natural state. On unirrigated lands this method is universal.

The second method is called 'Mach', 'Lunga' or 'Chhap'. The seed is steeped in water and forced to germinate and then thrown on the soil, previously flooded to receive it. This method is prevalent where water is abundant.

The third method is 'Ur' or 'Rohn'. Rice is first planted in nurseries. When about a month old, it is transplanted in the well flooded fields by hand. This involves much labour. But the yield is always greater than under other methods. Farmyard manure is applied; the nursery, in particular, is heavily manured. Each proprietor has his appointed day or days for receiving water for rice planting and when the field is flooded, he takes the help of village people for transplantation. The people who assist are fed by the farmer. Men rake and churn up the soil and repair the levees or field ridges and the women transplant rice. Women sing songs and occasionally amuse themselves by throwing mud on the passers-by. Thus with mutual help and some amusement this laborious task is accomplished. The field is watered for a month after planting and is then weeded and watered again. Another watering is necessary when the ears form and another one when the grain sets. The growth of weeds in the rice fields, is very rapid and to get rid of them the crop, weeds and all, is in July deliberately ploughed up. This operation appears to destroy the whole crop but the weeds are effectually extirpated while rice springs up again more luxuriantly than ever. This practice is called 'Hoda'. Harvest time is in October when the grain is cut and allowed to lie in the fields to dry for

a few days, it is later stocked at the threshing floor until the 'Rabi' ploughings and sowings are over. It is threshed in November or early December. The grain is separated from the husk by a hand pestle and mortar, women being mostly employed in this work. 'Dhankutis' or rice husking mills worked by water power are also operated at a few places. Of late, a few electric rice-husking mills have been put up in some towns. Cultivation of rice draws much energy from soil, which need be replenished by manures.

Rice has a very extensive range. It grows at places as high as 7 000 ft above sea level. Area under rice varies in different tahsils (Fig 44).

TABLE
Showing Acreage Under Rice (1951)

S No	Tahsil	Acreage Under Rice	Acreage of Irrigated Rice
1	Kangra	30 538	28 526
2	Palampur	31 610	27,113
3	Nurpur	12 783	6 732
4	Hamirpur	17 055	3 218
5	Dehra	10 979	6,730
6	Kulu	6 174	1 721
7	Mandi Sadar	11,231	1 173
8	Jogindernagar	14 389	8 387
9	Chachiot	7 484	1 378
10	Sarkaghat	16,181	6 855
11	Bhattyat	6 000	5 700

Himalayan Beas

Basin 166 727 99 536

Kangra, Palampur, Jogindernagar and Sarkaghat have large areas under irrigated rice. In the first three tahsils most of the crop is irrigated and in Sarkaghat nearly 2/3th is irrigated. In the rest, it is mostly unirrigated rice. Rice is thus associated

with the well watered tracts and better off classes while maize is associated with 'Barani' tracts and poorer people. Rice eating people of the valleys look upon those of 'Barani' tracts as 'eaters of coarse grains' in much the same way as the French look upon the Germans as 'eaters of black bread' and the parallel is perfect because like the French the people of valley areas are less tough and hardy than the people of 'Barani' tracts who like the Germans are more virile and martial.

The cultivation of rice is an agricultural practice leading to the development of its own type of culture. Low food value of mill husked rice, malaria and intense effort required for rice cultivation, all put a high premium on human energy and the population is in general weak and debilitated. Land escape of paddy area is also strikingly individual. In the words of Spate, it consists of myriads of tiny mud walled fields through which the young paddy shows like thin flames of a most wonderful glowing emerald.¹

Other Cereals

Other cereals cover less than 1/10th of rice acreage. In all they occupy 37 689 acres. The rice with maize in Kulu and occupy small areas in Mandi district. In Kangra and Bhattyat their cultivation is negligible. The cereals include Koda (Fusine corocana), Bharsa (Eragrostis amargatum), Kangra (Pennisetum italicum), Chini (Panicum maharajm), Sarira (Amaranthus anardana) and Buckwheat or Kathu (Eragrostis esculentum).

Oilseeds .

Oilseeds occupy 12,839 acres (Fig 44) It is mostly 'Til' (*Sesamum orientale*) and is grown unirrigated in Kangra Proper

Pulses .

Of the autumn pulses (Fig 44) 'Mah' (*Phaseolus radiatus*) is most esteemed as it resists the attack of insects. In Kangra it is usually grown along the rice field ridges 'Kulth' (*Dolichos uniflorus*) and 'Rong' (*Dolichos sinensis*) are cultivated on high lying poor soils. 'Mah' and maize are commonly grown together in 'Baram' tracts and make good combination of maize bread and Mah pulse, so well known in Nurpur, Dehra and Hamirpur

Sugarcane :

Acreage under sugarcane is only 3 219 Nearly half of it is irrigated. It is cultivated in Kangra, Palampur, Nurpur, Dehra and Manli. Elsewhere its cultivation is negligible

TABLE
Showing Acreage Under Sugarcane

No	Tahsil	Acreage under Sugarcane	Irrigated
1	Kangra	476	410
2	Palampur	259	132
3	Nurpur	1 055	261
4	Hamirpur	71	32
5	Dehra	934	421
6	Kulu	59	3
7	Mandi Sadar	395	19
8	Jogindernagar		
9	Chachhot		
10	Sarkaghat		
11	Bhattiyat		
Himalayan Bear Basin		3 219	1 308

There are several varieties. The best known are 'Chaun', 'Aikar', 'Kandiari' and 'Pona'. Cane is less thick and luxuriant than in the plains but is quite as sweet. The juice is extracted by 'Belna' or wooden press worked by bullocks. Iron Press is now increasingly used.

Fibres .

Cotton is grown in Kangra, Palampur, Nurpur, Hamirpur and Dehra. Total acreage is 2,834 and is practically unirrigated. It is sown in April and ripens about November. The output is too small, and large quantities of cotton are imported from outside.

Other fibres include hemp or 'San' and 'San Kokra' (*Crotalaria juncea* and *Hibiscus cinnabina*). They are generally used for cordage.

Spices and Condiments

Tumeric and ginger are also grown. Tumeric is planted in May and is ready in November. Tubers are taken out and dried in the sun. It is considered quite a paying crop as it occupies the soil only for 6 months. Hamirpur, Dehra and Nurpur grow most of the tumeric and supply to the rest of the area. Ginger is cultivated as a garden crop all over the area but mostly in Siba and Chanaur in Dehra. Coriander, anise, capsicum, mint, fennel, fenugreek etc. are grown in small quantities as condiments.

Tea

Tea occupies 9 931 acres in Kangra, Palampur and Jogindernagar. Its cultivation and industry has been dealt with separately.

Potatoes and other Vegetables :

Among vegetables potatoes occupy a special place. Their cultivation has prospered in the higher hills and has assumed commercial importance. Total acreage under potatoes is 1,131. Potatoes hold a place among the staples of the hills. In the beginning two varieties were grown—one small and yellowish and the other large and whitish, locally known as 'Desi' and 'Angrezi' respectively. The 'Desi' type is sown in spring and grows till December but the other type is ready in 3-4 months time. Potato cultivation is very profitable. If the prices are good, handsome profit is netted. Wheat cultivation is not so paying. In the higher hills potatoes are sown in March and harvested in September, but in the lower hills and valleys they are sown in December, January and February and harvested in May and June. Potato uprooting aerifies soil and extra manure used is left for the next crop. 'Potato' seed, before sowing, must have two months storage period otherwise it does not germinate. In the higher hills potatoes can be stored throughout the year. Cultivation of potatoes is therefore very popular. Moreover hill potatoes are ready before the harvest of the plains, and fetch good prices. The potato seed produced here is virus free and has great demand in several parts of India. Potato cultivation has spread on the slopes of Dhauladhar range and outer hills. Heavy manuring is needed and potatoes particularly do well in places where the flocks are penned. The introduction of potato cultivation has in fact greatly increased the value of all

culturable land above 5,000 ft elevation¹. The fields around the Gaddi peasant's homestead which formerly produced at best only maize, wheat or barley now yield a very lucrative harvest of potatoes. The Gaddis express this by saying that 'the potato has become our sugar cane'. Potato is also more and more appreciated as an article of food. A large part of the crop is exported to the plains. Better storage facilities should be made available for storing them. 'Kharif' crop is mostly unirrigated but 'Rabi' crop is nearly 50% irrigated.

TABLE
Showing acreage² under Potatoes (1951-52)

S No	Tahsil	Acreage under Kharif	Acreage during Rabi
1	Kangra	150	102
2	Palampur	612	105
3	Nurpur		28
4	Hamirpur	9	32
5	Dehra		173
6	Kulu	1,505	34
7	Mandi Sadar	83	31
8	Jogindernagar	768	6
9	Chachhot	464	1
10	Sarkaghat		
11	Bhattiyat		
Himalayan Bas Basin		3,641	493

Very little area is devoted to fodder crops. In some tahsils the practice of growing fodder is unknown. Thus the total acreage under fodder during Kharif in 1951 was only 516 and during Rabi only 293 acres.

¹ Ivali J. B. Revised Settlement Report of Kangra, 1971, p. 58.

² The acreage under potatoes is not fully accounted because it is cultivated in a variety of places on the hills and is sown in small plots around the houses.

of the rains. Mostly from the beginning of April till the end of May, there is a succession of harvests.

Acreage under wheat varies in different tahsils (Fig. 46) according to soils and climate.

TABLE

Showing Acreage under Wheat (1951-52)

S No	Tahsil	Acreage under Wheat	Irrigated Area
1	Kangra	34,123	21,401
2	Palampur	39,187	18,769
3	Nurpur	39,166	3,656
4	Hamirpur	53,234	2,699
5	Dehra	46,743	2,538
6	Kulu	21,121	849
7	Mandi Sadar	23,964	3,825
8	Jogindernagar	19,129	6,310
9	Chachot	11,495	773
10	Sarkaghat	25,833	6,596
11	Bhattiyat	14,800	5,149
Himalayan Beas Basin		327,795	72,625

Local varieties of wheat give lower yields. Wheat C591 and C250 are very much liked by the farmers as they yield 3-4 maunds more per acre¹. Pusa 805 does best on high altitudes². Local varieties should therefore be given up and new varieties adopted as far as possible³. Farmers prefer beardless type of wheat as it is quick maturing and can be harvested earlier than the bearded type. Thus, fair time is available for the fields to be prepared for the 'Kharif' crops. Depart-

ment of Agriculture advises the use of C253 variety as it is early ripening, has strong stem and the crop does not fall. It also gives a higher yield and the grain is better⁴.

The wheat production is not enough to meet the requirements of the population and large quantities are imported from outside.

Barley.

Barley occupies about 9.5% or 39,193 acres of the area under 'Rabi' cereals. It is grown in all the tahsils (Fig. 46). Wheat and barley are frequently sown together and these mixed crops, including wheat and gram are locally known as 'Barera'. Thus, production of barley is greater than its pure cultivation indicates. The 'Barera' is reserved for local consumption and the unmixed grain is sold.

TABLE

Showing Acreage under Barley (1951-52)

S No	Tahsil	Acreage
1	Kangra	3,601
2	Palampur	3,060
3	Nurpur	3,668
4	Hamirpur	596
5	Dehra	2,704
6	Kulu	11,649
7	Mandi Sadar	1,484
8	Jogindernagar	2,146
9	Chachot	8,429
10	Sarkaghat	556
11	Bhattiyat	300
Himalayan Beas Basin		38,193

1 Vide Annual Report of Deptt. of Agriculture, Mandi District 1952-53.

2 Vide Annual Report of Deptt. of Agriculture, Kangra District, Dharmasala 1949-50.

3 Saini (Gurucharan Singh) New Wheat Seeds from Kangra Hills. Indian Farming 1959 No. 4, 78.

4 S. K. S. M. A New Variety of Seed for Cultivation in Kangra Valley. East Punjab Farmer Vol. 2 No. 1, July 19 1949 (in Hindi).

It will be seen that nearly 1/3 of all the barley is cultivated in Kulu. In certain tracts especially in Inner Saraj the higher elevations do not permit wheat to ripen in time to be followed by a 'Kharif' crop and barley not only does well in cool climate but is also quick maturing and hence is the favourite crop there.

'Barera' or 'Berrar' occupies nearly 8.8% of the area under cereals during 'Rabi'. It is mostly mixed wheat and gram and is largely popular in the drier tracts of Nurpur, Hamirpur and Dehra.

Minor Spring Crops :

Of minor spring crops, the important ones include pulses (Fig 46), oilseeds including flax (Fig 46), tobacco and safflower. Gram is largely grown in Hamirpur, Dehra and Sarkaghat and to a small extent in Kangra, Palampur and Mandi. Its place is taken by lentils, field peas and beans. There is a belief in the hills that a gram field attracts lightning, it appears that the plants wither. Gram is often sown with wheat or barley but the produce is easily separable. The ears of wheat overtop gram but wheat cannot

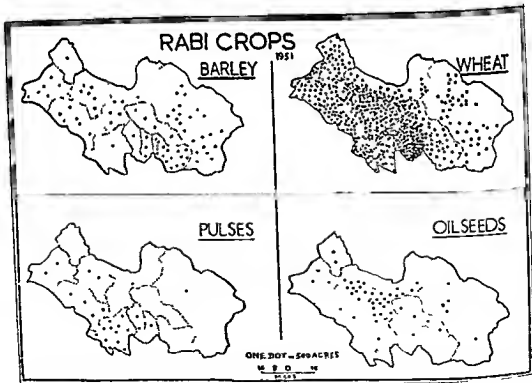


Fig 46

be separated from barley Peas and gram are plucked and winnowed together and sorted on a scooping tray The round peas roll to one side and the angular gram remains on the other Sirson' (rapeseed) is grown universally Little care is bestowed on its cultivation, the seed being simply thrown between the stubble of newly cut rice The crop is generally poor but meets the local needs to a great extent Safflower is grown in the drier tracts It seems to thrive best on upland soil Hill tobacco is said to be wanting in flavour and pungency and those who can afford prefer to buy tobacco imported from the plains

Poppy cultivation was most paying Rabi crop in Kulu but its cultivation is now restricted

Both 'Kharif and Rabi harvests meet the local needs to a large extent The means of transport are not well developed and difficulty is felt in secured hill tracts both as regards disposal in case of excess and purchase in times of want¹

D PLANTATIONS AND ORCHARDS

Tea

Tea cultivation was introduced in the area in 1819 by Dr Jamson then Superintendent of Botanical Gardens North West Provinces² The experimental tea plants flourished beyond even Dr Jameson's anticipations This was ample proof of the very suitable climatic and soil conditions

found in certain parts of the Himalayan Beas Basin Tea does best in this area on the foothills and lower slopes of Dhauladhar range, between elevations of 3,000 ft and 6,500 ft But the zone of country within which tea can be profitably cultivated, is a narrow one At high altitude tea is better but extensive cultivation is not possible The annual requirement of rainfall for proper tea growth is high Conditions of suitable rainfall temperature soil and slope are found in certain parts of Kangra valley The area of tea growth is contiguous extending from Kangra and Palampur to Jogindernagar Most of the tea gardens are between 3,000 ft and 4,500 ft elevation Hot winds are unknown in Kangra valley and between the months of March and October, there is considerable moist heat accompanied by rainfall of 20" or more The snowy Dhauladhar range besides causing rainfall provides great facilities for irrigation during the dry period The land surface is gently sloping so that water does not stand at the roots of the plant (Fig 47) The soils are suitable The more important thing is manuring which increases the yields

Gradually, since 1849 tea cultivation spread in the area In 1852 a government plantation was started at Holta near Palampur The success of tea cultivation led to the rise in prices of land and much speculation had to be effected to purchase land for tea gardens In 1892 there were 9,537 acres under tea in Kangra Palampur

¹ This is aptly expressed in a Hill saying: Mala Ho n tan pana kuf in Nahut H la, tan pana kuibun If the harvest is plenty there is no one to buy If the harvest is scanty we must lie down and die

² Kangra District Gazetteer Vol VII A op cit p 109a

and Kulu, nearly 1/3 of the plantations were owned by European planters. European planters left altogether after the earthquake of 1905



Fig 47—Te Plantation, Palampur

The original variety of tea plants introduced was Chinese. They continue to thrive very well. The seed ripens in October and is plucked and sown in November and December in nursery beds and is ready for transplanting during the following rains. The young leaves are plucked by hand. The output of green tea is estimated at 2 000 000 lbs. Kangra valley produces nearly half the green tea manufactured in the whole of India. The cultivation of tea fluctuates with prices in the market. Due to less demand in recent years and competition of Japanese tea in even traditionally Kangra markets like Afghanistan the cultivation has shown signs of neglect.

TABLE

Area under Tea (1951)

S No	Tahsil	Area
1	Kangra	1 053
2	Palampur	7 831
3	Kulu	9
4	Jogimlarnagar	1 030
Total		9 931

Palampur is the leading tea cultivating area (Fig 48). The most important tea gardens like Bandla and Holta are situated there.

In 1939 the Punjab Agriculture Department started Experimental Tea Farm at Palampur. There are 12 acres of experimental tea beds. In the farm it was found that with proper care the yield of tea can be increased as was done on the farm¹.

Year	Yield
1947—48	4,587 lbs
1948—49	7,530 lbs

During a visit to Palampur in 1949 the author was very much impressed by the size and foliage of tea bushes at the Government Farm and those around in other gardens were not so good. As a result of discussion with the officer in-charge of the Government Tea Farm and other local growers the following factors having important bearing on tea crop came to light:

(a) There is no doubt that it is more economical to rejuvenate old and neglected bushes in place of planting new ones.

(b) With judicious pruning flat plucking surface should be maintained. Efforts should

¹ Annual Report of the Government Experimental Tea Farm, Palampur 1948-49

be made to induce lateral spreading of the tea bushes to increase plucking surface area. This will keep down the weeds also.

(c) Heavy manuring is very essential for the forming of fresh healthy shoots.

(d) Plucking should be done every three years instead of the present practice of doing it every year which is unnecessary and wasteful. This will reduce cost of production also. The most desirable plucking height has been found to be 18".

(e) Regular and systematic manuring of tea bushes is most essential. Nitrogenous manures like ammonium sulphate and farm yard manure are essential and most useful

and result in increased leaf production. They act quickly and are quite economical to use. A combination of 1 maund of ammonium sulphate and 6 to 8 maunds of well rotten farmyard manure is most economical to use. Phosphatic and potash manures have no response in increasing tea leaf production and are not of any use for the tea plant. However, green manuring with sun hemp is quite useful and has lasting effects resulting in the improvement of the texture of the soil as well.

(f) The Japanese system of growing tea in close hedges, facilitates pruning and plucking. This work is done with the help

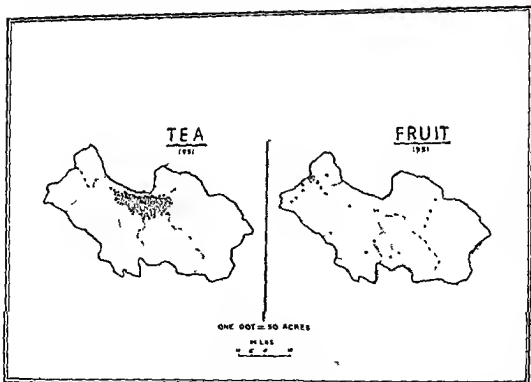


Fig 48

their own forest reserves, are better off with respect to timber, but large demand continues to be made on the government forests for oak for charcoal and fuel and Teak trees for making tea chests. Chul wood is also now used for making tea chests. Green tea is largely packed in bags. The opening of out agency at Palampur of Kangra Valley Railway is a great convenience to the planters.

The manufacture of black tea is interesting. The young tea leaves are plucked by hand and brought to the factories in baskets. They are spread on trays of bamboo and withered. Then they are 'rolled' in rolling machines propelled by steam and water power. Next process is that of 'fermentation' for about 5 or 6 hours and then again 'rolling'. They are dried in firing machines called 'siroccos', or over charcoal fires in grates. Manufacture is now complete and tea ready for shifting and 'packing'. The packed cases are carted to markets or godowns.

Manufacture of green tea is somewhat different. Leaves are scorched in heated pans and 'rolled off' by hand. Then they are cooked up in the same pans and artificially coloured with soap stone powder which is sprinkled over and rolled into the tea. Many people make only green tea whose manufacture is simpler and cheaper. The out turn of green tea is about 2,000,000 lbs. Many cultivators have their own tea gardens and do not employ extra labour—their gardens comprise of a few acres only. Large ones run to 300 acres.

Tea brokers purchase the produce of green tea at Palampur and export it to

Amritsar. The out turn per acre is 250 lbs for best gardens although the general average is much below this (155 lbs) per acre. Best plots however, produced as much as 700 lbs. The rise in tea production in other parts of India and Ceylon has reduced the margin in Kangra tea. Poorer lands no longer pay for cultivation.

There are about 40 tea gardens in the area. acreage varies from 10 acres in the case of small gardens and is as high as 2,000 acres or more in the case of some of the large gardens.

Out of 2,000,000 lbs of tea produced some 300,000 lbs are black tea and the remainder green. There are 15 tea factories out of which 11 are being run by electricity at Palampur. Palampur is the centre of tea industry. Production of black tea is now small. Green tea finds market in Kashmir & W F P (Punjab) Iran and Central Asian Republics. Recently the Kangra valley tea industry is facing a crisis as a result of competition from Japanese tea. In tea plantation and factories and in godowns at Amritsar large stocks of green tea have accumulated. Except for small quantities consumed locally, Afghanistan took the major part of produce of Kangra tea gardens. In return Afghanistan sold India dry fruit. It is now officially stated that there are no buyers for 80% of Kangra tea. Pakistan embargo on the passage of Indian tea through its territory has further added to the difficulties. Thus nearly 2,500 planters are faced with virtual collapse.² Punjab Government

1 Vide information as filed by Executive Engineer (Elect Branch) Kangra District Dharmsala: 4.12.53

2 Vide Report in Statesman New Delhi 21.1.57

can help out the tea industry by buying the accumulated stocks.¹ If necessary sales should be subsidized. Here also competition from outside is keen. Gardens have deteriorated. Shortage of manure and indifferent cultivation result in small yield per acre and the remedy applied is over plucking which is injurious to the plant though happily the tea plant is hardy. A circumstance that encourages this practice is on account of poor customers who are satisfied even with the coarsest leaf. Even prunings sell. Jhampu tea from prunings which could be purchased at one anna a pound used to fetch a profit of 4 to 5 annas from its sale in Peshawar. Labour costs have risen while tea prices have not gone up at the same rate. Local supply of labour has become uncertain and irregular. The fittest undertake cultivation of land while those unfit for work in the fields the refuse as it were of families seek employment in tea gardens. Some families belonging to the criminal tribes known as Bangalis have been settled as labourers.

One factor in favour of Kangra tea is that while 1 lb of China tea produces 5 gallons of flavour one lb of Kangra tea will produce nearly 7½ gallons of flavour. In spite of deterioration in quality less careful cultivation and manufacture scarcity of labour and higher wages the tea industry goes on though with ups and downs. To ensure comparative stability and freedom from fluctuating demand from external markets it is very essential to exploit and develop internal markets.

Horticulture :

The Himalayan Bear Basin has large areas available for the cultivation of fruit.² (Fig. 48) Some of the finest varieties of apples, peaches, cherries, persimmons and walnuts are grown there. The climate and soil of most parts of Kulu up to 7000 ft elevation are suitable for many kinds of temperate fruits (Fig. 49). Certain parts of Mandi District, Kangra and Palampur in the upper valley and the slopes of Dhauladhar are also fit for fruit growing or pomiculture (Pomum in Latin means fruit). In the warmer tracts several varieties of mangoes, bananas and other tropical fruit are grown. In Nurpur the production of oranges and other citrus fruits is important. Cultivation of Lichi and persimmon was introduced in Kangra valley only a few years ago but they have done surprising well and some people have taken to producing them now on commercial scale. The European varieties of fruits were



FIG. 49 Kulu Orchard

¹ The establishment of large tea factory for production of black tea was proposed but it requires Rs. 80 lakhs of rupees & 10,000 lbs. of tea leaf per month, which are not available at present.

² A detailed account was presented in a paper read before Geology & Geography Section of Indian Science Congress Roorkee 1961. Abstract Published in Proceedings Part III Abstracts P. 230.

introduced in about 1870 by Captain Lee at Bandrole and at Dobhi by Mr Theodore Kashmir fruit was first planted and then English varieties were grafted on them. Other orchards were started at Bajaura, Ratram, Dhungri, Baisan and Naggar. The area under fruit in different tahsils (Fig. 18) is as follows:

TABLE
Area under Fruit

S. No.	Tahsil	Acres
1	Kangra	60
2	Palampur	73
3	Nurpur	611
4	Hampurpur	29
5	Dhara	59
6	Kulu	336
7	Mandi Sadar	39
8	Joginernagar	—
9	Chachnot	—
10	Sarknaghat	—
11	Blattiyat	60
Himalayan Beas Basin		1,293

About 787 acres are irrigated. One of the limiting factors in fruit cultivation is the difficulty of marketing on account of absence of fair weather roads and other means of quick, cheap and regular transport.¹ For instance, it is said to cost about three times as much to transport apples from Kulu valley to Bombay as from Japan.² Great

damage is done to fruit crop by pests flying foxes and unseasonable weather.³ Heavy rains, strong winds and snow in April and May, play havoc with apple pear and cherry crop. In upper Kulu valley the damage to apple orchards on account of above factors was estimated in the summer of 1957 to be not less than 25%. The loss to pears and peaches was much heavier and was estimated to range from 50% to 70% of the entire crop. Further effect of bad weather was the disruption of communications. Unless they are restored soon the fruit growers cannot sell their produce to the market and whatever little of apples and pears is saved from weather may rot in godowns for lack of transport.⁴ The need for developing the cultivation of hill fruit is greater when large hill fruit tracts have gone over to Pakistan due to the Partition.⁵ In Mandi district of Himachal Pradesh, although large suitable areas exist for the cultivation of tropical and sub-tropical fruits, yet very little development has taken place.⁶ As Thapar⁷ says: "The average holding in the hill areas is small, being a little more than one acre. It is therefore not possible for the hill people to become self-sufficient in food grains in spite of their best efforts. It would be a better

1 The author heard the fruit growers grumbling about the transport difficulties during his tour of fruit growing tracts in Kangra, Mandi and Kulu during 1949 and 1950 and again in 1954. He himself saw large quantities of pears and apples lying about unspiced, obviously for want of transport and marketing facilities.

2 Hayes, W. B. *Improvement of Indian Horticulture*. Bombay 1945, p. 91.

3 The Lalson Wealth Institute of Biological Control opened a sub-station here. The sub-station will study methods of fighting agricultural & horticultural pests. There are only 12 such sub-stations in India (Statesman 7.6.57).

4 V. D. Report in "The Statesman", New Delhi, dated 27.5.57.

5 Bajaj, B. S. *Horticultural Research Station in Kulu and Its Role for Developing Hill Fruit Industries*. The Punjab Farmer, Vol. III, No. 1, January-March 1951, pp. 1-11.

6 Annual Report of Department of Agriculture, Mandi District, 1957-58.

7 Thapar, A. R. *Horticulture in the Hill Regions of Northern India*. Directorials of Extension, Ministry of Food & Agriculture, New Delhi, First Edition.

proposition for them to grow cash crops like fruits and from the income so obtained purchase their requirements of groins and other necessities of life. An illustration of this is provided by a scheduled caste family of Kotgrah in Himachal Pradesh. This family has a small holding of about a fifth of an acre with 20 apple trees bringing the family average annual income of Rs 800. Obviously there is an all round need for encouragement from the Government. There is also need for the development of nurseries or progeny gardens to serve as reliable source of saplings, budwood and graftwood. Some government nurseries have been started as at Jhamar in Mandi and at Kulu for the purpose of such supply and for research on hill fruit cultivation. The author learnt that their establishment was opposed by certain horticultural turists who held near monopoly of fruit industry and feared that the large scale distribution of fruit buds and saplings would adversely affect their monopoly. They argued that development in this direction has been done by them and that the government should concentrate on other fields. The Government was wiser and insisted on developing nurseries. These nurseries should prove in the course of time to be of considerable value to all fruit growers.

The cultivation of fruit may be divided into two broad types

(1) Tropical and Sub-Tropical Fruits

These can generally be grown up to 2,500 ft elevation. If the climate is not too cold and frosty they may be grown even up to 3,000 ft. Fruits include all citrus fruits in

cluding oranges and other fruits like bananas, guavas, mangoes, loquats etc. Pomegranate and Papaya also do well. Certain varieties of lime, grape fruit, lemon and 'Galgal' can be grown upto 4,000 ft also.

(2) Temperate Fruits

They can be grown from 2,500 ft to 8,000 ft elevation. The altitudinal range for the growth of various fruit is as under

(i) Straw berries, peaches, plums and apricots	2,500-5,000 ft
(ii) Pears	3,000-5,000 ft.
(iii) Persimmons	2,500-6,000 ft.
(iv) Quinces, apples and cherries	4,500-8,000 ft

Currants and almonds have also been grown in some areas but there is no commercial production as yet.

Kulu Fruit

Certain orchards in Kulu have wide reputation for the excellence of their fruit. Amongst the well known are the orchards at Manali at 6,400 ft elevation in the upper Beas valley. Captain Banon planted the fruit orchard known as 'Sunshine Orchard' in 1864. The English varieties seem to improve here in flavour, size and colour as compared with English fruits. Pears though not as prolific as apples do as well and improve in flavour. Local and English varieties of apricot grow well but monsoon rains wash out much of the flavour. The common hill plum or bukhara grows freely and is useful as stock for grafting plums which bear heavy crop. In fact they are too ready to kill themselves by overbearing except pomegranate which is a shy bearer. Cooking plums like Victoria, 'Yellow Maroon'

Bonum¹ improve so much in flavour and sweetness that they become suitable for desert. Wild cherry is indigenous to Kulu. It has no value except as stock for English cherries. Plums are ready in June. Oranges are very liable to damage from monsoons and varieties are needed which will ripen either before or after the rains. English figs also do well. English red and white currants are successful but local varieties are very sour. Strawberries grow luxuriantly but need heavy watering. Quinces (bilina) are indigenous to the valley. There are also wild varieties of almond, pistachio nut, pomegranate and olive, none of which have had yet the scientific treatment of good fruit. Spanish sweet chestnut bears copiously. Hazel nut grows wild at higher elevations. Walnut is of two varieties—hard and the other with a thin shell called Kaghaz. At the head of Beas valley in Manali, the climate is similar to that of North Devon but sunnier and more reliable. The result is that Devon can produce, year by year, apples and pears of higher average quality. For the production of apples and pears no other part of India compares with Kulu.² However it seems generally to be accepted that for successful growing of fruit in Kulu not only the grower be scientifically trained but he must have Kulu experience.²

Inter cropping can be practised in fruit orchards to raise income. The advantage is twofold—not only the land is thoroughly prepared but income can be had from the orchard even during its pre-bearing stage.

Various crops like maize, wheat, barley, pulses, chilies and vegetables can be grown. This aspect of orchard management is important but yet is not properly understood by the majority of the fruit growers. Compared with scientific methods of orcharding in other countries Kulu orchards are run on old-fashioned and simple—even haphazard lines. The ordinary orchard practices of manuring, spraying, pruning and occasional thinning are of course carried out, but not nearly to the same extent as are desirable. The use of artificial fertilizer is still very little.

There is a proposal to establish bud banks³ at horticultural stations for supply to fruit growers. It is also contemplated that virus free root stocks and scions will only be used for propagation.³ There is no doubt that wide scope exists for further development of horticulture in the Himalayan Beas Basin. This is not only quite profitable but tree agriculture appears to be a most suitable practice in this hilly and mountainous tract.

Fruit Industry and its Problems

The only important and well organized fruit industry in the Himalayan Beas Basin is that of Kulu Valley. Elsewhere the production of fruit is not so much for export but just for local use.

Kulu apples are known throughout India. The two words have become almost a stock phrase of door to door vendors of fruit. To most connoisseurs, Kulu is merely a name associated with the excellence of its apples.

¹ Bin in Major H. M., Smith's Orchards Leaflet.

² Punjab District Gazetteer V 1 XXXV Pt II op cit. p. 46.

³ Third Horticultural Research Work in Co-operation with India. June 1937. Vado Report in the Statesman New Delhi. Dated 29.6.37.

The high colour and quality of Kulu fruit may be attributed to favourable soil, proper rainfall, long winter period of dormancy and brilliant sunshine of spring and early summer. All these factors combine to create colour, abundant sucrose content and crisp flavour.

Pioneer of fruit industry was late Captain R. C. Lee of Bundrole Orchard who after retiring from the army travelled in the Himalayas and was struck by the similarity of climatic conditions between Kulu and those of his native Devon. He purchased land at Bundrole and started an orchard from plants obtained from his own native country. He was followed by Captain A. T. Banon who started an orchard at Manali. After considerable experience they selected for propagation only the most suitable varieties. Their final selections were amply justified. Some of their apples like Cox's orange, Newton and other Pippins and Marie Louise Seckle, and William pears continue to the present day and are still preferred by most buyers.

When various orchards commenced producing fruit and after local demands had been met, disposal of surplus fruit created a problem. At that time the nearest market was Simla, 140 miles afar. The only road was a bridle path across 10,000 ft. Jalore ridge and the Sutlej valley. Consignments of fruit were sent by mules and relays of coolies. Although fruit found ready market

in Simla, yet the transport charges left little margin of profit. Not satisfied with this, Captain Banon introduced sale by parcel post.¹ With the opening up of Larji gorge by a motor road and the construction of Kangra Valley Railway up to Jogindernagar, prospect of delivery to the market has vastly improved and has provided some stimulus to fruit industry. However rain and floods frequently cause havoc to the road transport. Sometimes bridges are damaged and sections of motor road swept away. Year after year, the through vehicular traffic is stopped at a time when it is essential for the export of fresh fruit. Unfortunately, the beginning of the export season of the main crop usually, somewhat coincides with the period of summer monsoon rainfall, with the result that due to the resulting difficulties of transport not half the crop is exported in some years.

Of the two hundred or more varieties of apples and pears, many have been eliminated and some new varieties have been introduced. The best commercial varieties now comprise some two dozen varieties of apples and half a dozen of pears. Here, in our country, much more than in the European countries, colour appears to be the main factor in appraising commercial worth. Irrespective of flavour, a bright red apple is more readily marketable than green, brown or yellow type. The larger orchards between them produce annually about 35,000 manunds of apples in an average good season. This estimated

¹ Postage rate then was only two annas per pound. This method was more successful and the fruit business thrived. In fact it was so successful that some of the tea gardens were growing fruit in preference to tea which was not so paying. The onus of transport fell on postal department. Palampur across the Bhabu pass was 90 miles away and relays of postal runners each carrying a kitta, for 6 miles, covered the distance in less than 24 hours. At the peak of fruit season, as many as 700 postal runners at each stage were employed. From Palampur to Pathankot the fruit parcels were carried in dak tongas.

total is considerably enhanced by the produce of numerous small orchards. Production of pears is about 12,000 maunds but the pear trees are so widely distributed in small numbers throughout the whole valley that it is difficult to make an accurate estimate. Under the best conditions of transport, pears and soft fruit do not travel particularly well, any excessive delay in delivery results in ruined fruit. Apples travel better. They have been received in excellent condition in so far way places as Bangalore, Ootacamund, Sylhet, Poona and Salem¹. But even apples cannot stand up to inordinate delays and rough handling of frequent transshipment. In the present circumstance, motor transport has not proved to be an unmixed blessing while the present rate of post parcel together with postal delays due to lack of through transport has considerably harmed the fruit trade. The more prominent orchardists of the valley are anxious to improve their orchards and productive methods but as they say: "What is the use of producing more under the present road and transport conditions? Moreover since the partition of country there is increased competition from Kashmir fruit which is now transported by the Pathankot Bijnagar road."

Until and unless there is great improvement in the present conditions of transport, and while fruit go to waste in such large quantities, it would pay to preserve them locally, despite the distance of Kulu from likely markets and additional expenses incurred by importing into the valley the

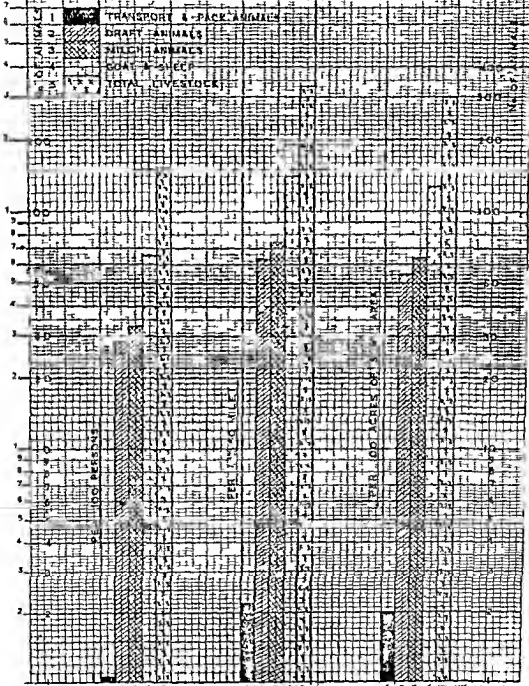
necessary machinery, cans and other equipment. It is indeed a sin to waste such valuable article of diet as the fruit, when there is an overall shortage of food in the country. Fresh fruit must be dispatched immediately on maturity but the preserved fruit can be transported at any favourable period of the year. The high cost of sugar, cans and freight, and the prejudice amongst people against canned foods, are factors impeding the development of canning industry. But as Kashalkar² says, "Increase in fruit and vegetable production without corresponding increase in the country's preservation capacity would only result in more food being wasted. Food preservation is the twin sister of food production." Preserved fruit can no longer be considered a luxury. It should form a necessary item of diet of people if nutritional standards have to be attained. At Manali jam and jelly factories have been started for utilizing perfectly good fruit which would otherwise be wasted. The difficulties of obtaining necessary equipment and import licences has considerably retarded anticipated progress.

To a limited extent apples and pears are conserved into dried fruit by peeling, coring and slicing and mainly sundrying. It is a tedious and laborious occupation dependent upon good weather and no large scale effort in this direction seems to have been made. Oil of apricot stone is extracted. Sun-dried seeds of pomegranate and walnut are also sold in markets outside Kulu.

¹ Vide Sunshine Orchards, Booklet issued by Sunshine Orchards, Manali.

² Kashalkar, N. Y., Personal Address—All India Fruit Preservers Association, Tenth Annual Conference, March, 1953. Vide report in The Statesman, New Delhi, 22.3.1953.

LIVESTOCK WEALTH



is no abundance of milk and milk products. The hill cow and buffalo are poor milkers. Moreover the number includes a fair percentage of dry and useless cattle which are also enumerated in the category of milch animals. The number of transport and pack animals is surprisingly as low as 1 per 100 persons and 2.2 per square mile. This is well below the requirements of a hilly and mountainous tract where other means of transport are not adequately developed. This means a premium on human transport while human energy should be available for more useful and remunerative tasks. The number of

sheep and goats is the largest amongst the various category of livestock. It stands at 141 sheep and goats per square mile of area which is a large number in view of the fact that their grazing has largely led to depletion of natural vegetation and consequent soil erosion over large areas. The rearing of poultry is yet insignificant, representing only 3.1 fowls per 100 persons.

Cattle .

There are 1,053,574 cattle in the Himalayan Beas Basin. Their number varies in different Tahsils (Fig. 51)

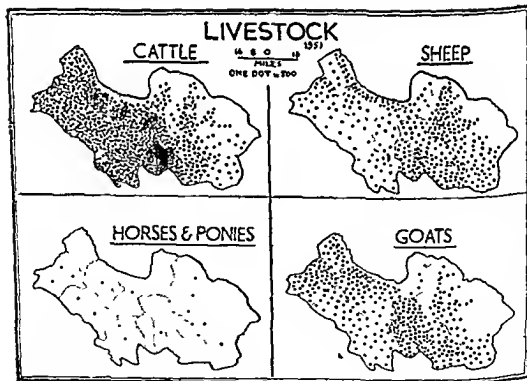


Fig. 51

TABLE
Showing number of Cattle (1957)¹

Tahsil	No of Cattle
Kangra	107 638
Palampur	119 230
Nurpur	102 706
Hanurpur	142 369
Dehra	131 104
Kulu	95 905
Mandi Sidar	86 451
Jogundernagar	79 311
Clachnot	61 633
Sarkaghat	46 786
Bhatiyat	51 794

It will be seen that the largest number of cattle is in Hanurpur Tahsil. The eastern hill areas have less cattle as they are too mountainous for them.

The Himalayan cattle are small and hardy. Small bullocks are necessary for ploughing minute and narrow fields. They are ready for training as plough bullocks when four years old and give about ten years of good service. In more level tracts around Kangra large bullocks are also employed. The hill cow gives very little milk because of its particular breed and poor nourishment. Generally she is small and undernourished looking like a wandering ghost of her natural self. Himalayan cattle are wretched milkers. The yield of milk per cow is $\frac{1}{2}$ seer to $2\frac{1}{2}$ seers per day. Many are just kept for manuring and breeding purposes. Imported cows do not give as much milk as they do in the plains. This is on account of the fact that neither they are a suitable breed for the hills nor they are properly fed. They deteriorate in the

hills. Suitable breeds for the hills have to be selected and bred. The housing of cattle is insanitary. They are kept either in the open or in ill ventilated rooms called Ghurals. The floors of these sheds are Kachha and roofs often leaky so that water and urine soak into them causing nauseating smell, moreover it is littered with dung and leaves thus the whole atmosphere is foul and full of flies. In some places the cattle are kept on the ground floor of the house. This is done to protect them from cold and the wild animals.

Cattle find grazing on edges of fields on hill sides common grazing grounds and in the stubble of the fields after the crops have been cut. Patrah or lopped leaves of beuhl mulberry oak and other broad leaved trees provide fodder. In winter and spring great scarcity of fodder is felt especially if the monsoons have been weak. Cultivated area is too small to allow room for fodder crops. The main problem of the livestock rearing is to secure enough supply of fodder for winter and summer months. During the latter half of rainy season men and women are busy preserving grass for fodder. Pastures near the homestead are carefully cut (Fig 38) and the grass is stored for winter. Inaccessible places like steep slopes are natural preserves for grass. Men and women are often seen cutting grass on such perpendicular precipices. Days during winter are short. There is heavy dew and frost. Cloudy weather continues sometimes for several days and bright sunshine is available only now and then. It is imperative there-

¹ Figures obtained from Livestock Census Records from District Record Office Pharsala, Mandi and Tahsil Record Office, Bhatiyat.

fore that hay should be made soon after Kharif harvests when the rains have ceased and enough sunshine is available for making hay. The mown grass is spread in courtyards and on rooftops and terraces to dry and the women and children turn and toss it at intervals so that all is properly dried and made into hay. In some areas hay is difficult to make owing to short ripening season and the monsoon rains. Hay, rice-straw (pral), wheat and barley straw and leaves are fed to cattle. Flocks of sheep and goats stand much better chance of surviving the lean days than cattle. They can eat leaves of bushes which appear in spring before young grass comes on, they climb to places where cattle cannot penetrate and due to practice of transhumance they go in large numbers to lower hills in cold weather. There are large number of casualties amongst cattle due to bad feeding during winter. Experiments on better fodder and mapping of location and resource conditions of natural pastures and common grazing grounds would assist in the solution of fodder problem. Provincial Fodder and Grazing Committee has also recommended ecological survey of grazing herbage and grasslands of Punjab but no progress has been made in this direction so far.¹

Buffaloes are kept by wealthy people for milk by cultivators for milk, ghee and manure and by Gujjars who combine pastoralism with agriculture. The 'Ban Gujjars' are nomads who move with the flock spending the summers on high ranges and the winters in woody parts of lower hills. The lower buffalo-

runs are called 'sowanais' or mhentaras. Main fodder consists of leaves and twigs. The grass in the upland pastures is very succulent and nourishing. Large number of muslim Gujjars left the country in 1917. Some cultivators have now taken to keeping of buffaloes for supply of milk to the small towns and urban centres. There are no dairy farms in the area and there is no scheme at present for their development.

Horses and Ponies

There are 12,485 horses and ponies in the area (Fig. 51). Their number is as follows—

TABLE
Horses and Ponies (1951)

Tahsil	No of Horses and Ponies
Hangra	1,233
Palampur	504
Nurpur	2,500
Hatarpur	666
Dekra	1,708
Kulu	4,547
Mandi Sadar	675
Jogindernagar	317
Chaelnot	69
Sarkaghat	110
Bhattiyat	106

There is no distinct hill breed of ponies in the area. They are imported from Yarkand, Zaskar, Lahul Spiti and Ladakh. Mules are imported from down country. The Sadartha breed in Nurpur was well known but with the coming of motor transport it has almost disappeared. Good riding ponies are hard to obtain although the area is well known for tourist traffic. This is due to lack of enterprise and organized breeding and the increasing facility of motor transport.

Sheep and Goats :

There are a very large number of sheep and goats in the area (Fig 51). There are 386,581 sheep and 408,823 goats in the area.

TABLE
Number of Sheep and Goats (1951)

Tahsil	Sheep	Goats
Kangra	30,931	46,935
Palampur	36,853	21,473
Nurpur	23,684	53,080
Hatnurpur	20,217	19,030
Dehra	9,039	29,465
Kulu	130,512	60,811
Mandi Sadar	27,480	27,168
Jogindernagar	26,750	42,502
Chachrot	41,213	45,113
Sarka,hat	18,781	30,742
Bhattiyat	16,121	21,175

Kulu has the largest number of sheep and goats. This is due to the plentiful pastures and grazing available in Kulu. Various cultivators keep a few heads of sheep and goats for wool, milk and manure. The only true shepherds are the Gaddis. Snow and frost in the higher ranges and heavy rain and heat below make rearing difficult and the only way is to change ground with the seasons.¹ The shepherds choose a cool and dry a climate as possible and also where they can find plenty of grazing for the flocks. Like the Swiss, and the Kirghiz² the Gaddis have also developed certain characteristic methods of livestock rearing. Transhumance or seasonal migration is one of the widely practised methods. Difficulty of feeding in winter and the cold causes flocks to be driven down to low hill pastures and valleys. Tirth or grazing fees are charged from Gaddis. Here

each sheep run is collectively called 'Dhar' just as it would be called an 'alp' in Switzerland.

The indigenous sheep are smaller than those of Europe, Australia or even the pack sheep (huang) of Tibet. Owing to constant shifting of flocks to distant places and at all levels from 2,000 ft to 15,000 ft elevation, the mutton is of poor quality. Wool is short stapled due to frequent shearing to avoid sticking of thorns etc. The quality of wool is also rough. Goat is the 'poor man's cow', and is kept for milk and meat. The rough hair are used for making ropes and rugs. Mention must also be made of Gaddi dog which is singularly handsome, large, strong and with beautiful glossy black coat of hair. It is a constant companion of the flocks.

Flocks of sheep and goats (Fig 52), however form a most important factor in the domestic and general economy of large sections of people.



Fig 52 Goat and Sheep Rearing

1 For a detailed account and maps see Gaddis of Dhauladhar—A Study in Pastoral Society Chapter XII B
2 Huntington, E. and Shaw F. B. Principles of Human Geography New York 1953 p 19

Poultry

Poultry is not kept owing to caste prejudices. It is only maintained by Moham medans and low caste farmers. Lately, some people have taken to keeping it in urban areas. The Agriculture Department maintains poultry farms in which good breeds of fowls like the Leghorns, Red Rhode Island etc are kept. Eggs are sold to public on nominal charges. The consumption of eggs has gradually increased and the cultivators could profit by keeping good poultry. This would also help to improve their diet. During the Second Five Year Plan it is proposed to set up farms for acclimatizing exotic breeds and for upgrading the indigenous stock¹. There is considerable room for development of poultry as a subsidiary industry provided imported stocks are available and elementary guidance in poultry keeping is provided.

Diseases of Livestock

Diseases take heavy toll of livestock. Rinderpest occurs now and then but is considerably checked by inoculation. The following are the common diseases amongst hill cattle and other livestock.

- (i) Rinderpest—It often takes epidemic form.
- (ii) Foot and mouth diseases—Locally called 'Lalu', 'Khareru' or 'Kharog marog'.
- (iii) Haemorrhagic Septicaemia—Locally known as 'Ghatu' or 'Ghotu'.
- (iv) Black quarter—Locally called 'Gali'.
- (v) Sheep pox—Locally called 'Taniah'.

- (vi) Lung disease—Locally called 'photka'.
- (vii) Mange—Locally called 'cherrar' or 'charter'.

Excessive consumption of 'niru' grass on first arrival at high pastures causes 'Tympantus' and large deaths take place among sheep and goat. In addition to the above there are large casualties due to slips over steep and rough terrain and attacks of wild animals. Dry pine needles make slopes very slippery.

Up to 1910 there were no arrangements practically for the treatment of animal diseases and the annual expenditure on veterinary work in Kangra District amounted to the meagre sum of Rs 2 500 only². Now small veterinary hospitals are being maintained in all Tahsil headquarters and the district headquarters at Dharamsala and Mandi.

Livestock Breeding

There are only 539 breeding bulls in the area. This number is very inadequate. Montgomery and Harianna bulls are kept at selected centres for breeding purposes. A good bull is half the breed and it is important that greater number of good bulls should be kept. It is often not realized that hill cows are too small for mating with down country bulls. Moreover it is not popular owing to the idea amongst some people that cross breeding will produce bullocks without humps and therefore useless for ploughing. However increase in the number of bulls means that the importance of good breed is

¹ Second Five Year Plan, op. cit. p. 269

² Kangra District Gazetteer Vol. VII A p. 279

is being appreciated by the agriculturists. The best hope for improving hill breed and maintaining it seems to lie in selection from local bulls and vigorous castration of the unfit¹. Much hope lies in the method of breeding by 'artificial insemination', which is being presently introduced. Sindhi bull is considered the most suitable for breeding purposes in the hills². There are no sheep farms in the area. Attempts to introduce merino breeding were not successful. Steps are being taken to start sheep breeding farms to supply rams and to improve quantity and quality of wool³. Now and then prizes are awarded to owners of best cattle to encourage them.

Much research is necessary with regard to problems of breeding, feeding and control of diseases and the proposal to start during the Second Five Year Plan, a Regional Research Institute for the Himalayan animal husbandry problems⁴ would be an important step towards the solution of the various Himalayan problems.

F. OTHER RURAL RESOURCES

Forests and Forest Products *

Majority of the people inhabiting the Himalayan Basins are agriculturists, living in tiny hamlets, consisting of a few houses, and terraced fields. The forests play an important part in their economy and no

system of forest management would be feasible which did not take into account the needs of the people for grazing and fodder and other forest produce⁵. In addition to cultivation and keeping of much cattle, many people keep numerous sheep and goats especially in the higher hills. Numerous cultivators have settled in and around the forests. The moderate gradients and warm aspects have been utilized for cultivation while only the colder and steeper slopes have been left out. In some places the forests and cultivated lands are so inter-mixed that the landscape often appears like a chessboard. Some people have, in addition to their home cultivation, land, which they have broken up on the higher slopes often in the middle of forests, where they repair for the summer months taking with them their cattle and their flocks and often those of their neighbours for grazing.

During the reign of hill rulers, the forests were strictly preserved. Soon after British occupation people broke loose and could not be restrained for a number of years from reckless devastation of timber. Restraints were imposed later. However the conflicting rights of the government and the village communities remained of no small difficulty. After preliminary survey by Lyall regular forest settlement was taken up in 1887 by A. Anderson. The important rights of users were recorded and are as under⁶.

1 Kangra District Gazetteer, Vol. XXV Part II, op. cit. p. 103

2 Second Five Year Plan, op. cit. p. 235

3 Vide letter No. SK/1514 II P dated 22.4.1952 of Revenue Assistant Manager to Director of Land Records, Himachal Pradesh (Unpublished)

4 Second Five Year Plan, op. cit., p. 291

5 Wright, H. J., op. cit., p. 1

6 Kangra District Gazetteer, Vol. VII Part A, op. cit., p. 155

and the income from their livestock for the means of payment of revenue. It was the realization of this important aspect that the General Objects of Forest Management² provide for bonafide agricultural and domestic requirements of local inhabitants' 89% of the population of the Himalayan *Beas Basin* is agricultural and depends to a great extent on the forests for its several requirements. The people exercise their rights largely in undemarcated forests but some rights are also permitted in certain demarcated protected forests. The unclassed forests are not classed without the consent of the cultivators. The forest uses and forest produce available to the cultivator make a long list³.

The value of forest produce per house per annum from the State owned forests according to the author's estimate is in no way less than Rs 150/.

The forest usages though by all means indispensable have led to certain malpractices like encroachment on forest land, bathing of trees, excessive lopping and over grazing and burning of grasses and litter.

The privileges involve reciprocal responsibilities but it is not a happy thing to say that villagers are lacking in whole hearted and full cooperation in maintaining a healthy

forest management. They seldom turn up to extinguish forest fires. The rights of the villagers in the forests are more than liberal and would be ample were it not for the professional graziers and herdsmen whose animals are for more than the forests can support⁴. The incidence of goats and sheep per square mile is 141 for the whole area. No where does the question of grazing and at the same time preserving the forests presents a more difficult problem than in the Kangra district⁴. This is true for the entire area. Such problems can be resolved by enlightened self interest about maintaining the perennial economy of the forests by healthy usage and practices. Rather than be at logger heads to their mutual disadvantage the agriculturist and the forester must learn to cooperate with each other in meeting the needs of both the agricultural economy and the healthy forest management. The Forest Policy Resolution of 1952⁵ recognizes the need of ensuring progressively increasing supplies of grazing, small wood for agricultural implements and in particular of firewood to replace the cattle dung for manure to step up food production and at the same time calls for the extension and improvement of areas under forest.

Some efforts have been made for meeting the demands of both agriculture and forestry

1 Agrawal K. L. Fourth Work ing Plan for Hills and Sora Forests 1949-50 to 1953-54 p 98

2 Fuel wood and charcoal Timber Fences and hedge wood, Manure for crops (from litter of leaves for cattle sheds) Material for baskets, pens brooms ropes, mats, pattals (used for Wood for agricultural implements) Wild honey and animal excreta Dyes (from *Kautilia* etc.) and tanning material (from bark of *Azadirachta* Kan ar and Mahandra etc.) Fuel for and grazing and Medicinal plants

3 Claver S. R. L. Forests in the Punjab, Its Culture and Use. op cit. p 87

4 Mulraj An Economic Survey of the Haripur and Mangali Taluqa of Kangra District of the Punjab Board of Economic Enquiry Punjab Lahore 1933 p 95

5 The Second Five Year Plan op cit. p 301

1 Timber for building purposes can be obtained on payment of the fixed Zamindari (cultivator's) rate

2 Timber for funeral and marriage rites, making and repair of agricultural implements, including the necessary charcoal and fencing etc., is given on permission of Lambardar and high Revenue Officers. No permission is necessary in case of wood required for burning the dead.

3 The Gujjars, the Gaddis and the rait holders are permitted grazing rights under certain conditions.

4 Lopping of certain trees is permitted for fodder, bedding and manure provided the trees are not less than 18 inches in girth.

5 New cultivation is absolutely prohibited in demarcated forests. Permission of Deputy Commissioner is required in undemarcated protected forests but in unclosed forests no such permission is necessary.

6 Miscellaneous—All fallen timber, stumps, leaves of trees or creepers, fruits, flowers, medicinal plants and edible roots may be removed without permission.

Nothing obtained in the exercise of a right may be sold or bartered or applied to any but the purpose for which it was acquired, except that fuel at encamping grounds, fruits, flowers, medicinal and edible roots and leaves may be sold. Government has also given to right holders a share in the revenue derived from sale of trees etc., in the forests in which

they have rights. This was done to secure cooperation and assistance of village communities in the conservation of forests.¹

In general, it may be said that everything the people require has been recorded as a right in their favour. This was subject only to the condition that Government may take such steps as may be necessary to preserve the forests from destruction.² It has been considered that except the grazing of sheep and goat, the enjoyment of all other forest rights is indispensable to the people to enable them to raise their crops and pay the land revenue which has been assessed with reference to the value of crops. These rights are appendant to the cultivated land.³ The inadequacy of agricultural produce to pay for the land revenue has been stressed even earlier. In his settlement Report, Diack⁴ emphasizes that 'without free grazing, fallen leaves for manure, free firewood and so far as necessary free timber for building purposes, a cultivator could not in this mountainous country pay so high a rent as he does. The assessment of land revenue is high and the cultivator has to earn from other sources. The right to use forests and certain forest produce considerably helps him in the maintenance of his economy. According to Coldstream,⁵ it may be said of upland villages generally that they depend on the forests for their livelihood as much as on their fields and on the products of the waste—the earnings of labour

1 Anderson, A., Forest Settlement Report 1887 p. 61

2 Trevo, C. G., op. cit., p. 3

3 Kangra District Gazetteer Vol. XXX Part II, op. cit. p. 171

4 Diack, A. H., Final Report on the Revised Settlement of Kulu Sub-division. Lahore, 1898, p. 21.

5 Coldstream, J., Assessment Report of Kulu Proper, Rups and Saraj Tracts of Kangra District. Lahore, 1911 p. 4.

and the income from their livestock for the means of payment of revenue'. It was the realization of this important aspect that the 'General Objects of Forest Management'¹ provide for 'bonafide agricultural and domestic requirements of local inhabitants'. 80% of the population of the Himalayan Bear Basin is agricultural and depends to a great extent on the forests for its several requirements. The people exercise their rights largely in undemarcated forests but some rights are also permitted in certain demarcated protected forests. The undemarcated forests are not classed without the consent of the cultivators. The forest uses and forest produce available to the cultivator make a long list.²

The value of forest produce per house per annum from the State owned forests according to the author's estimate is in no way less than Rs. 150/.

The forest uses though by all means indispensable have led to certain malpractices like encroachment on forest land, barking of trees, excessive logging and over grazing and burning of grasses and litter.

The privileges involve reciprocal responsibilities but it is not a happy thing to say that villagers are lacking in whole-hearted and full cooperation in maintaining a healthy

forest management. They seldom turn up to extinguish forest fires. The rights of the villagers in the forests are more than liberal and would be ample were it not for the professional graziers and herdsmen whose animals are for more than the forests can support.³ The incidence of goats and sheep per square mile is 141 for the whole area. No where does the question of grazing and at the same time preserving the forests presents a more difficult problem than in the Kangra district.⁴ This is true for the entire area. Such problems can be resolved by enlightened self interest about maintaining the perennial economy of the forests by healthy usage and practices. Rather than be at logger heads to their mutual disadvantage the agriculturist and the forester must learn to cooperate with each other in meeting the needs of both the agricultural economy and the healthy forest management. The Forest Policy Resolution of 1952⁵ recognizes the need of ensuring progressively increasing supplies of grazing small wood for agricultural implements and in particular of firewood to use the cattle dung for manure to set up food production and at the same time calls for the extension and improvement of areas under forest.

Some efforts have been made for meeting the demands of both agriculture and forestry.

1 Agrawal K. L., Fourth Working Plan for Hills and Forests, 1947-50 to 1973-50, p. 98.

2 Fuel wood and charcoal, Timber, Fences and Edge wood, Manure for crops (from litter of leaves of cattle sheds), Material for baskets, pens, brooms, shoes, mats, pattals, fans etc., Wood for agricultural implements, Wall hooks and similar items, Shives (from bamboo etc.) and various medicinal (four kinds of Amsa, Kansa, and Mahurda etc.) Fodder and grazing and Med. and plants.

3 Glover S. H., Fission in the Punjab, Its Causes and Cure, pp. 11, p. 8.

4 Malraj, An Economic Survey of the Haripur and Mangarkh Taluqa of Jammu District of the Punjab Board of Economic Enquiry, Punjab, Lahore, 1923, p. 93.

5 The Second Five Year Plan, op. cit., p. 203.

To encourage cooperation the Government is assisting in the formation of Village Forest Societies¹ and it is encouraging to note that villagers now take pride in their forests

Fishing

A considerable number of people eat fish. The professional fishermen belong to the 'Jhwar', 'Mallah' and 'Darem' castes. The cultivators as well take to fishing, as a pastime. Fish is also the cheapest meal for them.

The streams of Kangra, Kulu and Mandi are rich in the number of species of fish. The most important is Mahsheer (barbustor). The fish come up to spawn in the Beas and other streams.

Poisoning and use of explosives for killing fish is a very harmful practice². Poaching including such practices as dynamiting and poisoning, are still carried on in spite of fines for them. All the poisoning is done at night and parties of cultivators, sometimes 30 to 50 strong go out for this purpose. A few keep a look out for any official of the Fisheries Department and the rest collect the fish. By the early hours of morning they have departed leaving the stream littered with dead fry and tiny fish which were not worth their while to collect but which, if left to

grow just for a year, would have sufficed to feed the entire population of the village. The cultivators do more harm than the professional fishermen.

The sanctuaries and hatcheries are very well stocked and besides keeping the stock going to fill the streams, are an object lesson to the people.

The use of Kochbis, the bag net with a mesh less than 1 inch square has been prohibited. Spawning grounds of fish have been declared sanctuaries and diversion of water for killing fish has been stopped. Fishing has been regulated under licence.

Regular fishing is done with rod and line or 'bans' and 'birhi', spear or 'bhala', horse hair noose or 'kalerni' and casting and dragnet or 'jal'. The dragnet or 'Kahd' method is destructive but other nets do not cause any considerable damage. 'Chip' is another contrivance employed by the people for catching fish³.

Breeding time of fish extends from June to September. The diminution caused in the number of fish is due to floods and destructive methods hitherto in vogue. Mahsheer is caught in plenty in the main river Beas. Best mahsheer is found in 50 miles stretch from Nadaan to Mukeran⁴.

¹ Glover, Sir H., Soil Erosion, op. cit., p. 29

² For poisoning pools of fish, the people use lime, cactus or Chhu (Euphorbia royleana), trimal seeds (Xanthoxylum alatum), Chala seeds (Cascaria tomentosa), Ghanu leaves and boiled tea leaves with lime. These poisons (called mohani) are mixed in water. After an hour or so the fish appear on the surface stupefied or dead. No bad effects are produced by eating them.

³ This is made of split bamboos which are interwoven leaving interstices of 1½ inch square between them and erected towards the end of monsoons near a fall, when the fish after spawning descend the streams. All the fish coming down stream fall on to it. The little ones and the water runs out through the interstices. Large numbers of villagers take out the fence and erect a chip. They enjoy good supply of fish as long as the opera-

⁴ 177 of Kangra, Kulu and Mandi in the Himalayan Beas Basin, op. cit. p. 23

Mahsheers weighing 52 lbs or so have been caught in Kangra District. For the propagation of Mahsheer, there is a fish pond at Gang Bhairon near Kangra. Another interest to fishing was added with the introduction of Brown Trout (*Salmo faria*) in 911. Rain trout (*Salmo irideus*) is also being developed in some streams. Trout Farm has been developed at Barot. The streams of Kangra, Kulu and Mandi abound in fish. Popularity of trout fishing is increasing in Kulu. One of the charms of fishing in Kulu is that for fishing one can range the valley from end to end instead of being tied to one small section of the river.¹ Fishing season starts from March and lasts up to the end of October.²

Larvicidal fish can be reared in small ponds. It consumes the larvae of the mosquitoes and thus can be an important anti-malarial measure in the rice growing tracts. There are three varieties of it: *Colisa lala*, *Ambassis boccalis* and *Barbus sopnore*. These fish need no artificial feeding and can breed in any stretch of water stagnant or running. Spreading of oil for killing mosquitoes is not only a costly operation but water is also rendered unfit for drinking and other purposes. With the breeding of larvicidal fish in numerous tanks and ponds in the area can be developed to provide useful supply of fish.³

Many centuries ago the Chinese and Japanese found out that fish growing in ponds and rivers is one of the easiest ways of getting meat in a densely populated country.⁴ In the food deficit area like the Himalayan Beas Basin the development of fisheries will be an important adjunct to the food resources.

G AGRICULTURAL TECHNIQUES AND PROBLEMS

Implements

The agricultural implements are simple and few in number (Fig 53). The hillman's implements are well adapted to hill agriculture.⁵



Fig 53 Agricultural Implements

The agriculturists usually get the wood for these implements either free or at nominal cost from the forests and have to purchase the iron part of the implement.

1 Tyson T., "Trout Fishing in Kulu, Lahore 1941" p. 6.

2 Close season is from 1st November to 1st of March. See Punjab Fisheries Act (Act II of 1914) Notification No. 1818 D Dated 9-5-1925, Part F.

3 Fish Farming in the Punjab. Department of Agriculture, Punjab Fisheries Section, Leaflet No. 144.

4 Smith J. R., Industrial and Commercial Geography, New York 1929, p. 3.

5 The following list gives the names of implements in common use:

Hal and Lohala—Plough and Ploughshare. Mala—Leveller. Mach—Level raised on mule or bull.
Dandral—Harrow. Manja Kodal & Dandral Hoo for weeding. Bharota—Clod crusher.
Tringul—Pitchfork. Daranti—Sickle. Kabi—Mattock. and Kulhara—Axe.

The plough is, of necessity, very light and has a small ploughshare. The hill cattle are small and the fields are also small and therefore the plough is well adapted. There are 179 290 ploughs in the area, this means that there is one plough for every 3 1 acres of sown area. Recent increase in their number is due to extension of cultivation and fragmentation of holdings.

Hoe is extensively used in tillage though its chief use is in clearing weeds and to loosen and stir up the soil. The sickle is indispensable instrument and is chiefly handled by women. Its shape is like the sign of interrogation. It is employed in cutting grass, vegetables and rank growth. 'Darat' is a big sickle with a longer handle. It is used for cutting thorny bushes and hewing branches of trees. It is chiefly operated by men. 'Tokru' or basket in Kangra and 'killa' in Mandi and Kulu are used for carrying manure or produce.

Manure and Manuring

However sceptical the hill peasant may be of the advantages of deep ploughing and constant weeding, he is fully alive to the importance of manuring his lands. The practice appears to be that if manure is applied properly other troublesome precautions may be disregarded while if manuring be wanting the task of coaxing the soil into good yields is hopeless. The dung heap or 'Malham' stands at some distance from the homestead generally in a corner of a field. All the refuse of the household is deposited there. At night the cattle-pens are strewn

with litter of grass or young brackles which the next morning are thrown upon the dung heap. In higher hills farmyard litter is mixed with 'suh' or pine and deodar needles. This adds humus to the soil. Fermentation of dung heap manure goes on all winter till in summer the first demand is made upon it and this is repeated for every crop season. The manure from the dung heap is scattered over the fields twice a year. Land near the homestead receives the most manure and yields two good crops a year, the outlying fields will occasionally go without. No soil, however, will maintain productivity for more than three years without artificial stimulus and for distant fields the only alternative is to let them lie fallow. The most valued manure is the dung of sheep and goats. With the setting in of winter, the flocks of semi-nomadic Gaddis come down from the higher elevations. The cultivators compete with each other for having the sheep folded upon their land and would even pay for it if necessary, with grain, vegetables fuel and money. The manure is believed to be effective for two or three years. Day after day the shepherd changes his ground and before the harvest is sown reaps a small fortune. A large proportion of cattle are kept merely for their manure. Pony dung is very inferior manure. It is believed that it encourages agricultural pests. Often it is burnt and ashes are mixed with manure. Stubble of wheat barley maize and amaranth is left on the fields to be burnt or ploughed in. Similarly weeds are cut and left to rot and ploughed in. The manuring of fields at a

1 Improved types of implements are coming into use ploughs deeper and uproots weeds.

Furrow plough evolved at Luthiana, and sowing table.

distance from the homestead, sometimes a thousand feet or more, above the irrigated valley slopes, entails considerable exertion. Owing to great labour involved, ploughing is seldom done more than thrice in the hills but great importance is attached to proper manuring. The soil is generally poor, shallow and full of stones, and leaching and scouring by rain is pronounced. Moreover, the paucity of land reduces the fallow land to the bare minimum. Manuring therefore, is a highly necessary practice.

The dung heaps are exposed to the elements of sun and rain and a large amount of organic matter is washed down by heavy rains or moisture evaporated by sun's heat. This wastage is not often realized by the farmers. In some places this waste is avoided by penning the cattle in the fields. This is as much efficient as economical. It eliminates haulage and utilizes every drop of urine. The fields are also uniformly and evenly manured. It's shortcoming is that the organic manure is fresh and undecomposed.

The Department of Agriculture advocates and demonstrates the advantages of pit compost, in which there is no wastage. Pits may be of any shape or size because in the hills it is not always possible to dig rectangular and standard size pits. This practice of making manure in compost pits is so important that some sort of legislation such as 'Conservation of Manure Act' is necessary. 38,000 manure pits were constructed in the whole area during 1950-51.

The use of fertilizers is limited. Only 36 maunds of ammonium sulphate was sold in

Kangra District during 1949-50¹. The cost of fertilizer and transport is high. Steps should be taken to subsidize sales. Many farmers do not always have the cash to buy fertilizers etc. Moreover the soils are low in pH value and therefore there is tendency towards acidity by the use of ammonium sulphate and superphosphate. The practice of green manuring should be encouraged as it not only enriches the soil but also improves the texture. This may be leguminous fodder which can also be fed to the cattle. It may be grown in winter since 'Kharif' is the major crop of the people and much land for this purpose cannot be spared. Sun hemp seed is distributed free of cost for encouraging green manuring.

No rural habitation has proper sanitary arrangements for the disposal of night soil. There are no privies attached to the houses. Forests, stream banks and wastelands are used for this purpose. Thus the night soil is not only wasted but it contaminates the water and the air, causing foul smell and endangering health. This also ruins the aesthetics of the arcadian setting. There is much prejudice against use of night soil as manure and the value of scientific scavenging is not realized. Ashes are mixed with leaf mould and cow dung and this manure is considered very rich and is applied to vegetable growing. The irrigated lands are enriched by silt deposited by stream water and this affords very valuable top dressing.

The different types of manures and manuring practices in various parts are well adapted to the respective needs. Owing to

¹ Vide 'Annual Report, Extra Assistant Director of Agriculture Kangra District, Dharamala for 1949-50

adequate supply of fuel, very little of cattle dung is used as fuel and the treatment and use of this manure is one of the most advanced in India

Rotation of Crops :

The value of crop rotation, in retarding the exhaustion of the soil is well understood and its importance realized, by the hill farmers. The order of rotation varies with different natural conditions. Large variety of crops grown allows scope for varied system of rotation. Even in the rice growing tracts where every year presents a lush green paddy surface, there are minute changes imposed by experience. The field that bears one variety of rice this year will be sown with another next, and a third the year after. Sugar cane is followed by cotton, and cotton by maize before sugar-cane will be grown again.

In Kulu, in the best manured lands, barley follows maize and maize follows barley in unending succession or wheat may be the 'Rabi' crop regularly grown in succession. In less manured lands 'sariara' or 'kodra' or 'chua' mixed with 'kangur' is grown as the 'Kharif' crop in alternate years with maize. In the mid zone (maujhat) up to 7,000 ft., wheat follows 'kodra' and is followed by a fallow, after which a barley crop is raised and then the 'kodra' again. In high uplands above 7,000 ft or 'gahars', barley follows 'sariara' or wheat is followed by a fallow. In inferior lands, wheat and buck wheat succeed one another, or only one crop is raised in a year. The rotation is not carried out on any fixed system and seems to depend very much on the individual practice of farmers.

The areas with low altitudes, fairly high temperatures, heavy manuring, fertile silt, and assured regular water supply, produce two crops regularly every year and land is left fallow for any part of the year. Every third or fourth year the 'Rabi' harvest of wheat is omitted because continuous wheat cultivation reduces the quality and yield of rice during 'Kharif'.

Different types of lands have different types of rotation which are closely adapted to their peculiar conditions. The rotation is governed by soil, physical features, climate and special needs of the cultivator. The treatment of the cultivated soil is good as far as is possible under the difficult conditions of hill agriculture.

Seeds :

The supplies of seeds are drawn everlastingly from the same store of harvests and only lately have the farmers realized the value of imported and improved seeds. In this direction much useful work has been done by the Department of Agriculture. Use of better seeds is advocated and their sale is arranged. Main defect of local varieties of seeds is that most of them are low yielding and impure. Since no systematic seed survey and study of local varieties has been done, the good and bad points of different varieties cannot be ascertained. Some of the definitely good ones deserve patronage. It is very important that trials should be conducted with different local varieties for the different conditions in the area.

Seed Multiplication Farms have been established by the Department of Agriculture for selecting suitable varieties and multiply

ing seed to meet the requirements of the farmers. Seed observational and manual trial plots regularly carry out experiments and report the results. In 1949-50 wheat trials gave the following results¹

C228 and C250 Higher yields over local varying from 20 seers to 1 maund and 20 seers

C253 Lower yields over local varying from 12 seers to 2 maunds per acre

Large areas are now under improved varieties of seeds. It is generally felt that in the matter of seeds the advice of Agriculture Department is often advantageous²

A suggestion which is worth considering is that good seed should first be given to landholders whose farms could serve as model. It is also desirable that the Department of Agriculture should select in different localities any farm at random sow it with better seed and apply other improved agricultural practices instead of just concentrating on their own farms year after year. This will not only assist the farmer but is a better form of propaganda for all that the Department has to say. Such practices were introduced in U.K. during the war years with the result that the agricultural produce increased by 100% during that period³

The average percentage of area under improved crops in Kangra District is as under⁴

TABLE

Showing Percentage under Improved Crops in Kangra District 1950-51

Crop	Percentage Under Improved Crops
Wheat	62.2
Gram	48.2
Barley	—
Sugarcane	64.7
Rice	36.0
Cotton	75.5

The following varieties of seeds have been found useful according to different tracts

Wheat	—C591 C250 C253 C228 I P 80 S
Rice	—Phulpati No 72 Ramjawan No. 100 Lal Nakanda No 41 S 20 Jhona No 319 Mushlan No 7, and 41 Basmati No 370
Sugarcane	—CO 285 CO 319 CO 313 CO 19 CO 19
Cotton	—Molisoni 39

Most of improved seeds are imported from outside⁵. Some wheat, rice and vegetable seeds are produced on government farms but supplies are inadequate. Efforts are being made to raise crops from improved seeds in the notified areas under the Improved Seeds and Seedlings Act. More and more villages are being supplied with improved seed.

1 Annual Report 1949-50 F.A.D. Agriculture, Dharamsala

2 Sometimes, it happens, that young agriculture graduates who belong to the plains and have no personal knowledge of hill agriculture may render advice which is not quite suitable.

3 Easterbrook L. F. British Agriculture. Published for the British Council by Longmans Green & Co London, 1948, p. 29

4 Annual Report 1950-51 E.A.D. Agriculture, Dharamsala

5 Ibid.

Varieties of Wheat and Rice with their Characters and Sustainability

Wheat

C250 It is suitable for humid tracts and is resistant to loose smut and rust diseases. It does well under all sorts of conditions i.e. irrigated and unirrigated.

C253 This is a beardless type of wheat recommended for growing in the tract. It is resistant to loose smut and earcockle diseases. The most important character in it is that it is very easy to thresh which is very much desired by the people.

C281 It is a newly evolved strain of wheat with a hopeful future. It has given better yields than other improved wheats under normal and late sown conditions. In addition to high yields it ripens a fortnight earlier than the local wheat. Thus it is very useful as the land can be prepared for Kharif crops before the onset of the monsoons.

C591 It is good up to 4000 ft. elevation. It was tried in 4 demonstration plots by the Department of Agriculture and it gave 16.5% higher yields¹.

C288 At High Altitude Trials at Brot it did not do as well as the local variety. But in the lower hills its yield was 6% higher than that of local variety.

P-50 S This variety is doing well on high altitude over 5000 ft. elevation.

Rice

Lal Nakanda 41 This is rather a coarse variety. This variety yields 15-20

maunds per acre and does not require rich soil. It gives 15.2% more yield under transplanting and 17% under Battar and Mach than the local. This variety should be harvested just on ripening as the grains shed considerably on over ripening.

Ram Jowain 100 It is a medium variety. This yields on an average 20-25 maunds per acre. It requires rich soil and good water supply. It yields 31.7% more under transplanting and 23.7% under Battar and Mach than the local type. It is an all round good variety.

Phulpatas 72 It is also a medium variety also known as 'Mahinoo' or 'Har bhog'. It yields on an average 15-20 maunds per acre. The yields are 15% better under transplanting and 27.7% more under Battar and Mach than the local type. Grains are also longer and somewhat finer.

S-58 It has given 7% higher yields than local variety in demonstration trials at Nurpur².

Better seeds mean better crops and more prosperity to the poor hill farmer. The use of improved seeds on all agricultural lands should therefore be made.

Yields

In an area like the Himalayan Beas Basin yields of crops vary from taluqa to taluqa and mauza to mauza owing to differing physical soil and climatic conditions, and the varying agricultural practices.

The following average yields have been adopted at the settlement (1910-1919)

¹ Results of Demonstration Plots laid out in Kangra District during 194-48. Report, District Agriculture Office Dharamsala.

² Ibid.

KANGRA PROPER¹

Rates in seers per acre

Crop		Kangra	Palampur	Hamirpur	Dehra	Nurpur
Rice	Irrigated	380-540	280-500	370	140	420-520
	Unirrigated	180-200		200	240	240-300
Maize	Irrigated		150-200	200	260	160-280
	Unirrigated	220	160-210	200	210	220-320
Wheat	Irrigated	220-240	160-210	180	220	140-210
	Unirrigated	155-169	160-210	200	200	180-200
Barley	Irrigated		160-200	200	240	180-200
	Unirrigated			200	240	180-200

KULU²

(Rates in seers per acre adopted at settlement of 1912)

Rice	(Irrigated)	500	China	200
	(Unirrigated)	370	Mung or Mash	100
Sariara	(amaranth)	250	Wheat	230
Kathu	(buckwheat)	180	Barley	300
Bharsa		120	Masur	150
Kodra		320	Kala	190
Maize		400	Sarson	180
Kangri		200		

MANDI³

(Rates in seers per acre irrespective of irrigation)

Wheat	220	Barley	210
Rice	360	Potatoes	800
Maize	280		

Under proper crop management and use of fertilizers etc the yields can be increased two to three times as is shown by the yields obtained at Bhangrotu Seed Multiplication Farm⁴

Crop	Yield in seers per acre	
Rice	Rani Jowain	1 012
	Lal Nahanda	708
Maize		544
Wheat	S100	817
	C253	460

Crop competitions have revealed that these are by no means the highest yields

CROP COMPETITION MANDI⁵

Crop	Highest yield in seers per acre
Wheat	1 347
Paddy	2 327
Barley	1 616

Similarly in Kangra the average yield of sugarcane is 21 maunds per acre but the

¹ Kangra District Gazetteer Vol VII A op cit p 2.

² Kangra District Gazetteer Vol XXX A op cit p. 05

³ Annual Report 1925-26 District Agriculture Office, Mandi

⁴ Ibid

⁵ Ibid

highest yields obtained on Agriculture Farm¹ at Kangra were 87 maunds. It is therefore evident, that the highest yields in case of important crops are no less than four times the average yields. Considering that the highest yields are obtained under most favourable conditions which are not obtainable everywhere at all times it can safely be assumed that with the use of improved seeds, better manuring and enlightened agricultural practices, the average yields can be at least doubled. The prospect of increased yields is indeed the most important and promising aspect, which is worth achieving in this hilly and mountainous tract where the cultivated area is highly restricted and the carrying capacity of the land has already reached the saturation point at the present stage².

Pests and Natural Obstacles

The hill peasant labours under serious disadvantages. His crops and cattle are exposed to damage by many natural elements, animals and pests. He has to spend fair amount of time and energy in combating them. Like his other activities, the various devices to combat these, bear the stamp of the environment.

Amongst the wild animals that do much harm, the wild pig, the wild bear and the leopard are the 'Big Three'.

The wild pig or boar does great damage to crops. It invades the fields at night, but during monsoons when thick growth of crops gives it safe cover, it becomes much more

bold and would raid even during the day time. Its favourite foods are potatoes, maize, rice and sugarcane. Its killing is, therefore, encouraged. The peasants feast upon its meat and even pickle some of it. An effective means of protection against the pig is to guard the fields throughout the night and even in the day during August and September. A man looks out from 10-15 feet high tower erected on poles in the midst of fields. He scares the beasts by occasional shouts and beating tin cans. Sometimes when there is no one to spare for watching and the fields are near the homestead, noise is made by pulling strings tied to tin cans from the window of the house. A tin is sometimes suitably tied on a tree so that whenever there is a breeze, it strikes it and causes sound to alarm the animals. Some cultivators and the game seekers or 'shikaris' kill the wild pig with the help of gun.

The Himalayan bear is a terrible marauder to the peasant and the grazer. Unlike the pig, it is a good tree climber and exceptionally keen of hearing and sight. Its range of damage extends to fruit and field crops. It devours, scorns, millets, maize and fruits. It kills goats and sheep and mauls ponies and large number of people. Rewards are paid for the killing of bears and leopards. Their savagery is well known as they often attack the head and face. The grazer faces them with sheep dog and drat (giant winkle). The shikaris hunt them with the help of guns. Often the peasants inform the neighbouring shikaris about the marauding bears and leopards who come singly or in parties

¹ Report 1911, Government Agriculture Farm, Kangra.

² Kayastha, B. L., Demographic Features of the Himalayan Bear Basin, op. cit. p. 33.

to hunt them down¹ Fires are kept burning to scare away the wild beasts

Panthers and leopards are very destructive to cattle They also attack human beings They are very agile, quiet but ferocious in attacking, and the only effective way of dealing with them is to shoot them or attack them collectively

Porcupine is found in the lower hills It hides itself in caves and crevices and emerges after it gets dark It is a great pest to potato and other garden crops The villagers kill it by suffocating it with smoke in its cave, or trap it in ditches²

Himalayan monkeys ravage crops and fruits They find shelter in cliffs and forests and make constant raids on gardens and crops like maize They are chased with the help of four or five mongrels 'Langurs are a great nuisance They help themselves to choicest fruit and get the first pick of the produce The monkeys steal eatables from the houses and often remove slates and tear thatch, and glut themselves with any eatables that they can find They tear clothes and for vandalism they are without a parallel The deer, both 'Sambhar' (*Rusa aristotilis*) and 'Kakar' (*Cervulus aureus*) ravage forest regeneration and crops They are killed in large numbers each year Goral or Himalayan Chamois also falls prey to the

gun on account of the damage that it does to the crops Flying foxes damage fruit crop

Numerous insect pests and diseases damage crops Gram blight reduces crop yields by 50% Continuous cloudy days in winter encourage wheat rust and gram blight High rain and low temperatures often lead to insect pests and diseases Due to winter rainfall, their occurrence is more virulent in the area Epilechna beetle damages potatoes Sugarcane borer spoils the cane and rice grass hoppers destroy paddy, field and house rats destroy crops and stored grain Amongst important diseases may be mentioned halimothosporium of rice, rusts of wheat and barley, loom and flag smuts of wheat early and late blight of potatoes peach leaf curl and san jose scale of apples etc No statistical data is however available about the extent of damage due to these several causes

Amongst the inanimate enemies of the peasant are vagaries of rainfall floods landslips, avalanches hail frost and wind storms

Hail and storm destroy fruit and standing crops and damage terraced fields Large avalanches bury crops and everything Vagaries of rainfall are destructive to crops Absence of rain in October and November causes late sowing Late monsoons result in late sowings of Kharif crops and germination of weeds along with the crop Low

1 It is said that in case of an attack the best way to save oneself from the bear is to run down a steep slope As a bear follows down the slope its long fur fall over the eyes obstructing visual it

2 It is said that the porcupine hides in the mango stone so much that it will lick it the whole night The villagers try to trap it with that too They also try to partially blind it with dazzling light of torchwood and attack it with clubs A blow on the head is fatal but the hinder parts are invulnerable It withdraws its head amidst the erectile quills of its body and is very difficult to kill It attacks the strikers with arrow like quills When killed its flesh is consumed by the peasants.

rainfall or its comparative absence during the seeded period results in failure of crops over Barani tracts. In the upper hills indifferent weather, strong winds and frost damage wheat and fruit crop though damage to barley crop is not so much.

The damage from natural elements wild animals and crop pests and diseases is considerable. The hill agriculture which is highly strained due to several other factors, can hardly afford to bear losses due to aforesaid causes. Agriculture Departments should take steps to cooperate with the cultivators in reducing these losses.

Holding :

Small Holdings Cultivation is a prominent feature of agricultural economy in the Himachal Pradesh Basin. The farmers work on petty holdings and eke out a meagre living. The average size of holdings is too small, even uneconomical. Thus, the hill peasant is confronted not only with problems of difficult terrain, poor soil, climatic and natural hazards but also by the small size of his farms.

Only 19.5% of the total area is cultivated. Out of this only 19.9% is irrigated. The limitation to bring cultivable waste land under cultivation, is the absence of irrigational facilities and the difficult terrain. Hired labour is unknown on agricultural farms. The cultivators and his family members manage the farms and therefore they may be called family farms. It is characterized chiefly by subsistence agriculture.

Size and Distribution of Cultivator's Holding in Kangra District¹

Size of Holdings	Cultivators	
	Number	Percent
1 acre and less	3,697	61.8
1 2½ acres	1,936	27.6
2½ 5 "	907	14.2
5 7½ "	218	3.5
7½ 10 "	76	1.1
10 15 "	38	.5
15 20 "	8	.1
20 25 "	7	.1
25 30 "	1	

Thus it is clear from the above table that those cultivating 1 acre or less constitute more than half the number of cultivators and those cultivating under 2½ acres constitute 80.4% of the total. The size of holdings for the majority is too small and the cultivator cannot be expected to pull himself out of the depths of poverty when he is faced with additional adverse factors.

Estimated Area in Holdings

Size	Percentage of Total Area
Under one acre	13.2
One and under 2½ acres	29.2
2½ acres and under 5 acres	20.5
5 acres and over	37.1

These small farms cannot meet the requirements of the hill farmer and he usually supplements his income from other sources. Farm cultivation provides only 43% of the total income. Rest of the income is derived

¹ Talib, B. D., Survey of Small Holdings Cultivation in Kangra District. Board of Economic Enquiry Punjab, 1951 pp. 24-30.

from military services, wages from labour and domestic service sale of grass and fuel wood etc. The additional income barely suffices to meet the total expenditure. Small uneconomic holdings and low production are the chief causes of poverty. There is no doubt that the physical nature of the terrain, socio-political institutions and cultural patterns are also important contributing factors, but it is the uneconomic holdings that have shattered the economic basis of agriculture. No less than 80% of the cultivators farm holdings are of less than 2½ acres. Increase in production is often considered a necessary means to remove want and increase the carrying capacity of land. This will involve not only application of more manures, better seeds and enlightened agri-

cultural practices but would require a change in the socio-economic structure of the rural economy. Small holdings must be eliminated as far as possible. Cooperative farming should be encouraged. Intensive mixed farming should be encouraged. Alternative occupations must be developed and industrial potentialities exploited to reduce pressure on land. Absentee ownership or landlordism is a deterrent to improvement on land. The tenant is unable to bring about improvements in his land and techniques, on account of lack of authority, money, or interest.¹ Rural indebtedness and poor economic conditions are natural corollaries of small holdings and cultivating tenancy. Small holdings are hardly a means of sustenance, what to say of being a source of wealth.

¹ Due to New Tenancy Laws, agricultural classes have gained. The occupancy tenants have been given property rights by paying average price of land at 1935-16 0 rates. Non-occupancy tenants now pay ½ rates 1 of ½ produce.

Agricultural Regions

In an area of such varied relief, temperature and rainfall, there are bound to be several micro-regional variations but broadly three agricultural regions may be distinguished considering agricultural practices, crop distribution, horticulture and stock rearing (Fig 54)

1 Cool, Sheep and Goat, and Mountain Farming Region :

This region covers a wide belt of country in the north and east, including large areas of Bhattiyat, Kangra, Palampur, Joginder nagar, Kulu and Chachot (Fig 55) The area is highly mountainous, elevations vary

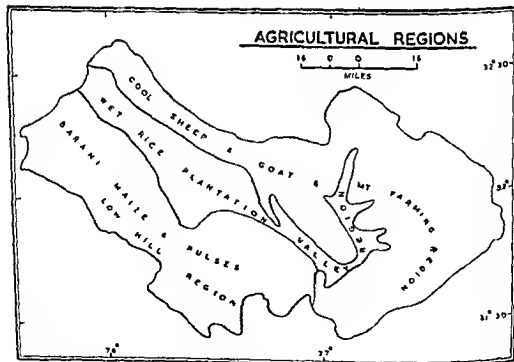


Fig 54

from nearly 5,000 ft to cover 20,000 ft. The slopes below the area of snow and glaciers, are covered with mountain pastures and forests. Winters are cold though summer is warm enough to permit cultivation on terraced patches up to about 10,000 ft elevation. Precipitation is heavy on the Dhaulidhar range and is fairly copious in other parts. Population is sparse. Wherever slope and aspect are favourable agriculture is carried on in isolated patches. The mountain pastures have provided for rearing of large flocks of sheep and goats. During winter these flocks are driven down to the valleys. Transhumance is thus a necessary practice in this region. The semi-nomadic pastoralists clear small patches of forest land and cultivate maize, barley, potatoes and pulses. In Kulu, coarse grain like buckwheat, 'kodra', and 'kangru' are also cultivated. Potato cultivation has become very paying and large quantities are produced. The agriculture in this region suffers from the depredations of wild animals and damage due to landslips, avalanches and snow. Agriculturally, it is the least favourable region.



Fig 55 Mountain Agriculture

2 Wet, Rice and Plantation, Valley Region :

This region consists of the fertile main valleys of Kangra and Kulu, it also includes small areas of Bhattiyat, Jogindernagar, Mandi and Chachnot (Fig 56). The general elevations in it vary from 2,000 ft to about 4,500 ft. Although the percentage of the cultivated area is small, varying from about 1% in Kulu to 20% or so in Kangra and Palampur yet the region is agriculturally the most prosperous. Here is practised the best and the most highly developed form of agriculture. The most important feature of agriculture in this region is irrigation. Plentiful water is available from the northern perennial streams which descend from the snowy and forested ranges. Here is found, the most wonderful system of 'Kuhl irrigation'. 40-50% of the cultivated area in Kangra and Palampur is irrigated while considerable areas are irrigated in other taluks in this region. Soils are fertile though not altogether alluvial and land is level or gently sloping. Rainfall is comparatively plentiful in Kangra valley and ranges from



Fig 56 Valley Agriculture

70° in the valley to 100° on the southern slopes of the Dhauladhar range. In Kulu the rainfall is less. Kulu climate is on the whole drier and cooler and Kulu constitutes a sub region, and is important for temperate fruit and crops. Terraced cultivation is practised and it is not unusual to see a flight of 30-40 terraced fields on a valley slope. It requires much arduous labour to make and maintain them. Perhaps, no other region can present anything more beautiful than the valleys of Kangra and Kulu exhibiting a scenery of wood, water, pretty farmsteads and care displaying mosaic of innumerable fields.

prising the broken hill country of Nurpur, Dehra, Kangra, Palampur, Hamirpur, Sarkaghat and Mandi tahsils (Fig 57)



Fig 57 Low Hill Agriculture

The soils are generally stony and poor. Annual rainfall in most of the area is less than 60" and more than 80% falls during the months of July, August and September.

The most important feature of the agriculture of this region is that irrigation here is an exception rather than the rule. The area does not enjoy the benefit of irrigation from the southern affluents of the Beas which are seasonal in character. The area through which the northern affluents pass is limited in this region, but these streams have cut deep channels and the water cannot be used for irrigation. Irrigation is available near the Beas the Suketi and a few other streams, in very limited tracts. The entire area may be considered more or less a 'Barani' tract, where agriculture is dependent on natural rainfall. Since rainfall is not regular and dependable crop failures are not unknown. There is always great percentage of Kharaba or crop damage. Maize, pulses and oil seeds

This region constitutes the backbone of the agricultural economy of the Himalayan Beas Basin. It has the best agricultural land, the best irrigational facilities and the best communications and marketing centres. Rice, tea and fruit, the products which are commercially prized commodities of the Himalayan Beas Basin, are all produced here. More than 50% of the rice and nearly all the tea and fruit of the Himalayan Beas Basin are produced in this region. In addition to these, the region produces large quantities of maize, oilseeds and pulses. Vegetables including potatoes, cotton, sugarcane, spices and narcotics etc. are also grown. Wheat is the most important 'Rabi' crop. Nearly 38% of all wheat is produced in this region. Large number of livestock is kept for agricultural work, milk and manure. Agriculturally, this is the most productive region.

3 The Barani, Maize and Pulses, Low Hill Region :

This region consists of the lowlying hills, uplands and lower valley of the Beas com-

are the chief crops during 'Kharif'. Oilseeds, however, are unimportant during the 'Rabi' harvest. Nearly 66% of the maize crop and 75% of the pulses of the whole of the Himalayan Beas Basin are grown here. Large areas are sown with 'Barera' or mixed crop of wheat and gram or barley to guard against crop failure. These warmer tracts also grow large quantities of tumeric and

chickpeas. Unirrigated rice is also grown wherever possible. Wheat is an important 'Rabi' crop throughout the 'Barani' tract. In addition to cultivation of crops farmers keep large number of livestock. Therefore some Ghee or clarified butter is exported from this region. Agriculture provides nearly half the annual income and people are compelled to tap other sources of livelihood.

Industrial Economy

A POWER AND MINERAL INDUSTRY

Power

Power and steel are considered to be the twin props of modern civilization. In fact the national income per capita in the industrial countries of the West is very often found to be in direct proportion to the amount of electrical and mechanical power used by each worker. The economic prosperity of a country is often judged by the amount of electrical and mechanical power consumed there.

In hill areas like the Himalayan Basins primitive sources of power still play an important part. Man and animal power is still very important in agricultural operations, transport and industry. It constitutes the primary basis of hill economy which is rather, under developed.

Still another important resource is the availability of fuel wood and charcoal from the forests. The supply is enough to meet all the necessary requirements of the people. Estimated consumption of fuel wood is 1500 000 mounds per year. The industrial utilization of wood as fuel charcoal proved too costly and damaging and had to be abandoned¹.

There are no deposits of coal in the area.

Fortunately there is abundant water power available thanks to the perennial hill streams and favourable gradients. Snow and forests assure continual minimum supply of water though the supply is much increased during the rainy season. In the hills water power is directly used for running water mills or Gharats for flour milling. Dhankuts or rice husking mills are also run by water power. Several such contrivances for milling the grains are seen dotting the hill streams near the habitations. Though of the most primitive construction the water mill exhibits much ingenuity in its details. Rice mill is on a much bigger scale. The supply and fall of water is also greater than for the flour mill. With some ingenuity more use could be made of the abundant hydraulic power.

The most important development in the use of water power is the generation of hydro-electricity at Jogindernagar. This is a significant development indeed for Hvel and so largely in agriculture.² In this area lacking in coal and for the state of Punjab the development of white coal

¹ For making one ton of iron two tons of charcoal were required or roughly twenty trees had to be felled for this purpose. Such industrial operations had to be stopped on account of great loss in forests.

² Spate O. H. K. India and Pakistan, op. cit. p. 70.

is a boon for industrial and other purposes. An additional advantage is that 'Hydro electric power is inexhaustible in the long run while coal and oil are limited'. The development of white coal gives to countries lacking coal, like Switzerland and Italy, a measure of economic power and status hitherto impossible¹. Hydrel is in fact a word of power. Thus, the Himalayan solution to the absence of coal is simple, it lies in the development of hydro-electricity from the water of the streams.

The taming of the natural force of water for electric production was undertaken at Jogindernagar in February 1926 and first stage was completed in 1933². In order of hydroelectric developments in India this project occupies 23rd position the first being the Darjeeling Power House (in 1897)³. The Mandi Hydroelectric Project gives about 55,000 KW of electricity. The capital outlay on this project up to the time of Partition was about 75 crores of rupees⁴.

The water of river Uhl a northern affluent of the Beas has been harnessed at Joginder

nagar on the spur of the Dhauladhar range. The catchment area of Uhl river is nearly 200 square miles for the most part at an elevation of 6,000 ft to 16,000 ft. Though there is met and supply of water in summer and rainy season sufficient flow is available even during winter. Water is taken from Uhl and its tributary Jamli Dag at Brot where the headworks are situated (Fig 58).

The power house is situated at Shanon (Jogindernagar) at 4,100 ft elevation (Fig 59). It utilizes a head of 1,800 ft. The whole project is a feat of engineering skill. The initial installed capacity was 48,000 KW. Only 4 generating sets of 12,000 KW each were installed in the first stage. One of these sets stands by and the present capacity is 36,000 KW. Second stage involves a 250 ft high dam at headworks to increase water storage capacity and thus provide four more generation sets. The third stage contemplates the utilization of water falling out of power station. The water would be taken in a open duct 3 to 4 miles long to Kun and by a second fall of

1 Mulliyilayya B. V. R. Basin Development Part I Manual of River Basin Planning. United Nations, New York, 1953, p. 61.

2 Bruhnes, J. Human Geography. London, 1932, p. 47.

3 'The Punjab Past and Present. 80 years Volume I. In: Se. Congress, Lahore, 1939, p. 190.

4 Hydroelectric Development in India. Central Board of Irrigation. Leaflet No. 3. S. 14, August 1948. Chart being 1/24.

5 Electric Power Development in Punjab. Brochure, p. 3. Year of Publication not given.

6 The combined water of Lamba Dag and Uhl is directed into a filter chamber for removing the suspended material. From here the water is led out to the forebay which rises 300 cft of water per second into a tunnel entrance. In the event of excess flow the forebay is provided with an overflow back to the river. A tunnel of 3 miles length was made here to carry the water to the generating station at Jogindernagar. The fall level between entrance and exit is just 1 1/2 feet. It is one of the longest tunnels in India and was constructed at an approximate cost of 8 million rupees. The tunnel is cut across the spur and the normal water discharge is 600 cusecs. The water of the tunnel is led through two steel pipes of 6 ft diameter each at 1,100 ft from the exit. Again after 1,100 ft both the pipes bifurcate into two small pipes each of 4 ft 7 inches diameter. Two of these pipes are used for power generation and other two are kept for emergency needs.

MANDI HYDROELECTRIC PROJECT

TRANSMISSION GRID



PLAN OF HEAD WORKS AT BROT



PEAK LOAD AT POWER-HOUSE JOGINDERNAGAR

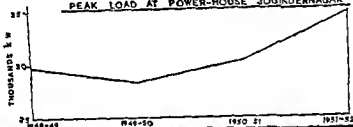


Fig 58

1,200 ft. a second powerhouse of 48,000 KW could be developed. There will be available a further fall of 750 ft so that, if necessary, water could be used for a third time.

From 11 000 Volts generated, the energy is stepped up to 132,000 Volts. By a double circuit 132 K V trunk transmission line, power is transmitted to substations at Kangra, Pathankot, Dhatriwal Amritsar and Lahore (Pakistan) (Fig 58). A single circuit 132 KV line runs from Amritsar to Jullundur and Ludhiana. From Lahore other transmission lines extend to Lyallpur.

In spite of various impediments arising out of Partition, the Uhl River Scheme

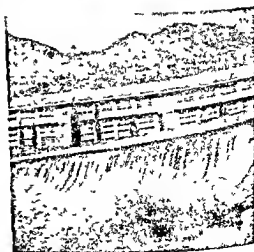


Fig 59 Power House, Jogindernagar

has developed steadily. The power house has been supplying electricity to West Pakistan initially under the Arbitration Tribunal and later by mutual agreement. Gradually the amount of electric supply to Pakistan is being reduced as demand on our side increases. Before the Partition, the area of province now in India consumed about 10,000 KW of electrical energy. Now it has increased to 22,000 KW. During the next few years, it will be possible to consume the entire generating capacity of Mandi Hydroelectric Project. There has been tremendous growth of load (Fig. 58) as is evident from the following table¹.

PEAK LOAD AT JOGINDERNAGAR POWER HOUSE

Year	Peak Load at Power House
1918-19	20,800 KW
1919-50	28,200 "
1950-51	30,400 "
1951-52	35,000 "

The monthly revenue is 1,025,000 rupees (1951-52) as compared to 388,700 rupees (1917-48) previously. The total annual revenue from the sale of power came to 12.3 million rupees (1951-52). Previously the working used to result in a net loss of 810,000 rupees².

The humming electric lines which carry power from the generating station, traverse Kangra Valley and other parts of the Himalayan Beas Basin from end to end and are symbolic of the new power for a new era of development.

The state department has during the past few years endeavoured to provide

electricity to a larger number of towns and villages. The number of towns and villages getting electric supply in Punjab (India) is now 102, as against 40 in 1917 at the time of Partition.

In the Himalayan Beas Basin, a few more towns and rural centres have been supplied with electricity. They are Palampur, Baijnath, Paproti, Upper Dharmasala, Nagrota and Purana Kangra. Electric supply was already available to Mandi, Kangra, Lower Dharmasala, and Nurpur (Fig. 60). There are schemes to extend electric supply to several villages in Mandi and Jogindernagar. Power from Chakki will be transmitted to Bhatiyat. The proposed extensions may not have full justification for all expenditure but the yardstick for justification of expenditure in the border hill areas has to be different from those areas of the country which have had full light and attention. Benefits of power and transport facilities and rising economy for over half a century in the underdeveloped areas like the Himalayan Beas Basin such expenditure is necessary from all angles—social or political for these areas have so far been deprived of development by special circumstances. Moreover this area happens to be near the border and economic development must be stimulated to raise living standards so that the people feel satisfied with their lot and do not feel tempted to extraneous propaganda. There is considerable potential for expedient development. In the Second Five Year Plan such

¹ Electricity Lower Development in Punjab Punjab Pamphlets No. 4, 1, 4 (Place and year of publication not given)

² Kuriyan G., Hydroelectric Power in India—A Geographical Analysis, Newnes 1941, p. 47

justification for rural electrification has been provided. It states that "For rural electrification schemes it may not always be possible to apply the usual yardstick of financial returns"¹

It is desirable that all big villages should be provided with electricity as far as possible but "the postponement of supply for a further period of five years would strengthen the sense of deprivation which even now is noticeable"² Electricity should be made available to Banjar, Kulu, Manah, Sarkaghat, Bhattiyat, Ajuhu and south of

Jogmndernagar up to Beas, Baggi to Janjali, Hamirpur, Sujampur, Nadaun, Dhragopipur, Bhawarna, Kotla and various other large habitations

Larji Dam Scheme :

The scheme to construct a 730 ft high dam across the Beas at Larji has been under consideration of the Punjab Government. It would generate 125 000 KW of primary power. It is also contemplated to divert about 10,000 cusecs of water from Chenab via Rohtang tunnel to augment power

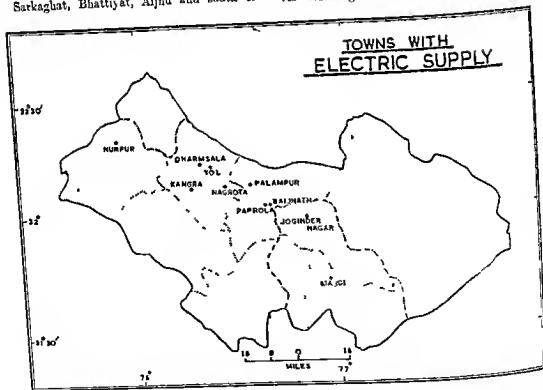


Fig 60

¹ Second Five Year Plan, op cit p 339

² Revised Second Five Year Plan, Electricity Deptt. Himachal Pradesh, Simla 1955 p 2

development of large dams. The scheme is no doubt ambitious but on account of the high cost and other practical difficulties, it is not likely to be taken up in near future.

Beas Project :

Work on Beas Project has begun. It comprises the construction of a Beas outfall link at Pandoh and an earthen dam at Pang. The Project is to be completed by 1970¹.

Small Scale Generation :

The territory is broken by ravines and intercepted by ridges and high hills isolating several areas. Long lines over vast uninhabited tracts would add very much to the cost of transmission. Numerous streams could be harnessed for local hydro generation on a small scale ranging from 10 to 250 KW. This power will be sufficient for the needs of lighting and small scale cottage and medium sized industries². In this way, like the Swiss valleys and chalets, electricity will be available to even small and isolated habitations. The generating sets will be of automatic type so that village groups are not put to trouble of maintaining them³.

The increased development and utilization of water power in the Himalayan Beas Basin will greatly energize its economy.

Mineral Industry :

In the Himalayan Beas Basin the potential mineral wealth is believed to be great.

Geologically, it has not been fully explored and charted.

Factors Retarding Exploitation :

Amongst the difficulties that have hampered exploitation are (1) Physical isolation of the region is not only due to its location in a distant corner of India but the peripheral hills and mountains separate it from natural communication with other parts of the country. Moreover, the state of transport and communications is not so well developed and fair weather roads are few. Thus inaccessibility, due to lack of proper communications and distance from markets, is an important factor, retarding development, (2) There is lack of efficient labour, technical skill, organization and capital to exploit the mineral resources. (3) There is absence of coal and scarcity of other fuel in places where development is desired. (4) Availability of cheaper products from outside is another reason. Iron is the only mineral most widely found but not exploited to any considerable extent.

Minerals and their Exploitation

Ores of antimony, lead, cobalt, nickel, silver and copper are also present⁴. Gold is found mixed with the sand of Beas. In Mandi, rock salt contributed nearly 1/3 of the former Mandi State Revenue⁵. These are the only deposits of rock salt in India. Slates are mined in Kangra and Mandi. In Kulu veins of silver, copper and lead

¹ For further details see under Hydrology.

² VI Report in the Statesman, New Delhi, dated 30.10.1954.

³ Revised Second Five Year Plan, Electricity Deptt. Himalachal Pradesh, op cit. p. 7.

⁴ Experts would start panning the deposits of Cobalt, nickel and silver in Kulu region. There is also hope of finding considerable quantities of Copper. (Till me 6.10.54.)

⁵ Mandi State Gazetteer, op cit. p. 49.

have been discovered. A large number of mineral and thermal springs exist in the area. Limestone is also found and extensive beds of sandstone occur. Mineral wealth of Kulu from different accounts appears to be great but is not yet exploited. Geological Survey is being undertaken in various parts of Kangra, Kulu, Mandi and Chamba for locating common and rare mineral deposits¹.

Recently drilling for oil has been undertaken at Jwalamukhi near Kangra².

In the schistose strata of Dhauladhar range between 5,000 ft and 7,000 ft are found the Dharmsala and Narwana slates (Fig 61). They are highly durable. A company to work out slates was founded in 1867 under the name of Kangra Valley Slate Company, at Kamara (32°12' E and 76°24' N) by Mr Fitzgerald. Average annual output was 1,500,000 slates, valued at Rs 80,000. Transport is provided by pack animals and head loads. Labour is largely seasonal.

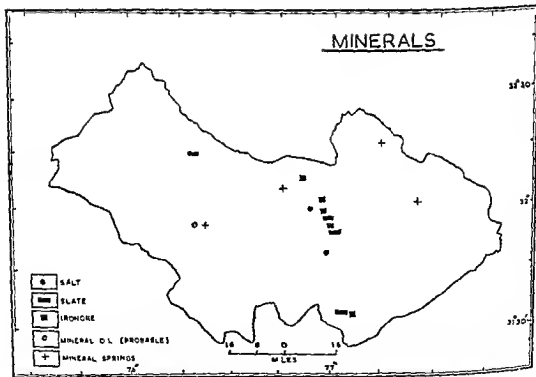


Fig 61

¹ "The Prime Minister said that in the course of survey the Atomic Minerals Division of the Dept. of Atomic Energy had located fairly extensive radioactive zones in the Parbat Valley of the Kangra District. The survey work has been intensified and extended (Statesman 27.8.6.)

² Suggestions for industrial exploitation of various minerals are made elsewhere.

Small quarries are worked at Bhagsunath, Narwana, Jiyya and Kareri

The deposits belong to Infra Krol age of Dhauladhar range and are found imbedded into sandstone of Blami group. The dip is on an average 40° – 45° .

Kangra Slate Mineral Composition¹

Mica (Sericite)	25–30%
Carbonaceous material	5–7%
Chlorite	4–6%
Quartz	37–49%
Haematite	2–5%
Rutile	0–1%

Slates of various shades of dark, blue and black colour are found. These colours are of great permanence and retain their original shade after years of use under very exacting conditions. Fading may take place due to decomposition of iron, lime and carbonate content under atmospheric agencies. Average specific gravity of Kangra slate is 2.7 and porosity is below 0.25%. Two favourable factors of Kangra slates are low quantities of sulphide of lime and iron, and high cleavability². Slate of rough quality is obtainable throughout Kulu and Sara; In Mandi slate is obtained from Sanor, Nachan, Pandoh, Uttar Lal and Chohar. The places are out of the way in high hills and therefore slates are produced for local use only. Best slates

are obtained from Bikhhal in Pandoh 12 miles above Mandi.

In Europe and U.S.A., the cost of working slate has been considerably reduced by wire saw method. This also helps in thin splitting (up to 1/50 of an inch) which is not possible by manual labour. Machines should therefore be installed. Since slate has now to compete with other materials, it should be quarried efficiently and the waste should be turned into a bye product³. When lack of galvanized iron sheets occurs, their demand increases. Lack of communications and capital prohibit extensive operations. The reserves are inexhaustible⁴.

Sandstone of various degrees of hardness and suited for constructional purposes is found throughout the region. Stones have been used for building purposes extensively and some of the ancient forts are a testimony to the fine quality of stone and the workmanship of the artisans. The cost of transport is a deterrent factor in further development. The mass of Divalik Group is quite unfit for building purposes. Sandstone fit for ornamental or monumental purposes may be found among the thick bedded hard limestones of Krol Group. They are fine to medium grained, kaolinitic and Nahani sandstones and are widely used for building and road metal purposes.

1 Netravala M. L., *Building Stones of India*. Dissertation, M.Sc. Geology, Banaras Hindu University, 1939, p. 88, 1 unpubl. sheet.

2 The latter makes quarrying easy as 1 slates as large as 8 ft x 8 ft. can be extracted with little difficulty. They possess even a perfect fissility which enables them to be split for slabs and fine roofing slates. Method of extraction is simple. Wherever cleavage is developed, a site is selected with care by simple geological, cross-section and hammer. Where cleavage is well developed, rock is exploded with dynamite. Later the slate is split trimmed in a sawed. All these processes are carried out by hand.

3 Leconk, G. S. L., Vol. XVI, 1915, p. 246.

4 Kchle, B., *Mineral Resources of Mandi District*, Thesis, B.Sc. Mining, Banaras Hindu University, 1931, p. 72, Unpublished.

Limestone is found in the metamorphosed strata of upper Kangra range in great abundance and is found in the rocks associated with Mandi salt belt. Stone most in favour with the people for burning into lime is Porous tufa. It is found everywhere along the flanks of limestone ridges. Usually limestone appears in a narrow zone between gneiss and Tertiaries. Major outcrops occur in Jogindernagar marls, Suket belt and Larj window. Some bands of limestone are suitable for manufacture of cement.

Glass sand Quartzite deposits outcrop extensively along Mandi Kulu road and the fact that they are described pure suggests that they may be suitable for manufacture of glass.

Numerous mineral and thermal springs exist in the Himalayan Beas Basin (Fig 61). Mineral springs occur in the neighbourhood of Jwalamukhi. They lie along the southern base of Jwalamukhi hills and are six in number. They contain considerable amount of chloride of sodium and iodine of potassium. Spring water issues from a hole made in the gneiss. The amount is not large¹.

The water promotes the cure of gotche which used to be so prevalent. A hot water spring exists at Tatwani² in Kangra Tahsil. The temperature of water is 195°F and there is no peculiarity of smell or taste.

Another hot spring is at Sansal in Palampur also called Tatwani. A fair is held there on the day of 'Nirjala' (Kadashi) and bath in the spring is said to be efficacious in curing rheumatism. Tatwani has a temperature of 120°F and contains salts calcareous and ferruginous³. Loonsu has a solution of iodine salts in Kulu, Manikaran⁴, there is a small group of springs. These hot waters attaining to a temperature of 202°F are situated along the banks of ice cold waters of the Parhati. The water contains many dissolved salts and deposit of ferruginous travertine and is considered healthy to sufferers of rheumatism. It also serves as a fireless cooker where the tourists and local people cook rice and 'dal'. Water is led to baths where the tired may relax their limbs. A small spring is at Khirganga on the right bank of the Parhati mineral properties of which have not been analysed. Bishist hot springs are situated about two miles from Manali. The water contains many dissolved salts chief amongst which are NaCl, Na₂SO₄, CaCl₂, CaCO₃. Near the spring is a revered shrine at either of which the sick or the sinners may be healed. Another hot spring is at Kalsh on the right bank of the Beas above Katran.

One curious feature in connection with Indian minerals is the neglect of our numerous hot and mineral springs⁵. Various

1 The author was told that the water used to be sold at one anna per seer after it had undergone a bit of concentration.

2 Tatwani is derived from the word 'Tatta' (Pana) which in local dialect means hot water.

3 Krishnaaswamy, R. 'Thermal Springs of India'. Indian Geographical Journal Vol. XXX, Nos. 1 and 2, 1905, p. 33.

4 The name Manikaran is due to the legend that small white pearls like beads or 'manis' used to be ejected from the spring.

5 Records G. S. I., Vol. XLVI, op. cit., p. 290.

springs should be developed as centres for tourism and therapeutic treatment as is the case in Europe. In Europe, Hotels and clinics have grown around them¹. Better roads and accommodation facilities, and a more comprehensive assessment of their therapeutic values are necessary. Hundreds of springs in India have been investigated by the Geological Survey of India and the fact has been established that the properties of some of these are similar to such well known foreign types as Vichy (sahne) Aix les Bains (sahj hur) I vian (sahj onate). It now remains to develop these resources as soon as possible.²

Iron ore is found in the valley of river Uhl (Fig 61). In 1882 the Kangra District Board spent 2100 rupees on machinery and started a road to the valley. The road was never finished and the machinery was disposed off for a song³, for several years the output was practically nil. Formerly local demand used to be met from here but now cheaper products are available from outside.

Administrative Report of Kangra District for 1882-83 makes mention of 8 iron mines in Bir, yielding 90 maunds or 3½ tons a year. The ore was tested by Mr Macartney of the Geological Survey of India and was found to be composed mostly of schists in which is found magnetic oxide of iron. Dhatmani is the site of principal mine and tests in England proved it to be as good as the best Swedish ore.

Ore is smelted by native smelting furnace by charcoal. In 1858 cost of 1 maund of iron was Rs 1/14/.

Iron Industry
Iron Produce

Year	(in mts)	Furnaces
1853	500	116
1883	90	19

Due to unfavourable factors of lack of fuel and transport and disappearance of 'Lohars' or iron smiths, the chances of working the ores have still further decreased. It was estimated that for making 1 ton of iron, 2 tons of charcoal were required or 20 trees had to be felled.

Now that electricity is available from Mandi Hydroelectric Project at Joginder nagar and railway communication exists up to that place the possibilities of development are worth exploring. An important reason which discourages the development according to the author is the availability of best quality of iron ore and the presence of coal and limestone etc. in such favourable manner in Bihar and other places in India that the cost of production is low. In comparison the working of Uhl iron ores would be uneconomical at present.

In Mandi iron ore is found in Nachan Pauloh Nagar and Saraj (Fig 61) in the form of crystals of magnetic oxide of iron embedded in decomposed and friable mica sheets. The deposits in both Kangra and Mandi are large. The ore is collected during rains when slips expose the veins and schists.

1 Kuvastila S. L. To metal Industry of Kangra Kulu and Mandi in the Himalayan District Board report p 135

2 Fox C. and Mura C. V. Indian Minerals ores etc. B.I. No 1-1-A G. S. I. Vol. LXXVI 1943 p 117

3 Kangra District Gazetteer Vol VII A Part I op cit p 323

are of ¹ Iron content of Mandi ores is 20-30%. Smelting is not profitable. Magnetite ores are easily friable. Their existence is known for a long time. Long ago the iron washers of Mandi used to work magnetite crystals out of the hills & detritus. From it the local black smith used to manufacture a very pure variety of iron which possessed a large demand. Mandi iron would not rust and utensils made of Mandi iron last a lifetime. Tradition has it that the famous 'Damasc Blades (swords)' of Panjt Singh's army were forged from Mandi Iron Ores. This is perhaps true as is evident from the large heaps of slag at Dhamrer Chachiot and Thanaq. In 1931 smelting was stopped by an order of the Paja of Mandi on account of great drain on forests for the supply of charcoal. Electric furnaces operated on hydroelectricity from Jogindernagar could possibly revive the industry but it is doubtful whether that would compare favourably with production costs elsewhere in India.

Salt is mined in Ghoghar range and is worked at 'Megal, Guma and Drang' (Fig 61). The Mandi rock salt does not look like one's conception of salt. It is grey to purple colour rock of limestone, slate and trap etc. Guma salt is better than that of Drang but both contain 20-35% of foreign matter. Salt is exported from Mandi to adjoining areas. In 1900-1 export was 111,074 maunds. In 1907 State expenses came to Rs 15,000/ a year and annual revenue to Rs 8,000/.

a year. Light tramway was constructed to remove the mud and stones etc. In 1846 price of salt was annas ten per maund³ and in 1871 it was Rs 1/4/ or double that of 1846.

Salt deposits are worked in a very primitive fashion. Mandi salt production on an average (1909-13) was 3,689 statue tons per year which gives a total percentage of 2.4% for undivided India⁴. According to recommendations of Salt Committee the Drang salt mines are being developed into 'the biggest salt works in India' at a cost of 90 lakhs of rupees⁵. They will start supplying 66,000 tons of pure salt a year after the implementation of expansion and mechanization programme. This will meet the demand of Himachal Pradesh, Pepsu, Punjab and Kashmir.

On wet mining the salt saturated water (brine) will be pumped and piped from Drang to Jogindernagar for refining. The percentage of sodium chloride in it will be 99% while the minimum percentage fixed for human consumption by the government is 90%. Present total output is approximately 112,000 maunds. Further the situation of Jogindernagar at railhead together with the advantages of cheap hydroelectric power and abundant water supply make it an ideal place for the development of chemical industry.

At Jwalamukhi jets of combustible natural gas had attracted the awe and admiration of countless people for hundreds

¹ Mandi State Gazetteer op cit., p. 50

² The age of salt is quite uncertain but it appears to be connected with Tertiary beds.

³ Mandi State Gazetteer op cit., p. 57

⁴ Records G. S. I. Vol XLVI op cit. p. 205

⁵ Wide report in the Statesman, New Delhi, dated 8.3.5

of years. This was considered as the main festation of the supernatural phenomena and the people worship at the temple of Jwalamukhi—'the Goddess of Flaming Mouth'. Now and then it has attracted the more scientifically minded to enquire as to the cause and some guessed the possibility of oil in the substratum.

There were investigations carried out recently by the Geological Survey of India, but only recently the Union Government Oil and Natural Gas Commission undertook to explore the possibilities of oil. According to 'Soviet Experts' Report¹, reference drilling operations were recommended for Jwalamukhi area (Fig 61). Investigations for oil and gas were also to be carried out near Dharmasala and Bala. At Pathar in Kangra, subterranean oil deposits are believed to exist and indications of oil were found at Bala Mandi².

Two and a half miles from gird domed Jwalamukhi temple, drilling operations were started by the Rumanian experts on 20th April, 1957, which day will be remembered as a red letter day in the history of mineral exploration in the Himalayan Beas Basin.

The 112 ft high derrick on a spur in the Jwalamukhi hills is symbolic of the impact of modern technology and science in this remote and underdeveloped area³. It is expected, that boring will go down to 1100 ft.

A geological laboratory is also being set up in the area for examining debris of stone and gravel, oil sand⁴.

B. PRESENT DEVELOPMENT AND FUTURE PROSPECTS OF INDUSTRY

Existing Industrial Development

Large scale manufacturing industries are unknown in the Himalayan Beas Basin. The ordinary demands of the people are met by the village artisans. The various cottage and small scale industries are adapted to the resources and requirements of the hill economy. The raw materials wood, wool, stones, hides and skins etc. are easily available. The local craftsmen and artisans turn out their products with simple and old fashioned tools. For some of the more sophisticated requirements of the townsfolk and once having lived in the town country folk manufactured goods and other articles are imported from outside.

1 Vile report in 'The Statesman', Delhi, May 22, 1956.

2 Vile report in 'The Statesman', Delhi, January 1, 1956.

3 In a message on the eve of drilling operations, Shri Nehru said: 'It is a new and major step and the beginning of a great adventure. Success in finding considerable quantities of oil will make a tremendous difference in India and in its economy. We have seen in recent months a great revival in oil not only in the world's economy but in the world's politics.' Vile report in 'The Statesman', New Delhi dated 21-4-57.

4 Shri N. D. Malaviya, Minister for Mines and Fuel revealed that Rs. 3 crores have been spent on oil exploration in the Punjab. 12 deep and shallow wells have been drilled. There has been no success in finding either oil or gas in commercial quantities. However, it is the view of the technicians that search for oil in this region must continue. Consequently the oil exploration programme has been reorganised to drill another half a dozen wells in the Jwalamukhi area. Vile Report in the Tribune, Ambala, 16-10-52.

So far, no economic survey for planning industries has been made, neither inventory has been prepared of the various mineral and other industrial resources. Thus industrial development has been hampered due to lack of any well organized effort. It is due to the fact that the area was partly under the rule of hill rulers who cared more for their purses and palaces than for the economic development of their territories, and partly on account of its neglect by the British Government which had treated the area as a colonial appendage more for exploitation of its people and produce than for its enlightenment and progress. The area has been an important recruiting centre for the Defence Services. In pre-independence days the usefulness of the area as supplier of 'cannon fodder' was apprehended to be endangered by more profitable opportunities and thus economic development was systematically neglected and restricted. Such state of affairs would not be desirable in independent India. Scope exists for important industrial developments. There is available abundant water power, forest wealth, salt, herbs and wool etc. Considering that under the present conditions, the agricultural density has already reached saturation point, surplus manpower could be utilized in industrial undertakings.

In the absence of organized labour force and capital, required for large scale industry, the area is suited, in general, to cottage and small scale industries. The local industries are inextricably interwoven with the whole texture of the domestic and social life

The various arts and crafts have long been recognised as 'material symbols of the unique cultural heritage'.¹ They provide greater employment and income for a large number of persons and thus occupy an important place in hill economy. Certain products like 'Pashmina' shawls, embroidery pieces and Kanera paintings have found their way to distant corners of the world.

SMALL SCALE AND COTTAGE INDUSTRIES

Textiles-Wool

Large quantities of wool are available from the Gaddi and peasant sheep flocks. In addition finer wool like 'Biang' and 'Pashmina' is imported from Tibet.² According to colour, generally two qualities of wool are available white and mixed. There are several varieties of wool according to texture and staple. Biang wool has an average staple of 4-6 inches and a maximum staple of 9 inches or so. It is available at the rate of 180-200 rupees per maund and four to six thousand maunds are annually imported. 'Imbu' wool has 2 to 3 inches long staple. The wool is fine and soft. It is the first cutting of the baby sheep. 'Deshkar' wool is local produce. Its staple is 1 to 1½ inches long and it is rough in texture. Gaddian wool is similar to 'Deshkar' but is coarser. The best wool is Pashmina. Pashmina consists of under fur of hairy quadrupeds especially that of goats found in elevated regions in Tibet. Its staple is 1 to 1½ inches only but the wool is very soft and fine. Nearly 4000 maunds are imported. Kulu

¹ Chattopadhyaya, Mrs. Kamla Devi, Cottage and Small Scale Industries. Statesman dated 1/1/57

² Due to recent developments across the border there is very little import now.

consumes about 200 maunds and the rest of the fleece goes to Nurpur, Ludhiana, Dharmal and Amritsar. Pashm is now purchased at high prices by Amritsar merchants, many of whom are agents for American dealers. Thus the prices of fine wool have shot up.

The whole of the wool contained in a sheep's fleece is not of the same quality but differs greatly according to the part of the body from which it is obtained. Best wool is from the sides and upper parts of hind legs. Long and soft fleeces have too small yield of yarn as compared to medium coarse staple wool of the plains. Kangra wool is best for worsteds. On account of frequent shearing, poor breed and nourishment, the fleece is generally short and coarse and unsuited for better types of cloth. Clipping of wool is done three times in a year—in February, June and October. Average yield is low. It is about 10 chaffaks (a little over a pound) per year but well maintained cultivator's sheep may yield as much as 4 pounds per year. Annual production of wool is about 1,500 maunds¹.

Weaving is important amongst hill people. Nearly all agriculturists of upper hills make woollen cloth and 'Pattis' or blankets for their own use. Spinning is usually done in winter and weaving in spring or summer. In addition to the cultivators, other wool workers include Gaddis, gypsies and professional weavers. The professional weavers are litigious and given to drink and other affairs and do not make an organized and

dependable labour force. The gypsies visit different villages and work for the cultivators on barter or cash basis and are efficient in their work.

Gaddis are highly skilled in spinning work. They spin on 'Takk², even while walking. Wool is spun into yarn by twirling the spindle and the yarn is wound on the spindle as it is spun. One person may spin nearly half a seer of wool daily if devoted to it exclusively.

Finer yarn is spun with 'charkha' or spinning wheel. The finer the yarn, the better is the fabric. Best spinning is done in Nurpur, Garhi and Kulu. Mahajan ladies and Kashmiris are great experts in spinning fine yarn.

Gaddis themselves weave cloth and blankets with simple but effective designs. Women and men both do the weaving. Wool spinning and weaving is an important cottage industry.

The looms employed are simple and primitive, consisting of nearly half a dozen small sticks, a few chords and leather straps. The wood is light. The common type is throwing shuttle loom. Improved types of looms are being introduced by the Industries Department (Fig. 62). The produce of the loom, after meeting the personal needs, is sold. Coarse wool is used for blankets, ropes and bags. Mixed cloth of wool and cotton is called 'Jora' and is also woven. The blankets or pattis are black, white

1 Vile information supplied by District Industries Officer, Dharmal, dated 17.9.56.

2 The takk is a simple contrivance. It consists of a circular piece of wood about 12 inches in diameter and through its centre is fixed a lateral spindle about 2 inches thick and 8-9 inches long. Its manufacture costs almost nothing.

or brown according to the colour of the wool 'Pattus are very much in demand and find ready sale Even merchants from the plains buy them in large quantities Pattis or cloth for suiting is made in pleasing designs Namda is a matted hair rug used as floor rug or bed spread in place of carpet Gudma' is a fluffy blanket and is used in place of quilt A rough kind of floor rug called Thobi is made from goat's hair The thobis are woven in strips of about 30-40 ft long and 9-12 inches wide in a large variety of pleasing colours For a floor cloth the strips are cut to the required length and sewn together just like the jute matting



Fig 62 Woollen Industry, Kulu
Shawls and wrappers of raffle and Pashmina wool are made at Nurpur, Kulu, and Mandi (Fig 63) Ladies shawls of Kulu are

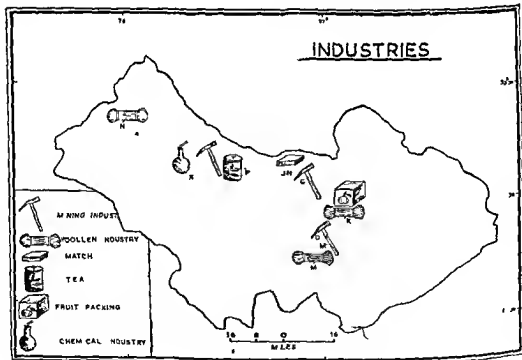


Fig 63

very attractive and have become so famous that similar shawls whether made in Kashmir or Mandi or Amritsar are also sold under the name of Kulu shawls. Nurpur was formerly the seat of considerable manufacture of shawls but the industry has declined recently due to the emigration of muslin weavers in 1917. In all, nearly 20,000 raffle ladies floral shawls and 4,000 pattus are made. Almost all manufactures undergo the process of stuffing. Fillip to woollen industry has been given by Government. Industrial School at Kulu similarly workers get instructions and other facilities at Workers Cum Production Centre at Mandi. There is need for starting a wool spinning carding and weaving centre at Palimpur. Carpet weaving could also provide business and its manufacture is well worth exploring. Workers could be better off if they work in co-operatives because at present the 'middle men' take out large share of profits and leave the worker with bare subsistence wage. The artisan is often at the mercy of the money lender and the bazar agent. They advance him money or raw material at very high rates of interest and take in repayment the finished articles at far lower than the market rates.

Cotton Textiles :

Cotton of rather inferior quality is grown in small quantities. Khaddar is made from coarse yarn largely imported but the production is small and much of the cloth

used by the people is imported mill made cloth. There are weavers of 'Julaha' families who are professional weavers but on account of decreased demand for their products, they are taking to other occupations. Scarcity of cloth during war period (1939-45) gave a temporary fillip to this industry. The dyeing work is in the hands of 'Nilars' who are skilled in the art of dyeing gay colours of great beauty and variety. There is good work available for them as no married women would wear just white clothes.

Silk

Early attempts were made to introduce silk in 1878.¹ Messrs Lister & Co attempted to introduce silk industry on a large scale but disease spread among silk worms probable due to want of care and after heavy losses the company had to close work. Government Industries Department has made efforts from time to time to reintroduce the rearing of silk worms. In 1914 silk worm eggs were imported from France.² In 1953-54 about 165 lbs of raw silk yarn were produced. The industry has not yet caught the imagination of the people but there is no doubt that would provide a profitable sideline.

Food Industries

There are various food industries amongst which flour milling, rice husking, oilseed crushing, gur making and apiculture are worth mentioning.

¹ Vide information supplied by Inspector of Industries, Mandi dated 27.9.1954

² Kangra District Gazetteer Vol VII A op. cit. p. 37

³ Vide information supplied by Inspector of Sericulture, Mandi dated 27.9.54

honey flora such as wild flowers and trees exist in the hills. Attempts to keep bees in modern hives were made in the beginning of 20th century but progress was very slow. In 1936 a Model Government Bee Farm was started at Nagrota, with a view to introducing modern methods of bee keeping, improving honey yields and popularizing bee keeping as a side business. Average yield per hive is 10 to 15 lbs a year. The present sale price for good honey is 2 to 3 rupees per lb. Thus the farmer and the horticulturist can add to their income without much effort or expenditure. Moreover, the honey bee helps in the pollination of different field and garden crops and thus increases harvest yields. In California (U.S.A.) mobile bee hive masters take their stocks to various orchards and have made business of pollination work in addition to honey extraction. Even as full fledged and independent business bee keeping is profitable and the producer of honey has ready sale. Mullick's Bee Farm at Rason (Kulu) and Dogra Bee Farm at Hatwas are run on commercial lines. At Kartrain (Kulu) and Nagrota training course in bee keeping is given.

Bee keeping is an occupation that is at once a cottage industry, hobby and education combined. The honey bee is an apostle of industry, cooperation and self sacrifice. It is just the example needed by the people of hill areas who need to learn and profit by industry and cooperation.

Liquor Distillation :

Distillation of Lagri Sur or hill beer affords livelihood to quite a few persons. Lagri is a popular drink amongst hill people.

Tea and Fruit Industry*

Both the industries are important²

BUILDING INDUSTRY

Masonry and Wood Work etc.

Roughly dressed stone is used almost in all construction work. In some parts sun-dried bricks are made and used in house construction. Some of the temples and old castles and palaces in the hills show very good stone work done by the 'Batershis' or hill masons. But now there has been distinct falling off of standard work mainly due to lack of patronage.

The 'Brecht' or 'Tarkhan' as the carpenter is known does most of the wood work. Brechts plane and design beams, doors and windows, and other house construction and timber. The 'Arakush' or sawyer cuts the scantlings and rafters into usable sizes. The cultivators feed the carpenters and give them some cash and clothes as wages for work. These men often remain continuously in work till it is finished, not even going home after the day's work. Now electric saws are doing most of the work.

Plume is made in a Kiln³ from limestone which is found widely distributed in the hills.

1 Edm in History, one of the heroes of the Acent of Mt. Everest happened to be a bee keeper from New Zealand.

2 They have been already dealt with in Chapter IV. See also D. Plantations and Orchard.

3 The kiln or Bhattu is a round structure roughly 10 ft in diameter. The bottom of which a thick layer of fuel is laid. On this the limestone boulders, broken into small bits, are spread to a depth of 1 1/2 ft. and these layers are repeated alternately till the well is full. It is then closed in with mud plaster. At the bottom is an opening through which the kiln is lighted and it usually continues to burn for 10 or five days—the process of cooling takes about the same time. The lime is then taken out and slaked.

quality is imported from the plains. Wool and grass shoes or 'Pulan' are also worn by some in Mandi and Kulu but use of leather shoes is becoming more popular. The chamars in most places combine the professional work with agriculture.

Iron and Brass Work

A good deal of iron work in connection with the needs of the agriculturists is performed by local iron smiths or Lohars. The work turned out is of poor quality. There is no knowledge of casting or steel tempering. Rough articles from hammered out iron are made. Pans, karahis and 'tawas' made of local iron in Mandi are durable and much appreciated by the people.

Thathars or brass workers make utensils of brass and copper at Sujanyur Kulu and a few other places. They also prepare brass statues for the temples of the local deities. The deafening din goes on all the day long where 'lohars and thathars' work. The trade of making utensils and implements is dwindling on account of increasing import of machine turned and much better finished articles imported from outside.

Clay, Stone and Wood Vessels

Articles of clay, stone and wood are made from the local raw materials so abundantly available here. 'Baterahs' make stone vessels, mortars, grinding slabs, millstones etc. They also make statues of stone.

The 'Kumhars' make earthen pots and earthen toys (Fig. 61) of all shapes but their workmanship suffers from lack of uniformity.

design and finish. There is still large demand for earthen wares.



Fig. 61 Earthen Toys

Pots churners, rollers etc. are made from wood. They are light to carry. Gujjars used them for churning curd or keeping milk. Gullies also use them. They make them from walnut wood which is easy to work on. There is need of an industrial school for imparting instructions in wood work. Plenty of suitable wood is available and wood work industry could be made as paying as it is in Kashmir.

Bamboo Work:

'Dhoomnas' are skilful workers in making articles of bamboo. These articles are useful and cheap.

1. A mandy proverb shows the extent to which the bamboo is held for the variety of articles made from it.

Kanky ro pas Pen v re saman ill ra kiya vankian

What can be said of different kinds of local handicrafts of which not an inferior article is made of bamboo.

Of late, bamboo chairs and tables are also being made. The only tool used is a knife with a sharp blade 6 to 8 inches in length. Special bamboo boxes or Pitars were valued for storing the more valuable articles¹. Amongst hill people they are considered suspicious for the bride's clothes and jewellery. Although bamboo is found in great profusion yet bamboo work is not done extensively on account of caste prejudice attached to the profession.

Ropes and Brooms etc

Fibrous manufactures from natural grass and bark of trees etc are not neglected. From the wild nettle and cultivated hemp are made ropes, shoes, bags and nets for fishing and snaring birds. The bark of birch and dhawan trees is used as fibre for ropes after the stalks have been well soaked in water for some days. Ropes are also made of Baggar grass which grows wild on hill sides. Brooms and winnowing scoops are made from reeds and mats from the leaves of exotic palm trees.

Forest Industry

The forest industry consists of extraction of timber, charcoal, bamboos and resin (Fig 65). Kangra, Mandi and Kulu forests represent the chief source of timber and resin for the province of Punjab. The forests are not easily exploitable owing to their remote location, difficulties of transport, irregular labour supply and increased cost of transport. Labour is difficult to obtain during crop season. People are fond of fairs

and their small social life and the forest work deprives them of these pleasures. Dishonesty of sub-contractors who frequently pay little or decamp with the wages is no less responsible for labour difficulties. Kulu and Bhattiyat people do not like to work in forests and even there Kangra labour finds its way.



Fig 65 Resin Tapping

Some forests are worked departmentally but generally standing trees are sold to contractors. Nearly 3,000,000 cu ft of timber is annually extracted. Market for timber is well established. It is in demand for railway sleepers, house construction, packing cases, pit props, telegraph and electric poles and various other uses. War made great demand for timber and excessive fellings were made. With the partition of Punjab in 1917 there was lot of demand for construction of refugee houses. Felling and

¹ In the hill idiom Pitara Sambhalia means to succeed to cash and valuables.

² Figures are collected from unpubl. *Annual Reports of Forest Department—Dharmasala, Hanuipur, Chambe* (for Bhattiyat), Mandi, Kulu and Saraj.

sawing is done by human labour. All timber finds its way to the Beas river. Launching of timber starts in the 2nd week of August when the streams are full of water. The timber is collected in the plains at Wazir Bhullar on Beas. Side streams are not all suitable for floating logs because of the occurrence of rapids. Donald gravity ropeways are used for bringing scantlings from the precipitous country. Due to rise in wages of labour and cost of transport, the cost of timber extraction has also been rising.¹ Since 1939-40, cost of extraction has more than doubled. There does not appear to be any likelihood of the prices coming down in near future.

About 50,000 maunds of *r sin* are collected from the forests. In addition to this, there is a long list of minor forest products including herbs which also bring large amounts of revenue. Right holders make large demands on forest produce. In 1948-49 in Mandi forest² the total value of disposals was Rs 1,366,161 while the value of grants and free usage to right holders etc. amounted to Rs 732,358². With better management and elimination of forest abuses more produce and more revenue could be collected from the forests.

MISCELLANEOUS INDUSTRIES

Chemical Industry :

The Azad Hind Chemical Works are situated on Kangra Pathankot road at

Ghnrkari. The output is not significant. There is a small match factory at Joginder nagar (Fig. 63). Washing soap is manufactured to meet the local demand in various towns.

In the case of arts and crafts, it is necessary that the products must live to see the needs of modern living. Redesigning is necessary if modern standards have to be met. The craftsmen often remain content in a state of mental torpidity and repeat age-old designs using age-old methods³. In fact the situation has so altered that the field of handicrafts is said to be mainly in the preparatory stages of evolving experimental new type forms for mass production. The local artisan and craftsman needs to be educated to see the new demands and changing patterns of their trade. The government must assist in giving technical advice, financial assistance, and in the formation of cooperative industrial societies. The Industries Department with the help of the multipurpose cooperative societies proposes to instal such industrial units in respective areas as would derive the benefits of certain concessions and rebates offered by the All India Khadi and Village Industries Board during the Second Five Year Plan⁴. In order to develop cottage industries and to render technical help to cottage industry workers at their very doors, the Punjab Industries Department maintains 12 'Travelling Demonstration Parties'. In addition to this there are three technical

1 Agarwal K. I., op cit p 54

2 Vile Annual Report of Mandi Forest Division, Mandi (1948-49)

3 Industries Supplement—The Tribune—Ambala 23-4-1954

4 Vile information supplied by District Industries Officer, Dismalsh letter dated 17-9-56

institutes¹, one each at Baijnath, Mandi and Kangra. There is great need of introducing suitable handicrafts and cottage industries on the pattern of 'Kashmir Arts and Crafts' to elevate the poor lot of the people. Much scope lies in the industrial cooperatives on cottage industries basis.

Proposed Industrial Development.*

As stated earlier, considerable potential exists for the development of such industries for which resources exist in the area. The proposal for newsprint paper manufacturing factory in Kangra and chemical industry at Jogindernagar has gone beyond the exploratory stage². A brief discussion is possible, in the present work, of certain industrial projects.

Match Industry

Suitable raw material is available for the manufacture of match splints and boxes³.

Simhal, Ambara, Oh, Kernal and Gumar grow in lower hills and the rest in the high hills. These trees grow extensively and

there can be no question of dearth of suitable and sufficient wood. The waste wood from coniferous forests is available in large quantities. On a rough estimate about 500,000 cu ft of waste wood is available from Kulu forests alone. In European countries match splints are manufactured from conifer wood of this type. Huge quantities of these are wasted in Kangra, Kulu and Mandi forests. During war years large quantities of simhal wood were exported to match factories of Shahadra (Lahore) and other places. Splint manufacturing on cottage industries basis can be started. Chemical treatment can be undertaken at a suitable centre. Peeling and chopping machines can be operated on energy of 2 H.P. which can be obtained direct or generated from Kulis. Nagrota and Jogindernagar would be suitable centres for the works, because of their suitable location and connection by rail and road. Production of 8 lac gross match boxes a year on cottage basis can be organized in Kangra valley⁴.

¹ They are (i) S. D. Technical Institute, Baijnath.

(ii) Industrial Training Centre Technical Institute, Govt. of India, Ministry of Labour Mandi

(iii) Technical Institute Kangra.

*Based on personal survey.

² Vide report in the Tribune Dated 10.6.54.

³ The following timbers will provide the necessary requirements.

1 Simhal	(<i>Bombax malabaricum</i>),
2 Ambara	(<i>Spodis magnifera</i>)
3 Oh	(<i>Alizia et pulata</i>)
4 Kernal	(<i>Lantus grandis</i>)
5 Gumar	(<i>Gainedna arborea</i>)
6 Rai	(<i>Ab + vundrow</i>)
7 Toeh	(<i>Picia morinda</i>)
8 Kail	(<i>Pinus excelsa</i>) and
9 Safola	(<i>Iopulus ciliata</i>)

⁴ Report of Development Board, Punjab Government. Value quotation in Annual Number of Kangra Sewak Salha Delhi 1953, p. 17.

Paper, Pulp and Rayon Industry*

The family of Gramineae from small grass like bhabar¹ to the giant grass like the ban il oo is a most suitable and economic source of raw material for pulp and paper industry. Both bhabar grass and Lamboo grow luxuriantly in the valley and lower hills. Large quantities of these are exported to Jagadhari Paper Mills. In addition to bamboo and grass there are abundant soft wood resources in the high hills. Conifers yield the most suitable material for newsprint paper². Pine needles and conifer waste-wood could also be utilized for making pulp. Their removal from forests would also reduce the fire hazard. Some of the important raw materials softwood and abundant water supply are available for rayon industry. Chemicals would be forthcoming from proposed chemical works using brine as raw material at Jalandhar nagar. High hopes were raised for such industrial development with the development of Mandi Hydro electric Scheme. According to Roy³ 'electricity will help in manufacture of chemicals refine silk recover gold from Sami khad by cyanide process revive iron industry polish beautiful ornamental stones of Mandi quarry slates and revive iron industry. Only huge capital outlay for such works is lacking and the Government can take initiative in this direction.

Wood Working

The Himalayan Best Bawn is in an enviable position in having ample resources

of workable wood. Wood is required for making bodies of buses and aeroplanes, furniture, electrical casings, toys and sports goods. Suitable varieties of wood are found in the area. Manufacture of prefabricated house material and ply wood is possible. There is great demand for these materials all over the country. Shisham, 'tosh, deodar, kailan l ras are excellent for door and window frames and cabinets. For plywood Bambox, maharoun, F. n. e. m. j. ar. bolana and Bitula alnouds are suitable woods. Cultivation of willow is being introduced in Kulu and mulberry wood is already available for sports industry. Suitable wood for pencils and penholders is available from deodar, spruce and silver fir.

Waste-wood Distillation

Large quantities of road tar are imported annually. There are possibilities of manufacturing a certain quantity of wood tar from wood rollings and waste. Besides other bye products also become available. The Government or the industrialists would be well advised to explore the possibility of starting this industry.

Silk Industry

It is possible to raise mulberry trees along streams, kulis and edges of irrigated fields up to an elevation of 5000 ft. 70-75 trees can supply ample food for silk worms raised from a tin of eggs costing about Rs. 5 or so. Within 40 days they grow into a full size when they form cocoons, which can be

1 Punjab & Third Five Year Plan & Jalandhar proposals designed to set up heavy industries such as a paper factory in the Jals Das cement factory in Ka. g. and etc. in a scheme to industry (The Hindu, 11/11/54, p. 46-7)

2 Roy & K. Th. Punjab Government Hydroelectric Stat. at Mandi & its J. ar. n. in the Mineral Resources of Mand State. Quart. J. G. of M. n. & Met. Soc. of Ind. n. Vol. I, Nos. 3 & 4, pp. 115-120

prepared which are not only members of Indian pharmacopoeia but also of British pharmacopoeia. Their enumeration would make a long list but to mention a few they are, *Ailanthoda vasica*, *Indian scilla*, *Castra fistula*, *Mulleus philippinus*, *Hydrocotyle asiatica*, *Plantige orata* etc. The presence of these herbs justifies the establishment of a pharmaceutical industry. The small concern at Kangra is but an apology. The preparation of 100 lbs of tincture *Belladonna* would cost about Rs 250/- but sale price would be nearly Rs 300/-, thus giving a profit of 20 per cent. Several species of the same herbs occur in the same locality and their collection by untrained hands results in mixed quality. Therefore there is also need to train people who can distinguish the different varieties. The herbs collected should be made into concentrates before export. This will save costs of transport and bring higher profits.

Chemical Industry.

During the industrial survey of possible developments it became evident that scope exists for the processing of certain articles in a chemical factory. Raw materials available are tea prunings, *Katha* (*Acacia catechu*), soapnut (*Sapindus mukrosi*), Lac, resin, wax, pectin (from fruit peels), tanning material, slate dust and mineral salt.

Caffeine Extraction

Rough and waste tea prunings are excellent raw materials for recovery of caffeine.

Katha Refining

About 5,000 maunds of *Katha* is produced annually. The *katha* content of wood is

12-15% but only 5-7% is recovered by crude indigenous process. 5% of valuable product goes waste and can easily be recovered by scientific handling.

Varnish Industry.

Manufacture of varnish with turpentine and linseed oil, both available, can be done.

Manufacture of Saponine

Manufacture of saponine or soap powder from soapnuts (annual production 100 000 mds) as is done in Australia and France could be profitable. Soap powder will fetch good prices from its sale even in the hard currency area.

Lac Refining

The area produces about 1 500 maunds or 25% of the lac produced in Punjab (6 000 mds), local produce is crude and refinement is necessary.

Manufacture of Pectin

About 1 000 mds of unripe damaged fruit can be used for producing pectin.

Manufacture of face Powder and Artificial Slates

About 80,000 mds of slate powder can be used for making artificial slates and face powder.

Caustic Soda, D D T and Bleaching Powder Industry

Heavy chemical industry can be developed at Jogindernagar for the manufacture of caustic soda from brine prepared from Mandi Salt Mines. Hydroelectricity and water supply are freely available. The Government

homage in the temples of Nagarkot (modern Kangra) and Jwalamukhi

But tourism in the modern sense is a recent growth. It is surprising that such beautiful regions have so long lain in oblivion when few other Himalayan resorts can compare with these vales for beauty, so rich in scenic glamour, in human elements and historic and religious associations. Rail and bus services have gradually broken down the insularity which existed in these out-of-the-way valleys. Only within the past few decades have the valleys become accessible

to the motorists. They are becoming popular as cheap holiday centres, although they are still not so well known as Kashmir.

The area affords to the artist unlimited scope for his brush, to the photographer an unlimited opportunity for excellent views, to the naturalist a vast field for study and research in its environments, and to the general tourist a pleasant and cheap holiday.

The State Governments of Punjab and Himachal Pradesh are taking measures to place these places more prominently on the tourist map of India. The Punjab Tourist



Fig. 66

Advisory Committee has recommended the creation of a separate Tourist Department¹. The Committee has recommended the establishment of a hotel in Kulu and for greater transport facilities during the Dusserah Festival. Four prefabricated aluminium houses will be set up in Kulu and Mandi and tents will be supplied at most of the rest houses. A regular airfield at Kulu has been made for air service between Delhi and Kulu. Some cinema films with their settings in Kangra and Kulu valleys, some documentaries produced by the Films Division of the Government of India, and popular hill dances performed at Delhi during Republic Day Celebrations have created an urge amongst the people to visit these areas. The paintings of Kangra School and of Nicholas Roerich and S. Roerich², the writings of General Bruce³, Shuttleworth⁴, Major Banon⁵, T. Tyson⁶ and particularly of M. S. Randhawa⁷ have made these areas better known. Justice G. D. Khosla, Chairman of Tourist Advisory Committee Punjab has also helped in laying emphasis on more tourist facilities.

Unlike Kashmir, these valleys lie nearer to the plains of Punjab and with more facilities of transport and accommodation, tourist traffic will increase very much in near future.

Tourist Attractions :

Scenery : To enumerate scenic attractions in physiographic details would make a long list. The valleys of Kangra, Kulu and Mandi known for their pristine loveliness are knit together by the river Beas (Fig. 67). The slopes of mountains are covered with pine, deodar and silver fir, the trees of the gods, and valleys are strewn with shrines of deities. Contrasting with the feminine beauty of the low hills, is the mighty Dhauladhar with its snow covered peaks and fanning glaciers which cast a spell on the visitor and in whose forests and alpine pastures peace and silence reign⁸. The majestic array of hoary peaks is visible from far and wide and



Fig. 67 River Beas at Dhura Gopipur

1 The Statesman, New Delhi, 29.8.35

2 Prof. N. Roerich and S. Roerich of Naggar came from an ancient and distinguished family of Russia. Late N. Roerich, a distinguished painter was one of the prime initiators of Russian Renaissance. S. Roerich is also a distinguished painter. Their Russian Himalayan Research Institute is at Naggar.

3 A former officer of the Indian Army.

4 A former officer of Indian civil service.

5 Secretary, Himalayan Club, Manali, and owner of Sunshine Orchards.

6 Of Katrain—Expert on trout fisheries.

7 Formerly Development Commissioner, Punjab. Later Vice President of Indian Council of Agricultural Research and Additional Secretary Ministry of Agriculture Government of India. Now, adviser in the Planning Commission, Government of India.

8 Randhawa, M. S., 'The White Range in Kangra Valley', The Tribune, Ambala, July 26, 1953.

is a constant landmark of these valleys. Mr. Barnes¹ states, "no scenery in my opinion presents such sublime and delightful contrasts".

Palampur is considered to be amongst the most beautiful Himalayan towns. "Palampur with its magnificent pines and avenues of deodars under the shadow of the Dhauladharas is a gem among the hill stations

of the Himalayas"². The beautiful lake Dal near Dharamsala and higher up lake Kareri (Fig. 68) are pictures of sylvan loveliness. The scenery from Baijnath to Jogindernagar is one of incomparable loveliness³.

Mandi is a picturesque area. Twelve miles from Mandi lies lake Riwalsar—the lake of floating islands. Kulu valley is noted for "much beautiful scenery which even



Fig. 68. Lake Kareri

1 Barnes, G. C. quoted in Kangra District Gazetteer, Vol. VII, Part A, op. cit., p. 4.

2 Randhawa, M. S., 'The White Range in the Kangra Valley', op. cit.

3 Randhawa, M. S., 'Vist to Baijnath', The Tribune, Amalga, 27-8-51.

Kashmere cannot equal and for the variety it certainly bears the palm¹". Kulu has also been called the 'Silver Valley'—an winter when the snow sparkles or in spring when all fruit trees are covered with snow white blossoms—it truly appears like the 'women in white' Major Banon who made a trip round the world and travelled extensively in various countries and was finally allowed to settle in Kulu valley says, 'Never in my travel did I come across scenery to match the sublime splendour of the Himalayas—the richness and brilliance of the seasonal colouring of Kulu, nor did I discover more serene environment² In addition to the rugged grandeur of the lofty snowy mountains the valley provides a fascinating scenery throughout four seasons of the year. On the lower slopes the pink and white blossoms of flowering trees and plants stand out in relief against the fresh green foliage of early spring. As the season advances innumerable little patches of entrivated ground, rising in terraces on the hillsides, gradually change colour from light green to golden brown, as the wheat with which they are planted grows and ripens. Later, the fresh green of the young rice plant and the red bloom of the amaranth affords a striking contrast in colour scheme. Immediately after the harvesting of the maize in late September, when the corn cobs are laid out to ripen, the roofs of the tiny hometsteads present a conspicuous blaze of pure gold and form a striking feature of Kulu landscape. The 23 miles of route from Kulu to Manali offers an extremely rich variety of Natural

Scenery³ (Fig 69) From Rohtang Pass (13,050 ft), there is a wonderful view of 22,000 ft high black streaked snow walls, with winding glaciers in between, laid out by nature to the most awesome advantage. A thousand streams trickle from the snow.



Fig 60 Himalayan Pastures

Climate •

Tourists go to places which have agreeable climate in addition to other attractions. In this respect Kangra, Kulu and Mandi have an asset. Excepting the very low lying areas, summers are cool and excepting the high mountain areas winters are mild. The climate of Kulu is drier than that of Kangra and Mandi, and the tourists need fear no discomfort, except that tent life in upper valleys means a good deal of wet cold.

The cold weather in the valleys is extremely bracing. It is on the whole untroubled with

1 Calvert J., 'Kulu Its Beauties and Antiquities and Silver Mines' Calcutta 1871, p 1

2 Banon, Major H. M., 'Fifty years in Kulu Valley', The Himalayan Journal, Vol. XVII, 1902 p 128.

3 Wulu, M. N., 'A Trip from Simla to Kulu', Our Punjab, Simla, Vol. IV, No. 10, Oct., 1901, p. 349

rainy or windy days. The climate of these regions can be considered 'marketable'

Forests and Flowers

On the hills, forests of oak, deodar, blue pine, spruce, silver fir, ash and birch present to the view masses of varying depths of green. The marked contrasts in natural vegetation attract the tourist. Crossing from one part to another across valleys and hills, he is fascinated by biotic changes from the tropical to the temperate. The animal life in natural setting of mountain flora is another attraction for the tourist. The way-side slopes are studded with numerous wild flowers: daisies, wild roses, forget me nots, violets, iris, harebells, blue poppy, and edelweiss. Higher up in May, rhododendron and azaleas are in full bloom, dark red and violet, apricot and saffron, shellpink, cream and palest white.

The fields are fenced by hedges of wild rose and in the month of April, their pink, red and white colours lend great charm to Kangra valley.

In Kulu forests of spruce and silver fir form pure stands. The beams of the sun scarce penetrate these mighty trees where save for the crow and the pheasant and the tap of the woodpecker, all is still. Beneath the shade of the silver fir, giant Himalayan lilies lift their heads of lovely flowers and diffuse their fragrance throughout the forest.¹

The extensive Himalayan pastures stretch above the forest limits to the line of perpetual

snow. Here is found a flora rich in many gems cultivated with much care in the rock gardens of Europe: *macranopsis potentilla*, *caltha*, *aconite*, various *senecios* and a wide range of *prunula*, *borage* and *myosotis*. In March and April fruit blossoms adorn the valley. The wild cherry introduces a rich colouring. At this time of the year, the colour of the country is brilliant not only the flowers and fields but every roof of the peasant's house glows with rich amber of the Indian corn and below, the crimson of the amaranth sweeps the valley in broad touches while the blue indigo of the distant hillsides and forests is lighted with the yellow of the turning trees and grass.

Mineral Springs

There are a number of mineral springs which can be developed as tourist centres. There are four mineral springs in this area.²

Manikaran consists of a small group of springs. The water is considered healthy and beneficial to sufferers of rheumatism and similar diseases. It serves as a fireless cooker and the tourists are served rice and pulses cooked in the boiling water. Small channels carry waters to baths where the temperature of the water is bearable and the tourists can take a relaxing bath.

Bashisht hot springs are situated at a distance of two miles from Manikaran. There are several shrines and medicinal springs at the either of which the sinners or the sick may be healed.³

1 Trevor, C. C., op cit p 14

2 (1) Loonsu 31° 5' N and 78° 22' E (2) Talwani 32° 0' N and 76° 46' E (3) Manikaran 31° 2' N and 77° 24' E and (4) Bashisht 31° 16' N and 77° 13' E

3 Stockley C. H., Birth of a Prayer. The Illustrated Weekly of India, December 16, 1951

Hiking and Mountaineering

Kangra Kulu and Mandi are a hiker's paradise (Fig 70). There are lovely stretches for trekking and lofty peaks to climb¹. If the tourist has time to spare the old routes of pre motor days still provide great charm and enjoyment.



Fig 70 On Way to Chauri Pass

Start must be made early in the morning. Streams are easier to cross by midday the melting snow increases their volume. The sun is also very hot and it is difficult to walk on steep inclines. An early arrival after march places at one's disposal more time to relax and look around.

Travelling light and living on the country is a valuable tip. There are afforded an extensive array of mountain peaks to anyone keen on mountaineering. Some of the highest peaks are at the northern end of Beas Valley. A significant development is establishment of Manali Institute of Mountaineering².

Sport

As a bait to the tourist the region offers plentiful resources of fish and game. Alluring as may be the various attractions to the traveller and the sight seer the tract also holds a fascinating attraction of sport to those who are interested in 'shikar' or game and fishing. Both big and small game are available. One of the charms of fishing in Kulu is that the angler goes practically where he pleases and can range the valley from end to end instead of being tied to one small section of the river³.

Places of Historical and Religious Interest

The tourist will find several places of historical interest. There are also numerous temples and shrines of gods and goddesses, hence the valleys are known as the valleys of gods. The Kangra Valley is especially rich in antiquarian remains belonging to Brahmanical, Buddhist and Jain religions⁴.

- 1 1 Simla to Kulu via Jalor Pass 1st miles 2 Simla to Kulu via Kotgarh and Bahico Pass 150 miles
- 3 Kulu to Manikaran and Pules in Parbati valley 37 miles 4 Jalandernagar to Kulu via Ehabu pass (9 490 ft) 43 miles 5 Dhan to Kulu via Dulh pass (6 60 ft) 40 miles 6 Kulu to Manali 23 miles
- 7 Kulu to Lanot via Rohtan pass (13 0.0 ft) and Baralacha pass (15 900 ft) 104 miles 8 Dha msala to Palanpur via Pathar 9 Kangra to Chamba via Chauri pass 10 Kangra to Mandi via Hamirpur
- 11 Dha msala to lake Kareeri and Hikka (snow) and 1 Ba path to Mani Mahesh
- 2 The Manali Institute of Mountaineering was set up in 1960 by the Punjab Government at Manali. The faculty consists of Prime Minister Nehru. It organizes courses in mountaineering and has a programme for undertaking canoeing, sking and trekking and high altitude relief work. A youth hostel was set up at Manali to accommodate 20 students. 3 Mountain huts have been constructed at Solang (8000 ft), Dhund and Shegara Durb (9 500 ft) and are meant for stranded mountaineers during winter. Vide the Statesman 4-11-6
- 3 Tyson Top et p 22
- 4 Kulu and Kangra Tourist Traffic Branch Ministry of Transport, New Delhi, February 1963 p 9

Kangra was the land of 'Trigarta' and some of the ancient Brahminical and Buddhist inscriptions belong to periods before the Christian Era. Yuan Chwang, the Chinese Buddhist monk wrote that there were several convents in Kangra. Numerous ancient Rajput forts on summits of immense crags stand witness to the cavalcade of history. The temple of Vajreshwari Devi at Kangra is a centre of great pilgrimage to people from all over India (Frontispiece). The fort is built most strategically on an alluvial hill (2401 ft). Jwalamukhi Temple (Temple of the goddess of flaming mouth) is situated at Jwalamukhi near Kangra. It is a well known centre of pilgrimage. Jets of gas issue from below and an eternal flame burns there. Indian Olympic Torch was lit there for the first time in February, 1960. Masurur Rock Temples are 15 shrines, rock hewn in Indo-Aryan style and have sculptural engravings. Such temples are found in the south but are rare in northern India. The temple of Vaidyanath or the 'Lord of Physicians' is situated at Baijnath. It was built in 1204 A.D. The style is in strict Hindu traditions. Pathiar inscriptions are considered to belong to 3rd century B.C. Nearby Pathiar is the temple of Nandikeshwara. Kanara inscriptions belong probably to 2nd century B.C. Mandi was known as Zahor to ancient Tibetans. Padma Simbhava has referred to Zahor the place where his teacher lived (about 750 A.D.). Mandi's charm lies in its being built right on the turbulent Beas. The local guides point to a huge rock on the bed of the river and say that the town got its name from the sage Mandavya who did

penance on it. Shivratri fair is held around the temple of Bhutanath. Near by, Lake Riwalsar, is of religious significance to Buddhists, Hindus and Sikhs alike. Kulu is one of the oldest principalities of the Punjab hills. In this valley of Gods, religious life of people is marked with joy and gaiety. During Dussehra there is a 'meet' of gods and goddesses on the Kulu maidan.

The law giver Manu himself gave his name to Manali. Here, too, lived Vyasa, the compiler of Mahabharata. In Bajaura is the temple of Geser Khan, the great conqueror from Central Asia. Rich in religious folk lore and history, Kangra, Kulu and Mandi provide abiding interest to the tourist.

Human Interest (People Customs etc)

Away from the motor roads and the railway line life is carried on with the same placid regularity as in times gone by. With few needs and simple habits the inhabitants lead an unsophisticated yet contented life (Figs 71 & 72). Their customs are often



Fig 71 Himalayan Belles

1. It was relayed 215 miles by 500 runners to Delhi for the opening of National Games of India on Feb. 2, 1960.
vaid, Statesman of 14.2.60



Fig 72 Kangra Women

colourful and hoary with age, life moves gently. People have legends about every thing. These may not be strictly true historically or scientifically but they have a human significance in revealing the sentiments and the character of the people. The colourful dresses, the gay folk, the lively perfume in the breeze, the folk songs, the rhythmic movements of the folk dancers, the lusty shouts and rippling laughter in the wind transport the beholder of Kulu fairs to a make-believe world in which dreams dance with reality. The gods of Kulu have divine relations and semi-divine acquaintances who visit them on fixed 'At Home' days. Each tiny hamlet has its own deity with its temple

and band of musicians¹. In Malans Glen there are in existence, religious and social practices which are survival of a culture earlier than the Aryan. From the anthropological point of view, it is one of the most interesting areas in India. Amongst the most charming, are roving shepherds or the Gaddis. Such are the valleys and the peoples of these Himalayan regions which inspired the Kangra school of paintings. The tiny hamlets and temples are built on sites which are serviceable and beautiful. The whole area reveals, in the life of its people, the effect of environment of valleys, hills, forests, streams and snows.

Tourist Facilities

Transport and Communications

Only during the last few decades have the valleys become accessible by motor road and rail². Previously, the journey used to involve several stages of walking and riding. Pathankot to Kulu can be reached in one day but the journey becomes too long and tiresome and break at Baijnath and Mandi is always more convenient and refreshing. From the foot of hills below Nurpur motor road to Kulu provides a variety of scenery and features of historical interest unequalled by any other hill road in Punjab. The journey from Pathankot by Kangra Valley Railway runs through beautiful country; it is undoubtedly the most scenic railway line in India. Pack mules and riding ponies are available at places where rail and bus facilities do not exist.

1 Kulu The Valley of Gods, Our Punjab, Vol. VI No 9 Oct., 1933 p. 75

2 For a detailed account see Chapter VII

Food and Stay

Simple and satisfying food is available throughout the area but the luxuries and comforts of big city hotels are not available. Fairly comfortable dak bungalows and rest houses exist throughout the area¹. Camping affords a very enjoyable method of spending a holiday in the valleys if accommodation otherwise is not available. Introduction of paid holidays will put great demand on cheap and comfortable hotels.

Tourist Bureaus Guides etc

Tourist bureaus and guide facilities are not enough. Some information can be obtained from Tourist Information Bureaus at Dharmsala and Kulu². Much information can be available on the spot from the local inhabitants.

Economics of Tourist Industry*Importance of Tourism*

The tourist is a vagabond with money to spend. The large sums of money spent by the tourist help the economy of these industrially backward hill tracts. Andre Seignfried³ aptly remarks that 'Tourist makes a rich contribution which he deposits over the countries he visits in very much the same way as the traditional inundations of the Nile fertilize the delta'. The tourist industry increases the volume of trade. The value of tourist trade is difficult to appraise because of the widespread diffusion of tourist expenditure. Free labour finds employment farmers sell produce and tradesmen and

craftsmen sell their ware. Indeed the people of Kangra, Kulu and Mandi reap a rich harvest in the 'tourist crop'. An indirect use of tourism is that it increases and encourages the conservation of natural resources. It is indeed fortunate that the unproductive areas like the mountainous regions are often good for tourism.

The prosperity of Kulu, Manali, Jwala-mukhi and to some extent of Kangra depends on the tourist trade. Some tourists return to make their permanent dwellings in these valleys thus adding their own share of wealth. There is great scope for increasing the tourist trade as it would economically help the poor people of the areas. In some foreign countries tourist trade forms a substantial part of the national economy and tourists are valued as the best of all customers. In the absence of any large scale industries and with subsistence agriculture the importance of tourist industry in these valleys should not be underestimated.

Tourist Industries

Tourists are good customers for local produce. They pay good prices for milk, vegetables, poultry, fruit and fire wood. Local honey finds ready market with them and the tourist takes away a few pounds of honey when he returns.

The woollen industry caters particularly for the tourist. Kangra blankets (Pattus) of pure wool are sold in large number. Kulu cloth and shawls woven in up-to-date

1 Unhappily for the tourist during a snow they are always full of touring of cars.

2 A publication on Kulu and Kangra issued by Tourist Traffic Branch of the Ministry of Transport gives information about transport accommodation routes etc. but a more comprehensive book would be desirable.

3 Seignfried, Andre, Switzerland, London 1930, p. 10.

patterns, find sale. They have beautiful designs and tourists purchase them as souvenirs. Tourists also purchase herbs and medicinal plants and particularly there is a good sale of Jwalamukhi dhoop.

Hotel industry thrives on the tourists. The increasing number of tourists has opened the opportunity for the expansion of hotel industry. The profits of tourism are shared by all trades and industries, in one way or the other.

Suggestions for Future Development

Although the Central and the State Governments have taken measures to develop tourism of Kangra, Kulu and Mandi, there is much that needs to be done. It is expected that a separate Department of Tourism will be established as has been suggested by the Tourist Development Advisory Committee.

Publicity is woefully lacking¹. A number of documentary films should be made illustrating the tourist attractions of various places. Another eloquent spokesman is the magazine. Many tourists have been lured to distant resorts by looking at the beautiful pictures in illustrated magazines. A good tourist map showing all features of hills and valleys should be published. Besides showing other tourist attractions, many of the lovely treks can be marked on such a map. The accounts of these treks should be published so that the tourist can make his choice.

Government should help the hotel industry by giving loans, subsidies etc. There should be separate fares for shorter and longer stays

in order to encourage the tourist. In Switzerland Swiss Hotel Keepers Associations grant a bonus of 50 francs to guests staying at the same hotel for 14 consecutive days. As in USA, motels as simple overnight cabins with attached kitchens could be put up on important road stops. In California motels get 25% of the lodging business. The specie of rich tourist is dying out and the need today is more for the common man type of accommodation. Government can also increase the number of tourists by building rest houses for workers.

Something like the National Park Service of U.S.A. should be developed in these areas so that along with their use as catchment areas, forests, grazing and other uses, their recreational value may not be lost. The National Park Service can undertake to point out and explain chief features of the special regions. Trained naturalists can take field trips, give lectures and talk to the tourists. Representative sample areas like Malana and natural stands of old timber, or natural fauna and landscape should be set aside and modern roads to these areas should not be provided. Ceremonial dances and other festivals should be organized. All weather roads should be provided to the tourist centres. The provision of air service twice weekly now from Delhi and Chandigarh to Kulu is sure to increase the number of tourists. Trained guides can provide valuable information and call attention to colourful and existing events in the history of the region so that the tourist may relive history. Travel Agencies

¹ Except a small pamphlet on Kulu and Kangra issued by the Tourist Traffic Branch of the Ministry of Transport, there is hardly any other literature which the tourist could consult.

could be developed to help tourism. People of the area should be made conscious of the importance of tourism so that the ordinary person may show such courtesy to the tourist as is meted out to the guests.

With proper facilities available, many tourists would like to take temporary refuge in these oases of peace and natural beauty. Development of tourism requires organization and imagination. Proper values to tourism are yet not attached both by the people of the area and the government.

Tourism has higher values than that of physical relaxation and happiness, spiritual values are implicit in forests, wilderness areas, hills and valleys. Here, recreation according to N. B. Dury, Ex Director of National Park Service in U.S.A., is 'Re Creation'. It lifts the people out of their humdrum lives and opens new angles and vistas—tells them something of the majesty of nature—the story of earth history, the development of plant and animal life and their inter relation, and with the environment around them.

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² Zierer C.M., op. cit., p. 40

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Transport, Trade and Commerce

A TRANSPORT AND COMMUNICATIONS*

General Conditions

The availability of transport facilities is essential for the economic, social and political development of any area. Cheap, efficient and fast transportation is the dominant fact of our modern industrial and scientific age¹. It not only serves the needs of the population but it also stimulates further development of human activities. As Bruhnes says² 'Communications are not only a factor in the physical transformation of the surface, they transform also the quantity, quality and aptitudes of human population; they conquer space. Space derives its value only from its connection with life, and the progress of communications always takes the form of a more or less conscious recrudescence whether cynical or disguised of the spirit of domination'. Transport serves the movement of man, goods and ideas and just as manufac-

turing creates 'form utility' so transportation creates 'place utility'.³ The form and extent of transport facilities is fairly indicative, like a registering apparatus, of the human and economic development of the area.

Problems of Hill Transport

Transport facilities are not extensive in the Himalayan Basins. In spite of this, travel and transport have been recorded since early times. Streams of pilgrims, Buddhist monks, travellers and traders from Central Asia, China and Tibet travelled across to 'the great plains of India'.⁴ Pilgrims have always frequented the religious places like Zahor (Mandi), Jwalamukhi and Kanera. Yet the present state of communications—just a single straggling railway line and two axial arterial roads—gives the impression that either a new area is being opened up or that it is in a state of underdeveloped economy and comparative isolation. The isolation

*For a detailed account see

Kayastha, S. L., 'Transport and Communications in the Himalayan Basins', National Geographical Journal of India, Vol VI, Pt 2, 1960, pp 104-114

1 Finch, V. C. and Trewartha, G. T., op cit, p 822

2 Bruhnes, Jean, op cit p 98

3 Finch, V. C. and Trewartha, G. T., loc cit p 672

4 Kayastha, S. L., 'Tourist Industry of Kangra, Kulu and Mandi in the Himalayan Basins', op cit p 178

results partly from its remote location in a corner of India but to a great extent, it is the result of the hilly and mountainous character of its terrain. Elevations in the area vary from about 1000 ft to over 20000 ft. From the map of hydrography (Fig. 11) it can be seen that numerous water channels are spread across the area like a bunch of ferns. One of the difficult problems of hill transport is the large number of bridges required to be constructed and maintained across innumerable hill streams that run across the country.¹ It is exasperating to find that between Dharamsala and Malan a distance of 11 miles 46 bridges are necessary. The tiny hill streams become raging torrents during rains and damage roads and bridges necessitating considerable repair work every year. The swelling of streams also accounts for the massive bridges crossing channels where the actual flow of water in the dry season is reduced to a trickle. The dangerous and uncertain character of hill torrents often makes it almost impossible to construct bridges over them. The omnipresence of steep inclines excepting in the valley areas presents an obstacle of great magnitude to the development of hill transport.

The construction of road involved numerous loops and often dangerous bends. The presence of mountain ranges and hills all around

the region (Fig. 8) practically seals it off from adjoining areas. The passes are few and difficult. It calls for the qualities of a tough mountaineer to cross the northern and north-eastern passes.² Climatic difficulties add their share to the rigours of transport. Snow and ice close the high passes from December to April and above 7000 ft almost all human activity comes to a standstill. High rainfall in the Dhauladhar, and the nature of rocks combine to cause erosion and landslides and hinder transport. Even to this day it has not been possible to provide a fair weather road to famous places like Kulu and Manali. Thus mountainous hills and streams, snow, floods and landslides hamper circulation. The boon of modern means of transport like the motorbus and the railway is thus restricted on account of above factors to limited valley areas. Even these facilities are inadequate to meet the requirements of travel and transport of goods. The author realized this to his cost while touring the area in 1951 and was prompted to publish a letter³ in the Tribune.

Areas of high relief carry on with their ancient paths and trails. One could meet persons there who have not seen a railway engine or enjoyed the bus ride. The author happily recalls the occasions when a semi-

1 Kangra District Gazetteer Vol. VII A of 1943

2 The Punjab Government has recently established the Central Government to give financial assistance for construction of railway and jeepable road across the 14000 ft high Rithang Pass. (The Tribune, 18.10.60)

3 Kulu valley is well known for the rich variety of its natural scenery. Many tourists are attracted to come and spend their vacations in its tranquil environment. But several visitors find much of their pleasure gone when they are stranded at a place for lack of transport facilities. During my one month's tour of the valley I found that more than half the passengers do not get tickets at any bus stand and one word is why the authorities are not alleviating the transport problem. The fruit growers find it very difficult to send down the fruit and a good deal of it is wasted in these days of food shortage just for lack of transport facilities. Compared to

nomadic Gaddi¹ of high hills, travelling by the same bus would exhibit a sense of awe and exhilaration. As the bus gathered speed he would cling more and more to the seat.

Human and Animal Transport

In the highland areas ponies, sheep, goat and man are still the carrier of goods. New transport methods may have greater speed and greater capacity for carrying weight but these ancient means are more primitive but also more flexible.² Thus even the tiniest hamlet is connected by some sort of path and man and his goods reach there.

Although the primitive means of transport appear to be modest in their carrying capacity, yet their utility in these hill areas is great. They are the only means available over large tracts and will remain so unless and until there is some further revolution in the modes of transport like the availability of cheap and efficient helicopter service, and development of atomic locomotive which may be able to negotiate steep inclines. Mule paths, sheep and goat trails and man tracks along the valleys, or over the ridges, provide links between different habitations. These

narrow ribbons whose surface is brushed by footsteps of men and animals are important in the circulatory system. Wheeled traffic is unknown there. There are numerous foot paths leading from village to village and from glen to glen. The construction of these must have called for considerable ingenuity and nerve. Villages are sometimes so inaccessible that the small hardy hill cattle cannot be driven to them from the next village or pasture ground along a rough but carefully constructed path, sometimes hewn out of solid rock in the face of a cliff. Narrower tracks are enough for sheep and goat. Rude galley paths, consisting of slabs resting on wooden props driven into clefts in the precipice, are made. For the man, unencumbered by load, the mere semblance of a path is sufficient.³ Sometimes the paths follow the dry beds of streams.

Man occupies an important place amongst the chief means of transport. Human portage is the most universal as well as the most primitive means of transport.⁴ He alone traverses areas where the dumb animals can not go. The hill porters exhibit great strength and endurance.⁵ These 'Tollers of

modern highway the road that exists hardly deserves the name and the transport difficulty added to it is sure to make any tourist miserable. Comfortable and efficient transport facilities are the first sine qua non of tourist industry. The necessity of developing tourist industry can be easily brought home when it is realized that it is an economic necessity for the poor people of the valley. Therefore both for the sake of tourists and the people of the valley proper transport facilities should be provided. It is desirable that some taxia should be available for the convenience of the passengers. I hope the authorities will look to the need of the people and provide better transport facilities. The Tribune, Ambala, 29-7-51.

1 A Gaddi when he first saw a railway engine and heard its loud whistle bowed down and said, 'Dan O Angreza ta n jofas ta cheek survasi O Englishman! you are blessed. You even made iron track.'

2 Brahma's J. op. cit. B. 95.

3 'Khali admire da rasta is the hillman's term for the worst kind of track.

4 Blache Vidal de la 'Principles of Human Geography' London 1930 p. 349.

5 The author had engaged a Gaddi porter on his trek from Kamra to Chamba, who not only carried the trunk and bedding weighing nearly 30 seers (approximately 60 lbs.) but was always walking ahead and taking to steeper short-cuts from the road.

the Mountains' are essentially simple and cheerful people. Every porter carries a rope with which he secures the load on his back or he may carry a 'Kilta' (conical basket) which he fastens on his back. In his hand he carries a T shaped stick (Sotdhi) for support. He also carries a blanket with which he pads his back so that the load does not hurt. He uses it as waterproof when it is raining, and at night covers himself with it.

Ponies and mules are important means of transport. They are sure-footed and cover steep and difficult paths. The hill pony is small in size and docile, but is sure footed and will go up and down steep inclines and walk with a firm foot on narrow and slippery ground. The muleteer arranges the load with proper balance and carefully directs the mules and ponies over difficult paths. The animals are furnished with bells whose jingling sound is so familiar in the hills. A mule will carry two to three maunds of load. The mule is very hardy and more sure footed than the pony and will carry more weight than the ass. Thus the usefulness of this bastard breed is great for carrying heavy loads over rough and steep paths. Asses are regarded as undignified means of transport and the few are kept by Hads, Kumbars and Dhobis etc. Goats and sheep are also employed by Gaddis for carrying small loads but not as much as by the Bhotiyas who

use them for trade with Tibet¹. Sheep and goat are here called 'camels of the snow'² on account of their ability to transport goods over small trails in the snowy mountainous areas.

As cheap mechanical transport is penetrating more and more into the area, the importance of the beasts of burden is declining³.

However, there will always be rough terrain where the more flexible carriers of goods, the man, the pony and the mule will remain supreme means of transport. Kulu has at present the largest number of transport and pack animals, 3.34 per square mile of area and 3.2 per 100 persons, because it is the most hilly and mountainous tract in the whole of the Himalayan Basins. Taken as a whole, the number of such animals (2.2 per square mile and 1 per 100 persons) is far from being adequate for the area.

Road Transport

The development of roads and vehicular traffic broke the comparative isolation of the area. Motor transport has caused improvement of roads and bridges. Only during the last few decades has the area become accessible by motor road and rail. Previously, the journey used to involve several stages of walking and riding⁴. Like the hill regions in U.P., Assam and some other states⁵ Kangra, Kulu and Mandi have

¹ Pant S. D., Social Economy of the Himalayas. London 1933. P. 207.

² Sethi I., Camel of Snows, Illustrated Weekly of India. 2.12.19.6. p. 24.2.

³ The author remembers that as far back as 1931 or so there was so much transport by carts and bullocks that the Kangra mail van used to be full of them but now there is practically no traffic like that and it is after days and days that a solitary cart may be witnessed.

⁴ Kojasetha, S. L., 'Tourist Industry of Kangra, Kulu and Mandi in the Himalayan Basins' op. cit., p. 141.

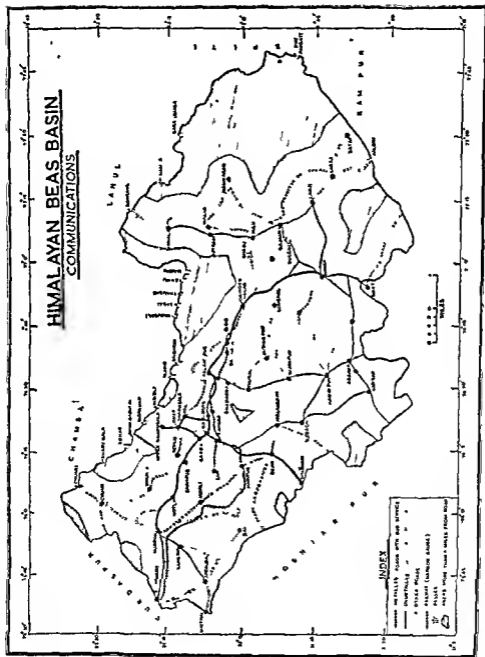


Fig 73

(branch roads to Kangra and Dharmasala), Palampur, Paprola, Baijnath, Jogindernagar, Mandi, Kulu and Manali. Like most hill roads it is full of twists and sharp bends. Beyond Mandi, the road is very narrow and at places is blasted from solid rock and supported by wooden eaves partly hanging over the turbulent Beas. Beyond Manali, there is no motor road but a trade route exists to Lahoul, Spiti, Ladakh and Yaskand over the Rohtang pass. From the low hills of Nurpur to the mountains of Kulu, the motor road provides a life line through the main valley areas. It is worth while to note that all the urban centres lie on this axis. The road between Dharmasala and Hoshiarpur was metalled during the past few years and not only serves to link the area with the plains but provides an alternative route for all purposes between Punjab Plains and Kangra, and through Kangra to Pathankot, if necessary, to meet transport requirements for Jammu and Kashmir. The only difficulty lay in the crossing of river Beas at Dehra Gopipur. Happily, a bridge over Beas at Dehra Gopipur has been constructed¹. This now provides for through traffic all the year round.

—Numerous unmetalled roads connect various habitations to arterial roads. Some have regular bus services (Fig 74). Important amongst them are

1. Palampur, Bhawarna, Sujampur, Hamirpur, Barsar Road
2. Kangra, Jwala mukhi, Nadaon, Hamirpur, Mandi Road.

3. Mandi Manali Road
4. Mandi Suket Road.



Fig 74 Bus Transport

In addition to these there are several bridle roads serving the urban centres and the villages in the interior. The poor condition of roads and their absence in certain areas has led to 'isolation and conservatism'. Officers avoid touring work in the interior as much as possible. Each year during the rains the condition of roads is particularly bad. Floods and landslips render transport and communications difficult (Fig 75). Even an ordinary shower brings down huge quantities of earth and boulders due to rapid and heavy erosion. It is necessary to check erosion, failing which it will become very expensive and difficult to maintain the roads in good condition. Successful arboriculture protects

¹ The Chief Minister of the Punjab inaugurated the new bridge over the Beas river at Dehra Gopipur. The bridge has been built at a cost of Rs. 26 lakhs and is 1170 ft long. It connects Jullundur directly with Kangra and Dharmasala via Hoshiarpur. *The Statesman*, 9-4-52.

road surface and provides revenue, shade and fodder in times of scarcity¹



Fig 75 Road Breach Mandi Kulu Road

Mountain Passes

Numerous passes occur in Kangra, Kulu, Mandi and Chamba (Fig 73). The most important ones include the Rohtang Pass (Fig 76) between Kulu and Lahoul,² the the Chuani Pass between Kangra and Chamba, the Jalori Pass between Kulu and Trans-Sutlej States, and the Bhabu and Dulchi passes between Mandi and Kulu. The last two are less frequented now owing to the construction of Kangra Mandi Kulu road but the other three are used as regular routes for communications and trade. There are several other high passes between Kangra and Chamba, and Kulu and Spiti which are used only by the people of the area. Gaddis use the Kangra Chamba passes when they cross over with their flocks in search of pastures. So far,

little attempt has been made to make detailed study and compile a list of passes.



Fig 76 Rohtang Pass

Passes are situated on the crest of spurs. A true pass crosses the water parting line. The Rohtang (13,050 ft) and the Hamta (14,000 ft) cross the water parting between Beas and Chenab rivers. Similarly the various passes between Chamba and Kangra cross the water parting between Beas and Ravi rivers. The various important passes have been shown on the map (Fig 73). All these passes are closed from December to April except Chuani pass which is closed only from December to February. These passes are generally passable by man, sheep and goat, and unladen hill cattle. A road is being constructed from Nurpur across Chuani Pass, which happens to be the lowest pass in the Dhauladhar. The road between Kulu and Simla is also being made. jeepable Mandi has been connected with Simla via Sundarnagar by a motorable road. Bus

¹ Dormair, W. S., 'The P. W. D. Guide to Roadside-Arboriculture', Lahore, 1931.

² Manal Rohtang motor road is now nearing completion. Rohtang wireless station is expected to be set up within a few months vide The Tribune, 29-6-63.

There were proposals for ropeway¹ between Kangra Dharmshala, Kangra Nagrota and Palampur as far back as 1919 but were dropped as their operation would have been uneconomical. Haulways are operated between Power House J_o in Jernagar and Brot

Water Transport

Though there are numerous streams and rivers but on account of strong current and interrupted course even the chief river Beas is not used for navigation. Ferries exist at Sujampur, Nadaun, Chamba, Dada Siba, Dehra Gopipur, Rah and Rialh (Fig 78). Petty crossings are made by 'Daryas' (inflated skins) and small flat bottomed rowing boats. Then daryas are bold and skilful in their calling.



Fig 78 Ferry Across R. Beas at Dehra Gopipur

The hill streams and River Beas serve the useful purpose of transporting timber canthangs. Huge consignments are floated down.

Air Transport

Air strips were prepared at Tanda (near Kangra) and Bhuntar (near Kulu). Landings were successfully made at Tanda. Twice weekly Air service is now available from Delhi and Chandigarh to Kulu. The tiresome journey from Delhi to Kulu is covered in just 2 hours and 20 minutes.

Post, Telegraph and Telephone Communications

Postal, telegraph and telephone facilities are available in practically all places of importance. The number of wireless sets is also increasing day by day.

The development of roads, railways and other communications is rapidly breaking down the isolation and conservatism of the people and from every point of view the growing development of trade and traffic and other human institutions is infusing new vitality into this remote and under developed corner of India.

B TRADE AND COMMERCE

The means of transport, the products of agriculture and forests and small scale and cottage industries provide a clue to the avenues and articles of trade and commerce. Owing to the peculiar means of transport, absence of enterprise, industrial backwardness and the low standard of living of the people, the trade must of necessity be on a modest scale. The adjoining plains, the high plateau of Tibet and the Himalayan Beas Basin are regions of contrasted production and there has naturally developed certain

Conservation of Natural Resources

The indiscreet exploitation of the resources brings unhappy consequences. The damage to natural vegetation, water resources, wild life, and soil has been great and unless timely measures are taken to conserve these important assets, nothing but ruin can follow. Conservation is not the work and responsibility of a few officials and experts but in this task the rank and file must join. Man must learn to live not only in inner harmony with himself but also in outer harmony with his environment (Fig. 79). Through such harmony alone is peace and progress possible.

Conservation of Natural Vegetation

First and foremost is the conservation of natural vegetation. Forest abuses such as excessive felling and overgrazing must be stopped. Taxes on flocks of sheep and goats and cattle should be imposed so as to restrict their number to the actual requirements. Rotational closure of forests would help regeneration. Substitution of stall feeding for grazing, made possible by the growth of grass in the closed areas, has been the founda-

tion of a modern forest policy¹. Voluntary closure of waste grazing lands should be encouraged. The area of undemarcated and unclassified forests should be reclassified and village Forest Societies formed in order to 'enlist the co-operation of villagers in the management of their own forests to preserve and improve forests, to prevent further erosion, to afforest the eroded slopes, proper terracing and cultivation and improvement of local breeds of cattle'². The experiment of village Forest Societies has met with success. Cooperation of the people is necessary for the success of any plan and the joint work of the people and government is also more democratic. Forest fires cannot be reduced or even stopped without the full and whole-hearted cooperation of the people of the area. The first Village Forest Society was formed in 1912. Now there are numerous Village Forest Societies all over the area and as a result of this 'Protection has been excellent, far better than when forests were under direct government control'³. Thus the people have justified the trust which the government had placed

¹ Glover, *loc. cit.* 'Erosion in the Punjab, Its Causes and Cure', op. cit., p. 89

² *Ibid.* p. 90

³ *Ibid.* p. 91

based on Land Capability Classification land use mapping and Land use Planning is necessary. Nature provides for protection by proper ecological balance and conservation measures should tend to approximate to nature's own way of conservation. On sloping lands, in addition to other conservation practices, it is necessary to introduce suitable technique to reduce velocity of the run off water so as to minimise losses of soil and water. Recent research has shown that rain drains away the property of the soil because the terrace is inclined slightly outwards. Bench terracing is now being introduced with slight slope inwards. Contour farming is the answer to it. Contour strip-cropping should be practised. It consists of growing alternate rows of erosion permitting (cereals) and erosion resisting (pulses and legumes) crops. Ley farming or grass in rotation with agricultural crops also protects soil. On mountain and hilly areas where it may be difficult to maintain an adequate grass cover, forest cover is the best thing. A combination of trees, shrubs and grasses in ecological proportions is good for flood control, gully control and for reclamation of all sorts of damaged areas by erosion. Shuhart¹ has recommended that a 'Soil and Water Conservation Law' should be made part of the Constitution of India. The objective of soil conservation is the utilization of every acre within its limits of capability, and protection of every acre in keeping with its need. The misuse of good agricultural land in an area where agricultural land is highly restricted is very alarm-

ing (Fig 80). By law, such misuse should be stopped at the earliest.²



Fig 80 House Construction on Good Agricultural Land in Kangra Valley

Conservation of Water Resources

Conservation of water resources for irrigation, water power and water supply is most desirable. Water is usually a non-diminishing resource. The irregular flow of streams induces serious limitations to development and use of water power. Planning for the best use of water resources is a regional responsibility, the region being coincident with the drainage basin of the main stream. Flood control can be affected by preventive measures in the whole of the basin. Here again, the importance of retaining the cover of natural vegetation is paramount.

Conservation of Wild Life and Recreational Areas

Conservation of wild life lies in the wise use and management of game and fish and

¹ Shuhart D V., Preliminary Examination of India for Soil and Water Conservation, 1946.

² The author observed that some of the best agricultural land in Kangra valley, e.g. along Kangra-Masoor road is being misused for building purposes. It must be realized that loss of good agricultural land is repairable loss.

other fauna for the benefit of all. The value of birds, mammals, and other fauna in the control of insect, rodent and weed pests is great. They consume great quantities of injurious insects, pests and weeds. Bryant¹ estimates that meadowlarks in Sacramento valley of California consume 193 tons of insects daily. Not all wild animals are beneficial. But many persons enjoy wild life for game or aesthetic reasons. Wild life constitutes part of the balance which nature has created. Fish provide food and pleasure of fishing. Basic principles for the conservation of wild life are enunciated by Gabrielson²:

- (i) Soil, water, forests and wild life conservation are only parts of one inseparable programme.
- (ii) Wild life must have an environment suited to its needs if it is to survive.
- (iii) Any use that is made of any living resource must be limited to not more than the annual increase if the essential seed stock is to be continually available.

Proper management of our land especially forests and pastures and control of game shooting is necessary. The conservation

of wild life is essential to this hilly and mountainous area where game provides food and recreation. Conservation of our recreational areas and even historical places is desirable. Something like the United States Park Service could point the way³ to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations⁴.

Conservation of man

Our greatest asset is the man whose conservation cannot be overlooked even if it is too obvious. As Whipple⁴ says,

A nation's true wealth lies not in its lands and waters, not in its forests and mines, not in its flocks and herds, not in its dollars, but in its healthy and happy men, women and children.

Conservation may involve complete reorganisation of land utilisation conforming to limits imposed by natural environment. It may also entail a change in socio-economic structure. But conservation is like an investment that always pays dividends.

1 Bryant, Harold C. *Economic Value of Western Meadowlark in California*. University of California Ag. Expt. Stan. Bull. No. 236. Berkeley, 1913. p. 12.

2 Gabrielson, Ira N. *Wild Life Conservation*. New York, 1947. p. vi.

3 Quoted in the Report of the National Park Committee. Ministry of Town and Country Planning, London, 1947. p. 3.

4 Whipple, George Chandler. *Vital Statistics*. New York, 1903. p. 10.

THE SOCIETY

Population

A DEMOGRAPHIC FEATURES*

The study of the demographic features of the Himalayan Beas Basin is of great topical interest and regional importance. Population is the pivotal element from which resource features derive their significance. It is, indeed, through analysis of population features that an appreciation of regional differences can be fully made¹. According to Gimsberg, such a study is necessary for the correct understanding of social morphology².

Before proceeding with the study of demographic features, it is necessary to note briefly the physical setting which bears a definite relation to distribution and density of population. Yorke³ remarks that physical conditions enter intimately into every cultural development, not excluding the most abstract and non-material. Physical conditions however have both 'restrictive and permissive relations to human activities'. Areas of harsh climate and steep inclines are thinly populated, while areas of favourable climate and alluvial level surfaces carry

high population (Fig 81). Lake mineral veins in a rock, valleys are rich in population element.



Fig 81 Densely Populated Valley Area

To the north and east the high and rugged Himalayan ranges capped with snow are practically empty. The areas like the Kangra Kulu and Suketi valleys are densely

*1 or a detailed account see Kayastha S L, Demographic Features of the Himalayan Beas Basin', The National Geographical Journal of India Vol II Part I March 1956 pp 14-35

1 Trewartha G T, 'A Case for Population Geography', Annals of the Association of American Geographers, Vol XLIII, No 2, June, 1953, p 87

2 Spratt, W.J H., Sociology, London p 7 (Year of Publication not given)

3 Yorke, C.D., 'Habitat, Economy and Society' London, 1953 pp 403-404

populated and it is here that most of the population is concentrated. Further southwards is the broken hill country which is sparsely inhabited. The Siwalik tract in the south and west is poor scrubland and is thinly inhabited.

The influence of physical setting on population distribution will be obvious. High densities occur in valleys with dependable rainfall and genial temperatures while areas of difficult terrain and harsh climate are sparsely populated.

Pre Census Period

About a century ago even a rough estimate of the population of the Himalayan Basins had not been made. Travellers' accounts and sketchy historical references only indicate that the area was inhabited since very early times. There is no doubt that this mountainous area has often provided refuge and shelter to those who were compelled to seek these places on account of religious and political persecution in the plains during the Muslim rule. These mountainous areas have assumed a special character as the home of ancient peoples and culture¹. As Blache² puts it 'Mountains not only bring populations into being they preserve them, once they have been created. Practically no information is however, available regarding the size of population. It can be inferred from earlier accounts that the population was rather sparse. Some

efforts at counting the number of inhabitants in Kangra district were made by Barnes (1850) and Lyall (1863)³. Even such estimates are not available for Mandi and Chamba. The average density of population of Kangra in the mid-nineteenth century was 233 and that of Kulu, only 38 persons per square mile. Population was predominantly agricultural and more essentially Hindu than in any other equal tract of the country⁴.

These incomplete estimates however cannot be considered reliable for any serious study.

Census Period (Since 1891)

Dynamics of Population Numbers

The first reliable and complete census was taken in 1891 and as such the study of the growth of population will be made in reference to this date.

The variation in population has on the whole been positive though the decade marked a very small decline. Two distinct periods of population variation may, however, be noted. First from 1891 to 1921, and second from 1921 to 1951. During the first period of thirty years the growth rate was very slow (2.5%) with some decline in 1931 but during the second period (1921-51) the growth of population has been relatively rapid (Fig. 82) the increase being 23.4%.

1 For an interesting example of this see

Rosser Colin A. *Hermits' Villages in Kulu, India* & Villages Edited by N. Srinivas, Bombay 1960 pp. 77-89

2 Blache Val de la, op. cit. p. 146

3 Barnes G. C. and Lyall, J. B., *Report of the Land Revenue Settlement of the Kangra District* op. cit. pp. 16, 173-87

4 Ibid., p. 35

The small percentage of increase during 1891-1921 is due to several factors. There was high mortality from fever in the decade 1891-1901, and a severe cholera epidemic in 1892¹. There was heavy loss of life due to Kangra earthquake of 1905². A large number of persons were enlisted in the army³ during the First World War (1914-18)

and there were good many casualties. In addition, there were large deaths due to influenza in 1921. No wonder, therefore, that the 1911-21 figures marked a decline. In spite of several natural calamities, the overall small increase of 21,565 persons is not too small considering the fact that more than 2/3 of the area is occupied by

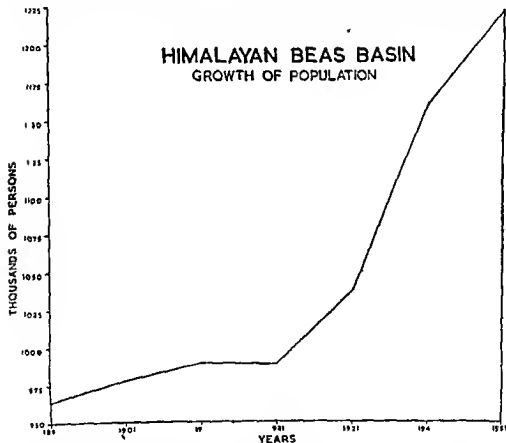


Fig 82

1 Kangra District Gazetteer Vol VII Part A op cit, p 123

2 In Kangra proper alone 12 000 persons lost their lives.

3 District Kangra is particularly a very important area for recruitment to the Indian Armed Forces. 40 000 persons were in Armed Forces in 19 1 (Vide Kangra District Gazetteer p 123). In Military circles the name of Dogra is given to the gallant hill tribes of Kangra and neighbouring tracts.

unculturable hills forests, streams etc, and that agriculture, the chief occupation is carried on by medieval methods

The rapid increase of population (Fig 82) since 1901 is noteworthy. Notable among the factors responsible for this increase are the construction of Kangra Valley Railway (267) the completion of the Mandi Hydro-electric Project at Jogindernagar, the improvement of road transport increase in the cultivated area development of tea gardens and fruit orchards and improved medical facilities. Before the building of metalled roads and Kangra Valley Railway the whole of the Himalayan Bear Basin was economically and commercially an inaccessible area. The construction of railway and metalled roads besides providing employment to the people, opened up the fertile valleys of Kangra Kulu and Mandi, and stimulated trade and settlement. Mandi Hydroelectric Project at Jogindernagar, which is one of the greatest hydro-electric projects in India gave employment to local population and made available cheap electrical energy for domestic and municipal requirements and for industrial purposes.

Fig 83 shows the general and relative decennial variation of population. The general increase of 2.56 lacs since 1891, is very spectacular when we consider the fact that even as early as 1911 the incidence of population per square mile of cultivated area was over 900¹. In 1901 the incidence

of rural population per square mile of cultivated area was 460 in the Punjab, while in Kangra, Simla and Hoshiarpur the incidence was 984, 972 and 831 respectively². Population of various tahsils has shown a good deal of variation since 1891 (vide fig 83). All the 'tahsils' have gained in population except Nurpur which has suffered a decline of 7,432 persons. The steady decrease of population in Nurpur, particularly in the town itself may be attributed to the following

- (1) Emigration of Kashmiri weavers after the loss of shawl manufacturing industry
- (2) Growth of Pathankot town at a distance of 14 miles from Nurpur Town and adjoining the tahsil boundary. Pathankot is a terminus station on broad gauge railway and the starting station of the narrow gauge Kangra Valley Railway. It is situated at the junction of hill and plain country, and thus, this important break-of-hulk town has drawn on the population of Nurpur 'tahsil' in general and Nurpur town in particular.
- (3) Scarcity of water and poor soil make it agriculturally one of the poorest 'tahsils'.
- (4) Absence of alternative remunerative employment.
- (5) Exodus of Muslim population in 1917.

¹ Note by P.J. Fagan, Financial Commissioner Punjab in L. Middleton's Final Settlement Report of the Palampur Kangra and Nurpur Tahsils of Kangra District (1913-1919) Lahore 1919 p. 2

² Kangra District Gazetteer Vol VII A op. cit., p. 121

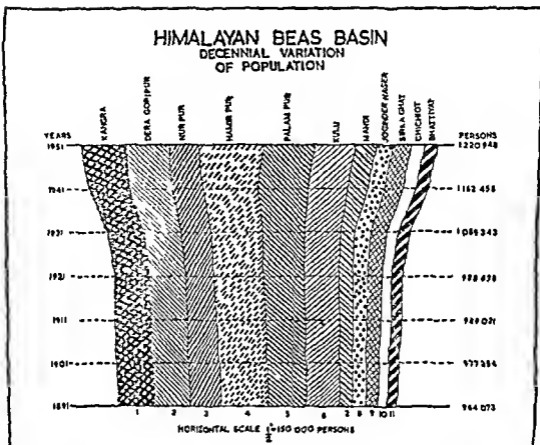


Fig 63

Increase in population of each Tahsil during 1891-1951 is as follows

Tahsil	Net increase in population	% increase
Hamirpur	51,372	35.2
Palampur	41,414	31.2
Kangra	31,233	21.9
Mandi	29,767	67.0
Kulu	28,072	21.3
Sarkaghat	27,888	66.6
Dehra	16,497	13.1
Chachnot	16,361	45.1
Bhattiyat	7,914	23.0
Jogindernagar	6,739	14.0

Hamirpur has healthier climate than the wetter tahsils further north and west and mortality rate is lower. People are hardy and receive large amount of income as pays and pensions from the army. This is also responsible for the maintenance of such large numbers. Hamirpur has also benefited from greater opportunities for trade and employment in Hoshiarpur, Bhakra, Mandi and Kangra due to the construction of roads. In addition to an increase in the cultivated area, irrigated area has also increased from

2.4% in 1921 to 2.6% in 1951. Palampur and Kangra have benefited from railway, roads and increase in irrigated and cultivated areas. Irrigated area in Kangra has increased from 53.1% in 1921 to 55.5% in 1951, in Palampur it has increased from 43.7% in 1921 to 49.4% in 1951. Recently large number of persons from the plains have also settled mostly as shopkeepers and after partition some refugees too have added to the number. Kulu has benefited from an increase in irrigated and cultivated areas and better communications. In July the irrigated area increased from 13.8% in 1918 to 17.5% in 1951. Mandi district as a whole has gained from increase in cultivated area and development of communications and commerce.

In general the increase in population (26.6%) during 1891-1951 presents an alarming picture, when we find that the incidence of population per cultivated square mile has reached the figure of 1718 in Kangra, 1513 in Palampur, 974 in Kulu and 1057 in Mandi. There has been further increase in population during 1951-61 period. Kangra district experienced a percentage increase of 15.33 which was low as compared to Punjab which experienced 25.86% increase. In Mandi and Chamba districts the percentage of increase was 23.70 and 19.61 respectively as against 21.78 in Himachal Pradesh as a whole.¹ Under the existing conditions of economic development, the population has reached

its saturation point. Indeed, such a heavy incidence of population and yearly increase can take place at the cost of standard of living which is already very low.

To provide for further increase in population, however small it may be, it is suggested that parallel economic developments should be made such as the development of intensive mixed farming, the establishment of small scale and cottage industries employing electric power as far as possible and making full use of the local resources as in Switzerland.² Better irrigational facilities will also increase the prospect of increasing production and area under cultivation and with numerous natural pastures the pastoral industry could find livelihood for more people if suitable breeds of cattle and sheep were introduced. The importance of tourism industry to this under-developed mountainous but beautiful region is obviously great.

The dependence on non-agricultural sources of income which implies development of transport, industry and services as well as growth and extension of towns coupled with springing up of commercial centres and areas is applicable only to a very small portion of population, varying from 5-14%.³ Evidently the region is dependent on agriculture rather of a poor type and the processes of industrialization and urbanization of its parts are slow and almost imperceptible. The area is at present in a rather under-developed state and with a proper assessment

1 Census of India 1961 Census Paper No 1 of 1962-Final Population Totals pp 344-356 and 35

District handbooks of Census Reports were not available at the time of publication for a detailed study of population characteristics

2 Gottman Jean, *A Geography of Europe* New York 1951 p 222

3 Census of India 1951 Punjab, Pepsu, Himachal Pradesh, Bilaspur and Delhi, Part I A Simla, 1953, p 30

of its resources and planned development it offers scope for supporting a somewhat larger population

Variation in Density since 1891

Some marked changes are clearly discernible in the variation of density patterns of population (Figs 84, 85 and 86). In 1891 Kulu had the least density of 86. Kulu and Chailot which have the largest area of hilly country registered a density of less than 100 persons to a square mile. Mandi, Joginder nagar and Blattiyat comparatively more accessible then and with small agricultural area had a density of less than 200 persons

per square mile. Kangra, Dehra, Gopipur, Nurpur, Hamirpur, Palampur and Sarkaghat had densities ranging from 200 to 300 persons per square mile. They are more accessible and have larger agricultural land and form a continuous tract of country.

In 1931 only Kulu remained the least densely populated taluk with 91 persons per square mile, the chief control operative being the ruggedness of its terrain, the inaccessibility and the great incidence of venereal diseases like syphilis and gonorrhoea. Large areas of land continued to remain under forests and less than 1/10th of the area in Kulu was cultivated.

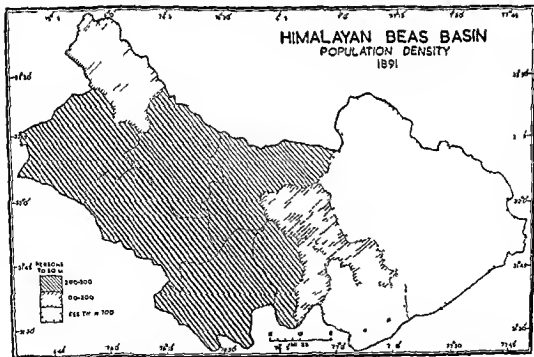


Fig 84

The changes in population density may be considered in two periods

A (1891-1951) Period showing total variation

B (1921-1951) Period showing recent variation

1891-1951 Period

Important changes in density of population during this period of sixty years have occurred in all tahsils except Nurpur and Jogindernagar. The fall in density in Jogindernagar is not real it is due to the change in the area of the tahsil. The significant fall is only that of Nurpur tahsil where the density fell from 202 in 1891 to

188 in 1951. The causes of this decrease have already been discussed. Large increases in density have been recorded as follows

High increase (over 100 persons per square mile) has taken place in Mandi and Sirkaghat

Moderate increase (50 to 100 persons per square mile) is marked in Palampur, Hamirpur and Kangra

Small increase (less than 50 persons per square mile) has been recorded in Chachot, Delra, Gopipur, Bhattiyat and Kula

High increase in Mandi and Sirkaghat can be attributed to their development

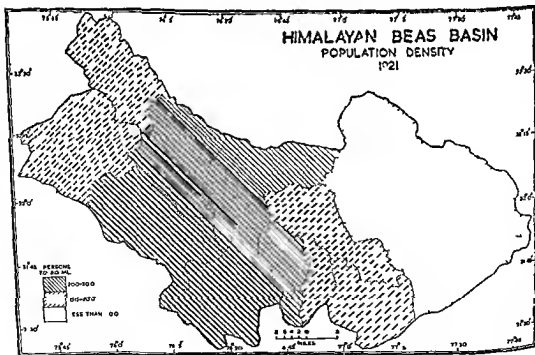


Fig 85

1 It was 351 sq. miles in 1911 Census Report and 445 sq. miles in 1951 Census Report

following the construction of Baiyath-Mandi road, Mandi-Sarkaghat Hamirpur road, Mandi-Una road and Mandi-Kulu road. Thus the entire area was opened to commerce, settlement and increased agricultural activities.

Moderate increase in Palampur, Hamirpur and Kangra is due to the fact that although the cultivated area and irrigated area increased and communications improved, the area was already densely populated.

Small increase in Chachiot and Kulu is on account of comparative inaccessibility and mountainous character of the country. Bhattiyat and Dehra Gopipur have poor soils, but being more accessible than Kulu and

Chachiot, already carried more population. With only small improvement in irrigation, cultivated area and communications, they did not offer much scope for increase of population.

1921-1951 Period

This marks the recent changes in population density. 1951 density map shows marked increase over 1921. Kulu, Chachiot, Joginder-nagar, Bhattiyat and Nurpur have densities ranging from 100 to 200 persons per square mile; Kulu still has the least density (107). In Dehra Gopipur the relative increase in density has not been as great as in Kangra, Palampur, Hamirpur, Sarkaghat and Mandi,

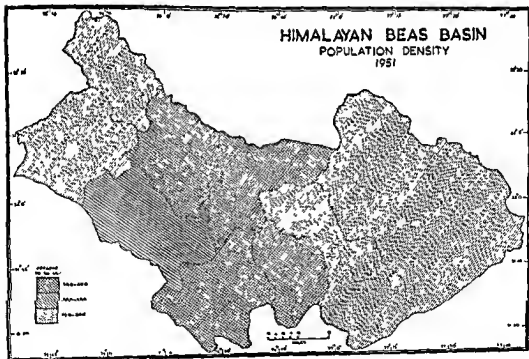


Fig. 86

due to its comparatively unfavourable location and poor soils. The period 1921-1951 is however, marked with general increase of density all over and in the case of Kangra Palampur, Hamirpur, Sarkoghat and Mandi, the density has considerably gone up, from between 200-300 to between 300-400. There have been marked improvements in road transport, introduction of railways, development of trade and increased urbanization in some, while increase in agricultural acreage and irrigation in others combined with comparative peace and better medical facilities, have all contributed to the increase of density¹.

Distribution of Population

The dot map (Fig. 87) shows the present pattern of population distribution. There is distinct clustering of population in valleys. The valleys have the best agricultural land and agriculture being the chief occupation of the people, such concentration is quite natural there. The best means of communication which provide for trade and general movement of people are also confined to the valley areas. Since the alluvial flats and valley floors and gentle slopes provide good agricultural land and irrigational facilities there is, in general, correspondence between population and hydrographical and average slope maps. Its analogues are found in Sweden and Switzerland. Bruhnes²

remarks that the smallest chalet in the mountains is primarily situated near a stream let or a spring. Water for them is a symbol of enduring life. In the valleys of Kangra and Kulu the concentration of population is very high. In the broken hill country south of Kangra and Baijnath, the population is more or less dispersed excepting a few small pockets of concentration. The northern mountainous tracts of Dhauladhar, Pir Panjal and Great Himalayan Range in the north and east are practically empty. An almost uninhabited ribbon between Mandi and Kulu corresponds with the south-easterly bifurcation of the Dhauladhar.

In Mandi District the only area which can be called by the name of plain is the 'Suket Valley'. This forms another area of high concentration of population. Another area of somewhat concentrated population may be seen between Sujanpur and Hamirpur mainly due to the availability of relatively good agricultural land. In the Beas Valley below Mandi, which is, in general, less attractive to population, one may observe a few small patches of concentration corresponding with the alluvial cones, mostly found along the south bank which is relatively low. It may be added that the Beas water is not easily available for irrigation purposes. The distribution of population follows the lines of tributary streams joining the river Beas from both the sides.

1 Per Sq. Mile density in 1951 for the districts of Kangra, Mandi and Chamba was 179, 254 and 6 respectively. For 1951 it was 103, 203 and 08. In case of Kangra increase is mainly due to separation of Lahul and Spiti which were large and sparsely populated areas. In Mandi and Chamba, it is due to development particularly of means of communication. There is natural increase in all the three.

2 Bruhnes J. op. cit., p. 39.

3 Man Mohan 'Mandi State, the Country and Its People' Chapter I.

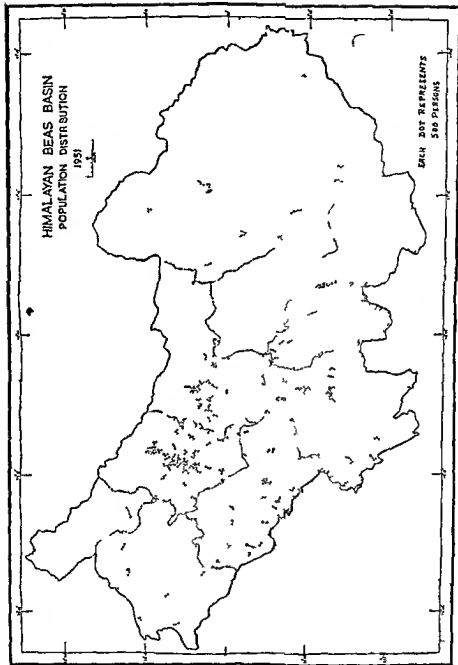


Fig 87

We may observe three degrees of concentration

(a) *Areas of High Concentration*

(i) These include the Kangra valley between Shahpur, Malan, Kangra and Dharmasala. The high concentration is due to fertile agricultural land, plentifully irrigated by water from the streams coming down from the Dhauladhar range. A small detached cluster to the north represents the urban tract of Dharmasala, the Headquarters of the Kangra District and a summer hill station.

(ii) The Palam Valley. This represents the well watered and fertile Palampur Valley, an area well known for rice and tea cultivation.

The discontinuity of high concentration to the west of Palampur is the result of numerous spurs which descend from the high northern range and separate the Kangra and Palam Valleys.

(iii) The Suketi Valley. This is a level tract from Mandi to Suket along the Suket. The urban area of Mandi is very thickly populated.

(iv) The Upper Beas Valley in Kulu. Here a remarkable concentration of population is exhibited owing to availability of good agricultural lands.

(v) Dispersed nuclei of high concentration are marked by the towns of Nurpur, Dehra, Hamirpur, Sujanpur, Agarta, Sarlaghat, Jogindernagar and Banjar.

(b) *Areas of Moderate Concentration*

These comprise Bhattiyat, Nurpur, Dehra Hamirpur, Sarlaghat, southern Kangra and Palampur, Jogindernagar, western Mandi, central and eastern Chachiot and inner Sara].

(c) *Areas of Sparse Population*

These include the forested areas in the north and east where small population is found in forest clearings. Altitudinal zones of population with decreasing density are observed from lower slopes to higher slopes. Where the slope is rapid, the fields are no bigger than a billiard table¹. In the upper cultivated terraces, concentration of population is less due to arduous labour required by agriculture, constant attention and repair of masonry and irrigation channels and danger of frost and wild animals. These areas lie in Bhattiyat, Kangra, Palampur, Jogindernagar, Chachiot and Kulu.

(d) *Uninhabited Areas*

Vast areas in Kangra, Palampur and Kulu are too steep and rugged for cultivation. The higher slopes above 6,000 ft are thickly forested and above it are found Alpine pastures, bare granitic rocks, snow and glaciers. These are too cold and only in summer the roving shepherds or the Gaddis, take their flocks of sheep and goats to the summer pastures. They seldom stay long at a place, only camping here and there for the night. Man thus occupies these heights only intermittently. The slopes above are mere barren wastes and carry no population.

It is, therefore, quite obvious that population distribution is influenced by factors of slope, climate, soil, accessibility, irrigation, agricultural prospects and various economic and social factors

Density Patterns :

No idea of pressure of population can be got from either general distribution, or mere arithmetic density because of the presence of large negative areas. This common expression of density, while not without some value geographically, in reality provides only the most superficial representation of the real pressure of population upon the resource base.¹ Although the per square mile population is not so high yet the region is remarkably well populated. This truth harmonizes with the impression that any intelligent observer would receive. The author could scarcely find a single untenanted arable plot. It is not easily possible to push cultivation further. Even now, many a rugged spot is furrowed by the plough and cultivated by hoe and spade which with lesser population and alternative means of sustenance, would not be considered worth while. To understand these demographic features it is necessary to examine the rural density, the urban density, the agricultural density and the carrying capacity. It is only then that the clear concept of a population problem will emerge as the population differences reflect the comparative economic possibilities and potentialities of areas.²

Rural Density

The percentage of rural population is fairly

high in the Himalayan Basins as can be seen from the following table³ :

TABLE
SHOWING RURAL POPULATION AND RURAL DENSITY

Tahsil	Rural Population	% of Total Population	Rural Density per sq mile
Kangra	125 433	80 24	303
Dehra	112 008	100 00	287
Nurpur	91,290	96 71	183
Hamirpur	211,119	100 00	373
Palampur	169 779	97 57	235
Kulu	141,994	99 10	69
Mandi	62,124	80 46	314
Jogindernagar	52 921	96 51	120
Sarkaghat	69,707	100 00	315
Chachrot	49 862	100 00	141
Bhattiyat	42 003	100 00	168

5 out of 11 tahsils have 100% rural population and the remaining above 80%. This high percentage of rural density is due to dependence mainly on agricultural and forest resources.

Kulu has the least rural density (Fig 88), because of large areas which are classified as rural but have little or no agricultural land. Chachrot, Jogindernagar, Bhattiyat and Nurpur come next with an agricultural density varying from 100-200 persons per square mile. These areas also have large tracts which are crisscrossed with ridges and spurs. Palampur and Dehra Gopipur have large areas of pastures and waste lands which are called rural tracts. Kangra, Hamirpur, Sarkaghat and Mandi have less barren tracts and contain large cultivated areas, and

¹ Trewartha G. T. A Case For Population Geography op cit p 21

² Ibid p. 92

³ Computed from Population Tables Census of India 1951 Vol VIII Part II A, pp 372-4 '3

therefore the rural tract is more densely populated. The highest rural densities range from 300-400, average rural density for the entire region is 231

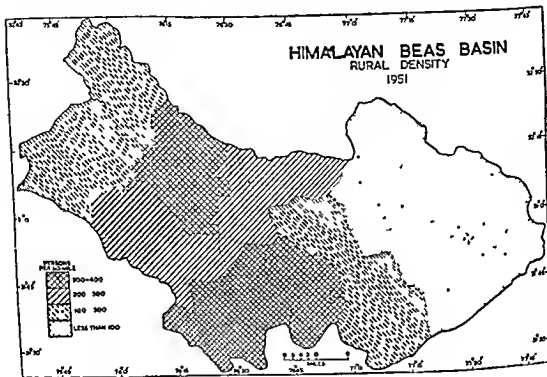


Fig 88

Urban Population

The percentage of urban population is nowhere high (Fig 89) and therefore, a brief mention of the same in connection with rural population will not be out of place. Kangra has the largest urban population amounting to 20% of the total, followed by Mandi 13.51%, Kulu, Jogindernagar, Palampur and Nurpur, each has less than 1%. Sarkaghat, Hamirpur, Dehra and Bhittiyat carry

no urban population. The author has marked a trend towards slow but steady urbanization during his frequent tours in the area. Hamirpur, Dehra and Sarkaghat will soon grow into small size towns. All the towns except Nagrota and Yol camp¹ are administrative centres. Dharmasala the Headquarters of Kangra district is the largest permanent urban habitat in the area. Nurpur, Kangra, Nagrota, Palampur, Jogindernagar, Mandi

¹ Yol camp started as a camp area for Italian prisoners during World War II but since then it has developed as a semi permanent township, serving at present as a refuge camp and jail.

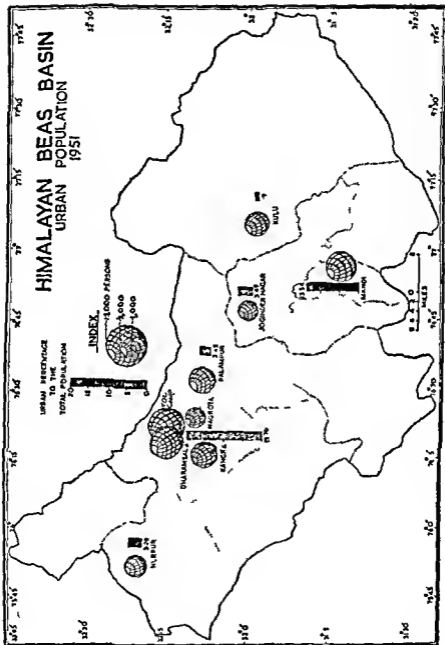


Fig 89

and Kulu lie on the important Pathankot-Kulu Road, the life line of the Beas Basin*

Agricultural Density

Agricultural density (Fig 90) can serve to give an idea of general population density in this area because here the agricultural population forms a very large proportion of the total population. Here as elsewhere 'It provides an index for measuring the carrying capacity of the land'¹ The following table gives the agricultural density.

Taluk	Agricultural density per cultivated square mile
Kangra	1251
Dehra	800
Nurpur	461
Hamirpur	847
Palampur	1316
Kulu	920
Mandi	915
Jogindernagar	953
Sarkaghat	1153
Chachot	1037
Bhattiyat	1154

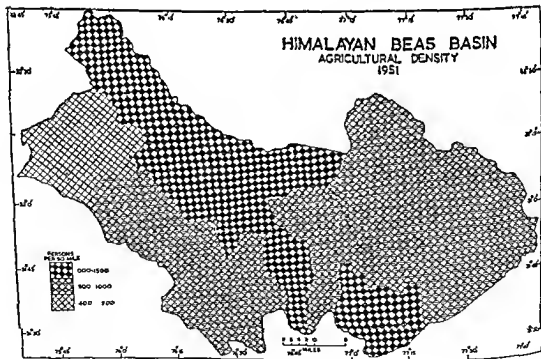


Fig 90

*For further account see Chapter V B Urban settlements

The average agricultural density for the whole region is as high as 1121 4 This clearly brings out the heavy pressure of population on the cultivated area It approaches the high density found in the agricultural tracts of middle Ganga Valley, and agricultural density of Kangra is higher than that of the upland of Banaras¹

Nurpur has the lowest agricultural density (Fig 30), where the soils are poor and the land is practically unirrigated Dehra Hamurpur, Mandi Joguwarnagar and Kulu have agricultural densities varying from 500 to 1,000 persons These areas have better irrigational facilities and more fertile soils though most of the cultivated land is unirrigated

Bhattiyat Kangra Palampur, Sarkaghat and Chachnot have the highest agricultural densities (1,000 to 1,500) These are well watered tracts where irrigational facilities are most developed They can support high density owing to relative security of rainfall high proportion of level land, intensive manuring of the fields and good pastures The agricultural population is thrifty and their requirements are few and the standard of living is low

Carrying Capacity

The carrying capacity of the cultivated land is still more burdened by the general population which looks for the produce of the land It may be added that the proportion of non agricultural owners is quite significant

TABLE SHOWING CARRYING CAPACITY

Tahsil	Carrying capacity per cultivated square mile
Kangra	1,718
Dehra	913
Nurpur	615
Hamurpur	991
Palampur	1,513
Kulu	971
Mandi	1,087
Joguwarnagar	1,017
Sarkaghat	1,275
Chachnot	1,059
Bhattiyat	1,221

The average for a tahsil in these Himalayan regions comes to 1,121 which is a very high figure The pressure of population per cultivated square mile in Kangra District in 1921 was 837² The population is remarkably dense for so mountainous an area³

Kangra and Palampur have the highest carrying capacity 1 500 2 000 (vide Fig 31) due to high percentage of irrigated and defaula land Economically this is the heart of the Himalayan Beas Basin It is centrally located and has also the best communication facilities in the region

Bhattiyat Joguwarnagar Sarkaghat Mandi and Chachnot carry a density of 1 000 to 1 500 persons per cultivated square mile Considering the population the cultivated land is not much and there is a good deal of crowding The e areas have adequately watered agricultural land In addition the people derive sustenance from the plentiful pastures and forests

¹ Ibid

² This included nearly 4 700 square miles of Lahul and Spiti which are almost barren tracts and therefore the density in the area of Himalayan Beas Basin was much higher

³ State O R K., op cit p 337

Narpur Dera Hamurpur and Kula have the lowest carrying capacity in the region ranging from 500-1000 persons owing to relatively poor soils and general absence of irrigational facilities. In Kula the land under agriculture is very little (7% of total tract). It suffers from the damage from frosts and wild animals.

To the author it appears that the incidence of population per cultivated square mile is the best index of crowding since it gives the best picture of population pressure.

Under the present conditions of economic development the Himalayan Beas Basin has reached the saturation point. It is established

by the fact that large number of persons migrate to the plains for employment. Some return after having accumulated enough money to pay off the debts while others continue to serve as domestic servants, peons etc. Those at home try to make some extra money, by keeping live-stock on common greens pastures and fodder from trees, by selling firewood and other minor forest produce and by working as labourers in the construction of roads buildings etc. Thus some of the intensity of pressure is offset but these are not permanent sources of income and the problem of population in relation to the cultivated land remains.

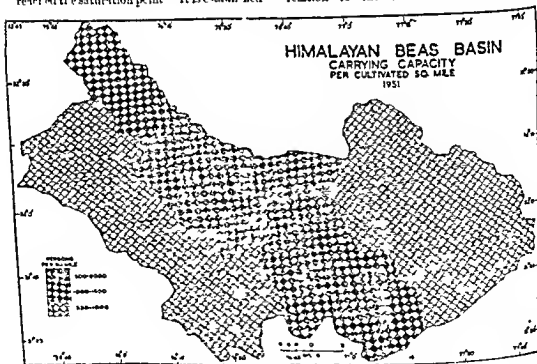


Fig. 91

This is being further accentuated by the misuse of agricultural land for other purposes. The present distribution is only a stage. Some of its causes are fundamental and others only beginning to operate. The study of demographic features supplies a vantage point from which it is possible to view the progress of population, past and present and even make estimates for future.

There is abundance of forests and water power. The development of forest industries as in Norway will be a step to provide alternative employment to population. There is evidence of large under-developed mineral wealth of slates, salt, iron ore, silver and oil. Possibilities of oil production¹ may lead to employment and increase of population but not to the dramatic rush because all prospecting and development will be controlled by the State Government. Further, cottage industries and tourist industry should be developed more so as to relieve the pressure of population on agricultural land and to raise the general standard of living of the people as a whole.

B OCCUPATIONAL GROUPS*

Agriculture is by far the most important occupation which employs nearly 89% of the total population of the Himalayan Base Basin (Fig. 92). This includes a very small percentage of non-cultivating owners and rent

receivers, amounting to about 3% and often far less, in most of the tracts. Land is the main source of livelihood and there is general absence of secondary resources. Since the pressure of agricultural population on cultivated land stands as high as 1121 4², the resources of land do not provide for more than a bare sustenance and the agriculturist often has to turn to other works for supplementing his income. According to Diack,³ and Colclstream⁴, both settlement officers, the assessment of land revenue is high and the cultivator has to earn from other sources. The physical environment has a considerable effect on the occupations of man and his material conditions. It has influenced his economic activities, social institutions and cultural patterns. The high upland areas where agriculture is either impossible or not quite repaying and where grass grows in abundance in forests and pastures have become the abode of semi-nomadic Gaddis who rear flocks of sheep and goats as their main source of livelihood. The area under cultivation is highly restricted (only 19.5% of total area) due to hilly and mountainous nature of the terrain and has rendered the size of holdings too small and uneconomic. The bulk of the cultivators therefore of necessity have to supplement their income as wage-earners in P.W.D. work or forests etc. Some

¹ According to Soviet Experts' Report two drilling rigs are to be set up in Jwalamukhi and Janauri area and investigation for oil and gas potentialities on of Jwalamukhi. Both are being made. (Title report in the Statesman, New Delhi, May 22, 1956, pp. 1 and 10).

* For a detailed account see:

Kayastha, S. L. Occupational structure in the Himalayan Base Basin. *National Geographical Journal of India* Vol. VI, Pt. I, March, 1963, pp. 14-18.

² Kayastha, S. L. Demographic features of the Himalayan Base Basin. *op. cit.* p. 30.

³ Diack, A. H. *op. cit.*, p. 2.

⁴ Colclstream, J., *op. cit.* p. 4.

may work as domestic servants or seek employment in other services. The southern tahsils of the area which consist of poor Barani soils have become important centres for recruitment to the military services. Undoubtedly the rule of nature beats strongly in all human activities in the Himalayan Beas Basin. Nevertheless dependence on

agriculture remains very high. In Chachhot 99.6% of the population lives on agriculture. Kulu comes next with 97.2%. Kangra has the least percentage of 12.8 (Fig. 93). Kangra is the most urbanized tract and industry, commerce, transport and other occupations have comparatively greater importance there than in any other tahsil.

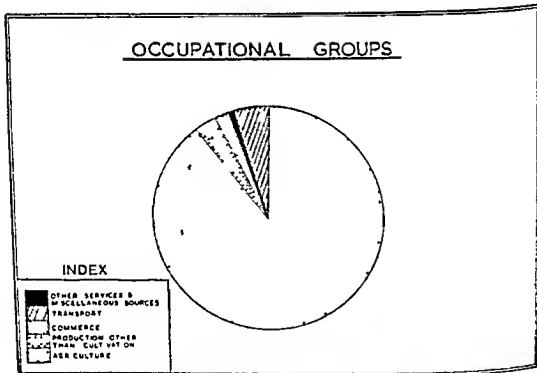


Fig. 92

OCCUPATIONAL GROUPS

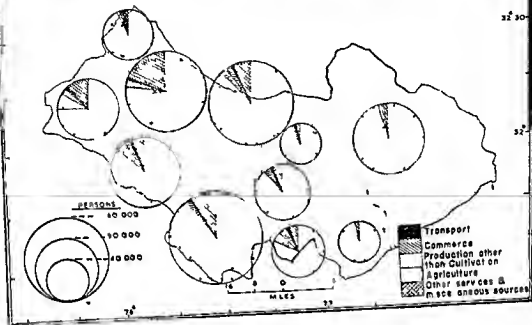


Fig 93

The following table will provide a clear picture of various occupational groups
OCCUPATIONAL GROUPS¹
 (Representing Percentage of Total Population)

Tahsil	Agriculture	Production other than cultivation	Commerce	Transport	Other services & miscellaneous sources
Kangra	72.8	4.7	2.9	0.6	19.0
Palampur	89.0	2.45	1.9	0.15	6.5
Nurpur	75.4	9.2	3.8	0.9	10.5
Hamurpur	85.2	4.6	1.5	0.4	8.3
Dehra	87.7	3.8	2.4	0.3	5.8
Kulu	97.2	0.7	0.7		1.6
Mandi Sadar	81.1	4.4	4.0	1.2	6.3
Jogindernagar	91.6	2.4	0.9	0.6	2.0
Chachnot	99.6	0.07	0.14	0.03	0.15
Sarkaghat	93.7	4.6	0.77	0.27	0.66
Bhattiyat	94.5	1.7	1.7	0.2	1.9
Total	89	3.5	2.0	0.5	6.0

¹ Calculated from data

Kangra, Palampur, Nurpur, Hamirpur, Dhara and Mandi engage considerable numbers in 'other services and miscellaneous sources'. They contain important centres of education and other economic and social amenities, which offer profitable employment to people in schools, offices, hospitals and various departments like the Forest, P.W.D., the Police and the Military. Some work as extra hands in hotels, shops and as domestic servants. Such opportunities of employment are not available in the less developed tracts of Kulu, Indernagar, Chachhot, Sarkaghat and Bhattiyat. Mining is negligible and manufacturing engages a small fraction of population in small scale industries. Commerce employs only 2% of the people.

Transport as an independent employment group is the weakest. It claims only 0.5% of the total population.

As economic development becomes more developed and diversified, it is certain, that occupations other than agriculture will provide greater scope for earnings and employment. Technological changes in production, whether of products or processes have important consequences for the demand for skills in the labour force. Major changes through time tend towards steady reduction of the proportion of unskilled workers. There is, however, no likelihood of rapid and large-scale change in the foreseeable future.

Human Habitations*

A GENERAL DISTRIBUTION

There is no doubt that human habitations had been established in the Himalayan Basins long before the Aryan infiltration. The hamlets of the aboriginals are found scattered throughout the length and breadth of this Himalayan tract. With successive immigrations since the time of Aryans and the growth of population the number of habitations has continuously increased.

The establishment of habitations has followed certain natural conditions. Some areas are densely settled, others are thinly settled, while large areas remain empty (Fig. 87). The physical conditions have exercised a most important influence on the distribution of human settlements. Large areas of harsh climate and steep inclines are either uninhabited or carry few human settlements. The valleys of Kangra and Kulu and Suketi are somewhat densely settled. There is distinct clustering of human settlements in the valley areas. The valleys have the best soils, plentiful irrigation from the snow fed perennial hill streams and comparatively level areas. These factors make the valleys the most favourable areas for the development of agriculture and

settlement of agricultural communities. On account of the somewhat level nature of these parts the valleys have developed the best surface communications and have further added the facility of transport for the establishment of settlements. In the broken hill country south of Kangra valley the number of human settlements decreases. The tract is crisscrossed with low hill ranges and is practically uninhabited. The mountainous tracts in the north and east are almost empty. These are areas of rugged relief, forests, snow and glaciers. Empty places consist of mountain slopes generally above 6000 ft. Forests have precipitous slopes, snow and glaciers prohibit the establishment of human habitations. Temporary huts of semi-nomadic Gaddis may be the only establishments there.

Densely settled areas include Kangra Valley, Palam, Suketi valley in Mandi and Upper Beas Valley in Kulu. Dispersed centres of concentrated settlements are represented by the various rural and urban centres.

Thinly settled areas include Bhattiar, Nurpur Dehra, Hamirpur, Kangra and Palampur south of the valley, Jaganernagar, Western portion of Mandi, Inner Saraj and

*For a detailed account see

Kayastha S. L., *Human Habitations in the Himalayan Basins*. *The Indian Geographer* Vol. 6 No. 2 December 1951 pp. 146-171.

has the highest population of 13 520 yet it cannot be classed as a town because of absence of urban functions it is more truly in the nature of a camp where the true urban character has not developed

Towns grow in particular places to discharge necessary functions¹ In the former times a fort formed the nucleus of small urban communities The fort provided the needed protection and around the fort often developed an urban colony with market and shops to cater for the needs of the people In several cases, the townships around the important forts also happened to be the capitals of the hill principalities Thus developed, the oldest urban centres of Kangra Nurpur, Sujanpur etc The earliest notice about the country of Trigarta, containing Kangra is found in about 470 A D² Under the hill chiefs the hill towns flourished for a time becoming seats of art and culture But many of these habitations have decayed with the end of hill chiefs and the fall in the significance of fort sites Sujanpur is now only a shadow of its former glory, which reached its climax under the reign of Raja Sansar Chand (1775) a ruler with power and influence and a great patron of arts and crafts Similarly Nurpur was a flourishing city under Raja Jagat Singh (1619)³ but now it is a very small town (3200) as if grown old and weak

B URBAN HABITATIONS

Growth of Urban Habitations

In Himalayan Basins urban habitations are few and far between The percentage of urban population is nowhere high Kangra taluk has about 20% and Mandi taluk about 13 5% of its population classed as urban other taluks have less than 5% each except Sarkaghat Chachiot Hamirpur, Dehra and Bhattiyat which carry no urban population It is therefore natural, that development of urban habitations should be highly restricted There are only nine towns of all sizes in the whole area of 5 633 square miles but if we consider the number of towns with a population of over 5 000 persons, there are in fact only two towns, i e., Dharmasala (population 9 933) and Mandi (population 8 909)⁴ Although yoj camp

1 Karyatha S L Demographic Features of the Himalayan Basins op cit p 78

2 In the census of 1961 the number of towns with over 5,000 population has increased to 5 These towns are Manali, Khasa, Yoj, Dharmasala, Palampur and Kangra Vide Census of India 1961 Census, Paper 1 of 1962 pp 8-9 and 1931

3 Smalley A E The Geography of Towns London 1953 p 44

4 Cunningham S R A Kot Kangra Archaeological Report 1877-78 Vol V Archaeological Survey of India, Calcutta 1877 pp 15-169

5 Kangra District Gazetteer 1925 Vol VII A, op cit p 94

A new lease of life to some of the ancient towns was provided by instituting there the administrative offices of the tahsils or districts. All the present towns except Nagrota and Yol camp are administrative centres. They have been chosen on account of their centrality. The administrative role of most of the towns can be judged from the fact that the so called 'cream of the society' there, consists of the official bureaucracy and their hangers on, the well-to-do lawyers, etc.

Not all the towns had their origin around the forts. It is significant to observe that Nurpur, Kangra, Nagrota, Palampur, Joginder nagar, Mandi and Kulu lie on the Pathankot-Kulu Road, the life line of the Himalayan Beas Basin. This single road is a cultural dominant (Fig 73). All these towns lie on route centres and command, certain, though varying amounts of nodality.

The choice of Dharamsala as district headquarters and cantonment area may be attributed to the large areas available for cantonment, its cooler and healthier climate above the malarial valley tracts, and its fine scenery. Yol camp owes its origin to the vast open slope that was available at the foot of the Dhauladhar range for the construction of camp for Italian prisoners during World War II (1939-45). The site of the camp also happened to be near Dharamsala, Kangra and Nagrota which places could act as depots for supplies and services. The absence of large urban centres, is due to the fact that the village communities have few

needs. They may buy salt, cloth, kerosene oil etc. which is provided by the village shopkeeper or the wayside retailer. The communal need for the services of the town is not felt too keenly. The urban habitations thus do not get the 'sap for growth' from the vast surrounding region¹ which is necessary for the growth of urban organism. However the primary support of urban centres is not only for their internal needs but also for the surrounding tributary areas². The rural habitations are small in size, often they occur as sprinkled hamlets. The area is highly dissected by relief and hydrography and there are few good roads. Thus, both the physical and cultural factors inhibit the growth of urban habitations. The urban centres, wherever they have developed, still carry very strong agricultural elements and do not have the urban outlook. They have a general sleepy atmosphere around them. As Spate³ puts it, Perhaps two or three central streets inadequately paved and lighted give the semblance of an urban catchet.

The reason for the small urban and rural centres is their accessibility to the rural areas and their function as collecting and distributing centres. Thus commerce is an important function of all towns. Some of the urban centres are overgrown villages. Nagrota (Fig 91) was a small village before the construction of metalled road and railway line. Some centres have grown around the temples as religious centres like Jwalamukhi, Kangra and Baijnath (Fig 91).

1 Singh R. L., *Panaras A study in Urban Geography* 1953 p 173

2 Finch V. C. and Trewartha G. T., *op cit* p 503

3 Spate, O. H. K., *op cit*, p 192

Towns of Submontane tracts have an inter regional function. Nurpur acts as 'entrepot' for trade between the plains and hills. Kulu performs the same function between hills and trans Himalayan regions of Tibet and Central Asia. Only important centres of population are served by motor

roads, elsewhere the access is by pack animals or human transport. Some urban centres have developed at ferry points like Dehra Gopipur (Fig 78) and Nadaun on the Beas river. The pattern of various towns and their sites are illustrated in figure 94.

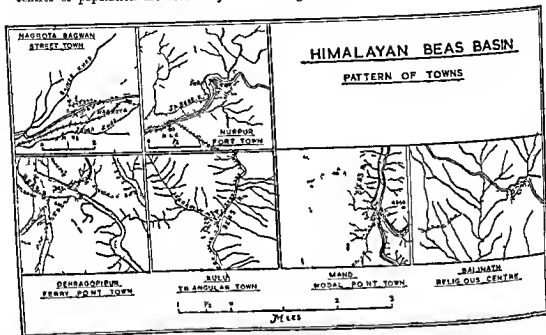


Fig 91

Pattern of Urban Habitations

Dharmasala is situated on a spur of the Dhauladhar. It is an elongated town (Fig 95). The ridge provided the necessary space for the construction of various offices of the district, the markets and residences. In the middle where Kotwali bazar is situated the slope abruptly becomes too steep and is covered with forest. The cantonment area occupies the adjacent ridge to its west

across the Banoi khad which acts as a divide as does often the railway line between the city and the cantonment in the plain areas. Dharmasala was first occupied as a station in 1849 when a site was required for a cantonment to accommodate a native regiment. An old Hindu sanctuary or Dharmasala stood near the selected site whence the name adopted for the cantonment. Civil authorities were attracted by the

advantage of climate and scenery and built their houses in the neighbourhood of the cantonment. In March 1855, the new station was adopted as the District Headquarters. Dharmasala is a straggling place. The slopes on either side of the ridges are too steep and the population has overflowed to a level tract below the ridge and the new settlement is now known as Shyam Nagar. The municipality has plans to provide roads etc. to that place.

Dharmasala had a population of 9,933 in 1951 and 10,255 in 1961 and it has steadily

increased in population since 1921 when its population was 4,901. The people have been attracted to settle there by the educational¹ and medical facilities and other services, in addition to the advantage of climate and scenery. The place is however, too wet from July to September and the general altitude also does not provide real comfort from the summer heat. Most of the people (71.2%)² stay there for services etc. Commerce and transport provide employment to only 11.5% of the population while agriculture still provides sustenance to

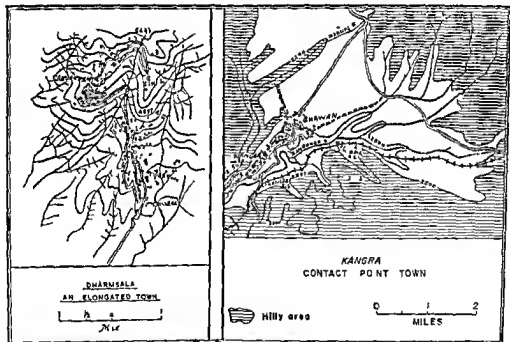


Fig 95

1 Dharmasala has a Government Degree College the only college in Kangra District and one of the two in the Himalayan Beta Basia

2 Figures for urban population livelihood classes in towns given here and elsewhere in this chapter are calculated from tables in Census of India 1951, Vol. VIII Part II A 1953 pp 25 42 43, 46 47, 50 and 75

11.2% people (Fig 96). Production other than cultivation is unimportant (only 3.2%) Dharmasala wears an officious look.¹

Closely to Dharmasala is yol camp having a population of 13,520 in 1901 and 10,921 in 1961 where agriculture still provides livelihood for 27.2% of the population, other services and miscellaneous sources claim 77.45% of population while other production, commerce and transport have only 0.35%.

of population (Fig 96). It may be regarded as a semi-permanent township of a special character.

The decrease of population in 1961 is due to its out of the way location.

Kangra Bhawan* (vide Fig 95) provides an excellent example of contact point location. It is situated at a point between the Kangra valley and the southern broken hill country.

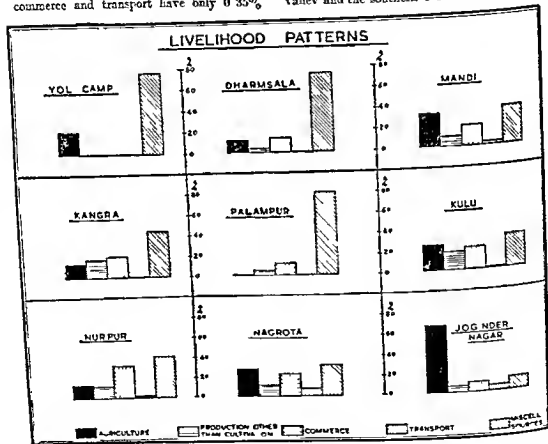


Fig 96

¹ In the evening the ceremony comprising mainly of gazetted officers finds recourse in the famous sanctuary the Raja Nagla Sahib Club.

² A detailed account of hano, a L. swan is given separately (see Chapter X-C Kangra-A Himalayan Town

Nagrota (population 2,503 in 1951 and 2,592 in 1961), is a street town or 'Gassendorf' along the Pathankot-Kulu Road and Kangra valley railway (Fig 91). On both sides of the road are rows of shops and behind them are found 'Mohallas' or community clusters. Nagrota is an overgrown village which developed urban character after the construction of the metalled road and the railway line. 27% of its population is dependent on agriculture while commerce claims only 22.3% (Fig 96). Nagrota is centrally located between Kangra, Sol, and Dharamsala, and lies on the main road and the railway line. There is sufficient level land around for expansion. All these factors b'd fair for the further development of Nagrota.

Nurpur is a fort town (Fig 91). It grew up around the fort, in the shape of a sector, on the high ground, along the loop of the road. It still carries some importance on account of the fact that it is well situated for commerce between the hills and plains and for the tract between Chuar (Fig 97) and Andaura. Its population in 1961 stood at 3,405.

Dehra Gopipur is actually a rural centre and owes its origin to its site at the ferry point on the Beas (Fig 91). A permanent bridge has been built at this point to avoid transshipment of the Kangra Hoshiarpur traffic and freight which passes through this point.

Kulu (1951 population 3,691 and 1961 population 4,886) is a triangular town situated on the confluence of Sarlati with the Beas (Fig 91). The alluvial fan and the water

front have been responsible for its shape (Fig 98). Kulu is an important trading centre. It is situated at a small distance from the Pothang pass and the trade between Central Asia, Tibet, Lahoul and Spiti, and the Himalayan Beas Basin passes through it. It functions as a sort of entrepot. Here one may meet itinerant Tibetans, Ladakhs and Yarkands¹ with their quaint dresses and merchandise. The Kulu mairan is the site of famous Dusserah fair where a good



Fig 97 Chuar



Fig 98 Kulu

¹ The author met in Kulu a Larkandi, with his sharpening stone wheel, who had wandered down to Kabul and thence to Mecca and was now on way back to his native country.

deal of business is done 40-15% of the population is engaged in production and commerce while 25-65% is still dependent on agriculture

Mandi (population in 1901-8 699 population in 1961 13 031) is situated on the nodal point of important routes (Fig 94) The Pathankot Kulu road the Mandi Sulek road the Hamirpur Mandi road the Chailot Mandi road and the Ghanals Mandi road all pass through this point. Here also is crossed the Beas river by a suspension motor road bridge built in 1957. The town is situated on level ground surrounded by hills on all sides (Fig 99) The suitability of the site was responsible for its early foundation in 1076 by Raja Ajhan Sen. Since then it has been the capital of former Mandi State and now the headquarters of the Mandi district of Himachal Pradesh. The town has a well laid out bazar known as Chauhatts. Overlooking the bazar is a large mansion called Chautra, where in the times of State rulers were held the court and Durbars, and which at present serves the more sober function of district offices. Adjoining the old palace is a large tank with a pillar in the middle, under which, the head of the principal Rana of Bhangahal is said to be buried¹. There is fine ground to the north east of the city. Here is also situated the college and the beautiful club building. Opposite the market to its south are situated the hospital and the palace. A new colony has developed across the Beas on a level

tract south of the motor road 29-45% of the population of the town is engaged in commerce and other production, 31-8% in agriculture and 38-75% in transport and other services etc.² (Fig 96) This picturesque Himalayan town is the hub of a number of highways. It connects Simla and Bilaspur with Pathankot. The Chandigarh Puar highway is on this axis and the road from Hoshiarpur will also connect Kulu and Mandi through Mandi. Mandi is a busy trade centre lying on routes from the trans-Himalayan regions to the plains. No doubt, therefore that the Mandi town has recorded the largest increase in population between 1901-61 period amongst all the towns of the Himalayan Beas Basin.



Fig 99 Mandi

Bairnath provides an example of a religious centre (Fig 94). This urban centre has grown up around the temple of Vaidvanath. Traders and artisans benefit from the influx of pilgrims. The town also happens to be situated on the Pathankot

¹ Mandi State Gazetteer op. cit. p. 65

² Mandi has attracted some Sikh population, on account of the belief prevalent amongst some that when all will be destroyed in a great holocaust, Mandi and Bilaspur will remain intact.

Kulu road and is on the Kangra valley railway. This has now added to the commerce and population of the town Baijnath lies in a wind gap and is one of the very breezy places

Palampur¹ (1951 population 4,622 and 1961 population 6,116) is situated on Pathankot-Kulu road in the heart of tea plantation country. The town has a beautiful setting lying as it does at the foot of the Dhauladhar range. Commerce and other production claims 17.3% of its population, transport and other services etc 81.7% and agriculture only 1% (Fig 96)

Jogindernagar (1951 population 2,002 and 1961 population 2,719) carries the smallest population amongst the towns of the Himalayan Beas Basin. It owes its urban development to its location on the rail head², and the Pathankot-Kulu road. It is also the headquarters of Jogindernagar taluk. Agriculture is the dominant occupation of the inhabitants (Fig 96). Rows of shops line either side of the road. There is marked new development of shops and railway buildings. Given some imagination and planning and with rail, road and electric supply facilities and good location, the town could develop further and shape better.

In addition to the above mentioned centres, there are a few other nuclei of population may be called 'embryonic towns'. Such are Hamirpur, Sujampur, Sarkisghat and Chuan (Fig 97)

C. KANGRA—A HIMALAYAN TOWN*

Site and Situation

Kangra lies at an average elevation of 2,350 ft in 32° 6' N latitude and 76° 16' E longitude at a distance of 52 miles to the east of Pathankot. Commanding a fine view of snowy Dhauladhar range and Kangra valley, it occupies a site at a point of contact between the valley and the broken hill country to the south (Frontispiece & Fig 95). The town is spread over the level valley tract and the adjoining hill, lying between the Banganga and the Manjhi streams, as if, between the pupils of an eye (Fig 100). The two urban agglomerations, Purana Kangra and Bhaswan, lie on either ends with the highest point in the centre, as though holding the two ends of the scale. The fort in the south and the gilded cupola of the 'Mata' temple in the north stand out as prominent land marks (Fig 101). Kangra is well situated from the point of view of communications. It is served by the Kangra valley railway, and the two metalled arterial roads, the Pathankot-Kulu road and the Dharmala Hoshiarpur road. Thus, from the point of view of site and situation Kangra occupies an important strategic position.

Origin, Evolution and Size

The earliest nucleus of Kangra town anciently called Nagarkot and now as Purana Kangra, developed as a small habitation below the fort. The celebrated fort and the presence of inaccessible cliffs and river

¹ On March 12 1934, fire havoc caused a damage of nearly Rs 50 lakhs. Fire gutted almost the entire main bazar. The bazar has been rebuilt now.

² Originally for transporting material and machinery etc. for the construction of Mandi Hy. Irco-electric Project.
* Based on personal survey. For a detailed account see Kayastha S. L., Kangra—A Himalayan Town. The National Geographical Journal of India. Vol IV, Pt. 2, June, 1933 pp 89-94.

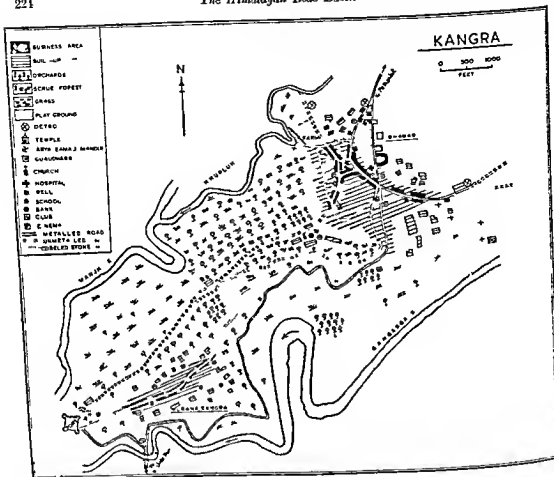


Fig 100

gorges on three sides provided the necessary protection from external dangers. This pre-urban centre became an important town by gradual growth and accretion. During the long course of its recorded history going back to the 6th century A.D., Kangra has experienced vicissitudes of fortune under successive rulers. Nagarkot is said to have been built by Susrama Chand shortly after the close of the Mahabharata¹. Its strategic

position in the precipitous fork between the Banganga and Manjhi streams must have, undoubtedly, ensured its occupation at a very early date. In 6th century A.D. Bhimkot or Nagarkot (modern Kangra) was the capital of hill province of the Kingdom of Jalandhara or Trigarta comprising of hill country between Ravi and Sutlej and the Jullundur Doab². After Muslim invasions in 1000 A.D. the territory of

¹ Cunningham, Sir A. *Kot Kanera. Archaeological Report 1877-78, Vol. V* op cit, pp. 159-160

² Kangra District, Punjab District Census Handbooks 1951 Vol. 7, Simla 1952, p. 4.



Fig 101 Temple of Vajreshwari Devi
Kangra

the plains was lost and Nagarkot became the chief capital of the hill province¹. Such was the prestige and strategic importance of Kangra and its fort that it was considered that 'he who holds Nagarkot holds the hills'. It has remained the stronghold of Rajput Katoch Rajas. From time to time Kangra was invaded, plundered and occupied. In 1009 A.D., Mahmud of Ghazni invaded Kangra and looted the vast wealth of the Vajreshwari Devi temple. According to Cunningham² this vast wealth was deposited there by the Hindu princes of Kabul. Feruz Tughlaq in 1351 A.D. Khawas Khan in 1510, and Akbar in 1571 and 1588 A.D. invaded and captured Kangra. Jehangir is said to have been fascinated by the place but his plans to build a palace remained unfulfilled. Sansar

chand was able to secure Kangra in 1787 A.D. after nearly a century and a half of muslim rule. During the reign of Raja Sansar Chand, Kangra became an important centre of population, commerce, art and culture. Plastic surgery³ considered a modern innovation was practised by 'Kangras' and Kangra school of painting developed⁴. Gurkha incursions in 1809 were responsible for some damage and destruction. This was followed by rule of the Sikh chiefs for nearly 37 years. The Sikhs affected the suburb of Bhawan the population of which is said to have increased largely during their rule, probably at the cost of Purana Kangra. In 1846, the British occupation took place which lasted for a century. Kangra became the District Headquarters of the newly constituted Kangra district. Owing to there being insufficient room for a civil station even much less for a cantonment the district headquarters were shifted to Dharmasala in March, 1855. Though the town had begun to shed its glory with the fall of Rajput supremacy, but now the sceptre finally departed and henceforth Kangra was to remain content as Tehsil Headquarters. There followed a period of uninterrupted peace and people no longer felt any further danger of loot and destruction. This led to the rapid growth of Bhawan which is more accessible while Purana Kangra suffered gradual decay.

¹ Ibid p 5

² Cunningham Sir A. Fort Kangra in Archaeological Report etc states 'The vast wealth according to Utch was so much that the backs of camels could not carry it nor vessels contain it nor writers hands record it

³ A family of surgeons resident at Kangra were fixed for skill in a curious operation having the object of restoring the nose to any face which had the misfortune to lose that appendage. They are said to have drawn down a flap of skin from the fore end as a covering for the new nose thus restoring the beauty of many marred countenances (Kangra District Gazetteer) Lahore 1906 p 494

⁴ Ghinns the surviving painter of Kangra School at Kangra died in the earthquake of 1905

Diffusion often takes place when the initial advantage of security from external attacks is not important and as Blache¹ puts it 'groups of houses are let loose like a troop of emancipated school boys'. By 1901 Kangra was a flourishing small town with a population of 4716². The town was important for suji and maida industry and for the work of Gold and Silver smiths and masons. Best shopping centre was near Thakurdwara. The town was completely destroyed in 1905 due to the Kangra earthquake³. Not a single house was left standing and the whole town was a mass of ruins. The beautiful temple and the fort were completely wrecked. Slowly the town was reborn literally out of dust. Restoration of the temple was taken up soon after 1905. A school was built by the Arva Samaj. Tahsil court and police station buildings were constructed and the mission colony was rebuilt. Bhawan developed faster on account of its better site but Purana Kangra even today remains desolate. Purana Kangra had only 715 inhabitants out of total population of 3527 in 1931. On account of the earthquake, the 1911 census recorded a much lower figure (3620) than that of 1901 for the Kangra town. The 1901 population stood at 4928 qualifying it as class VI town. In 1961 census population showed increase of 817 and stood at 5775. Kangra Bhawan now extends sprawlingly

from the fort to the club and from Chaharkund to about suraj Kund.

Demographic Features

Kangra is the fourth largest town by its population in the Himalayan Beas Basin, only Yol camp, Dharmasala and Mandi carry larger population (Fig 89)⁴. Due to the Kangra earthquake of 1905 the influenza epidemic and economic depression following the First World War (1914-18), the town suffered fall in its population from 4716 in 1901, to 3581 in 1921 and 3,527 in 1931. But with the return of normal conditions the population began to increase and in 1901 it stood at 4928, and 5775 in 1961.

96.6% of the residents are Hindus. The remaining population comprises of Sikhs (1.6%) and others (1.8%). Nearly 700 Muslims migrated to Pakistan in 1947 and about 354 displaced Hindus have settled.

Out of 4928 persons in 1951, 2684 are males and 2244 are females.

The occupational structure⁵ shows that 45.4% of the population derives its livelihood from services and miscellaneous sources. 40.5% is engaged in commerce and transport and production other than agriculture and 14.1% still finds sustenance in agriculture (Fig 90). 42.6% of the population is literate⁶, out of this women claim only 13.7% and men 28.8%.

1 Blache Vidal de la Chapelle p 316

2 Census of India 1951 Vol. VIII Part II A, 1953 p 25

3 For details, see Chapter I D pp 36-37

4 In 1961 it was the fifth town coming after Mandi, Khas Yol, Dharmasala and Palampur.

5 Figures have been calculated from statistics given in Census of India 1951 Vol VIII Part II A op cit pp 46-47

6 Kangra District 1951 Census Handbook op cit p CXXIX

Morphology and Plan

The town stretches for 1.6 miles in a north-east to south west direction from Fort to Club building between the fork of the roads (Fig 100). It has an width of 0.41 miles. The town has two well-defined parts, the Purana Kangra and Bhawan. The Purana Kangra has a simple plan. A cobbled stone road runs in the middle leading to the gate of the Fort. On either side of the road are rows of shops and behind them are the scattered dwellings approached by short paths from the market. Bhawan exhibits an arcuate growth along the club Tahsil-Suraj kund road. The southern limit runs roughly along a curve running through Ichhra Kund, Mission Hospital and Chakar Kund. From the motor road the elevation rises gradually up to the Chauk and there after abruptly to the Mission Hospital situated on the Malkara hill. Between Bhawan and Purana Kangra the hill is covered by grasses and scrub forest—an uninhabited tract except for the building of the solitary Dak Bungalow overlooking the Manuni Manjhi gorge. To the north of Bhawan are open fields. In front of the G. A. V. High School is a broad military ground, used as a playground. Residences and markets intermingle at some places but generally the residential area lies on either side of the central bazar (Fig 102) running through the middle of Kangra Bhawan. Good residential houses have sprung up along the Suraj Kund road, the Kangra Hoaharpur road and the School road, a few have been built by the christian missionaries on Malkara Hill and some others stand above the road near the courts. Most of the houses in the town are two storeyed. The houses of the

well-to-do persons are 'pucca' being made of stones, bricks, and cement and the roof is covered with corrugated iron sheets. The rest of the houses are 'Kaccha' and are made of earthen bricks and clay, and the roof is covered with slates. Every house has a good sized compound. Seen from a vantage point the whole town looks very picture-que in its physical setting of valley and hill ground.



Fig 102 Central Bazar, Kangra

The chief business quarter of the town occupies the central area. The chief market runs from the Police Station to about Chauk or Tala Gaurishah. From here the central bazar continues to lower bazar. Another bifurcation goes around the Arya Samaj Mandir towards the cinema house and a branch shoots off from the Chauk towards the temple. A few shops have developed near the bus stand and the cinema. There is no separate market for grain, cloth and vegetables. The medical practitioners pleasantly intermingle with grocers, cloth merchants and gold and silver smiths. The bazars are open and the shops appear fairly well stocked.

Public Utility Services

The development of other functions is not quite significant. The town is administered by an elected municipal committee¹. There are two high schools, one for boys and the other for girls. There is one civil dispensary, and a Mission Hospital for women. Banking facilities are represented by the local Himalaya Bank and the Punjab National Bank. The town has electricity, and proper arrangements for water supply have also been recently made². In addition to it there are a number of wells and springs. Practically the entire population of the town resorts to the springs and the riverside for the morning dip. Here one may meet friends and hear the town gossip³. Kangra is well served by motor transport. Bus services to Hoshiarpur, Hamirpur, Baijnath, Dharmala and Pathankot are available. Two railway stations, the Kangra Station and the Kangra Mandir Station serve the two extremities of the town. There are two good serais (resting houses) for visitors. Places of worship include the celebrated temple of Vajreshwari Devi, Popularly known as 'Mata da Mandir', a Thakurdwara, numerous Hindu shrines, a Gurudwara and a church. The roads to dal bungalow and to the country side serve for walks and the play ground is used for outdoor sports. There is one club for gents. A cinema house has been lately added to the town.

Conclusion

Purana Kangra and Bhawan present a picture in contrast. The former is a sleepy town while the latter is a place of business and activity. The whole length of the lazar of Purana Kangra and its large area appear too big for its tiny population. The reason of this anomaly lies in its history. Its confined and somewhat inaccessible location under the guardianship of the fort is no longer advantageous. Now accessibility rather than confinement is the potent factor in the growth of population centres. Bhawan, the northern part of Kangra town, enjoys a better geographical location and accessibility and has gradually grown from a suburb to the main township leaving Purana Kangra as a suburb. Thus, the daughter now stands head and shoulders above the mother.

Kangra Bhawan has good roads. It has suitable medical and educational facilities. The town has electricity and water supply. There is ample space for expansion. A few new industries and a college, the need for which has been long felt by the residents, would add to the further development of the town.

D RURAL HABITATIONS

Most of the population resides in rural habitations varying in size from isolated hamlets to agglomerated settlements. How

1 The Municipal Committee of Kangra was once suspended in 1935 due to inefficiency.

2 Although Kangra is well known for a number of springs yet during summer the supply of water used to diminish. Water Works have been built at Sursaj Kund and a reservoir is maintained near the mission School. Regular water supply to houses started in 1957.

3 With the provision of piped water supply the institution of public morning bath is declining.

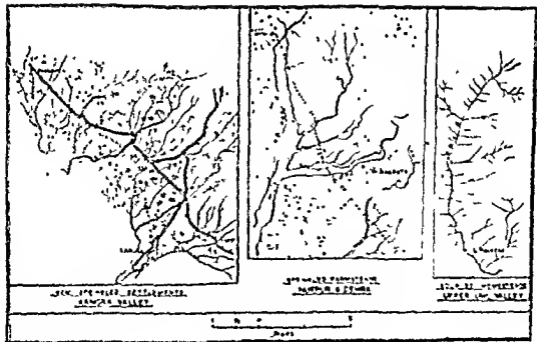


Fig 103

dispersal of the type found in European high lands¹. The physical features of the country are a bar to an agglomeration of houses. For revenue purposes however small areas are grouped into fiscal units called 'mauzas'.



Fig 104 Semi Sprinkled Habitations
Gangra Valley

The valley areas contain continuous stretches of fairly level land. Similar conditions of soil hydrography and climate tend to make a given type of settlement dominant on account of the necessity of living together in harmony². In the valley areas some waste land or somewhat raised surface is utilized for the building of dwellings. Moreover intensive use of land collective management of irrigation water and a common agricultural routine have led to the growth of small hamlets or semi sprinkled habitations. Another important reason is the necessity of mutual help in irrigation and cultivation of rice. Rice culture demands cooperation along several lines beginning from the transplantation of seedlings to artificial irrigation, harvesting and husking³. There is absence of large urban centres and industry and therefore there is no marked trend towards disintegration of these rural settlements. The small village communities continue to

Semi sprinkled or hamleted type is met with in the lowlying valley area (Fig 103)



Fig 105 Sprinkled Habitations
Kulu Valley



Fig 106 Isolated Habitations
Dhauladhar

¹ Spate O.H.K. op cit p. 171

² Blache Vidal de la, op cit, p. 278

³ Singh R. L. Evolution of Settlements in the Middle Ganga Valley. The National Geographical Journal of India Vol. I Pt 2 December 1955 p. 102

lead peaceful and apparently contented lives away from the din and dust of towns and factories.

Other interesting examples of semi-sprinkled habitations are found in the river valleys and spur sites. In Kulu the hamlets are strung in an arterial pattern in the valley of river Beas (Fig. 107) on either side of the water channel. The vast spaces adjoining the valley are mountains and are clothed with forests, snow and glaciers. In them a few lonely huts of the foresters or the graziers may be observed but the majority of the habitations cling to the valley floor where

land for cultivation is available. Moreover lines of communications follow the important valleys and they facilitate exchange and travel between various habitations. The concentration of human habitations generally goes side by side with the concentration of means of communications.¹ Discontinuity or break in the slope tends to produce linear pattern.² Between the river valley and the higher slopes marked concentration of habitations can be seen.

Spur tops sometimes provide sufficiently broad and fairly level surfaces. Human habitations have sprung up on these sites

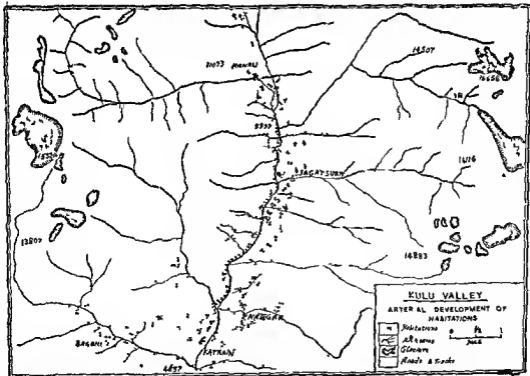


Fig. 107

¹ Spate O.H.K. and Deshpande C.D., *The Indian Village Geography* July 1940, p. 142
² Bruhnes, J., *op. cit.* p. 78

An example of semi sprinkled or hamleted settlements may be observed on the spurs descending south westwards from Dharmasala (Fig 108). The habitations avoid stream sides but small clusters are scattered in a linear formation on the spur tops.

Sprinkled or dispersed habitations have developed where the arable land is divided up in patches as a result of dissection of relief and soil and its character of hydrography. Such is the case in the broken hill country. South of the valley area much of the cultivated land is 'Barani' and the fields are small and scattered. Peasants generally live on their individual farmsteads (Fig 103). Thereby, they can take greater care of their

land and protect their crops against the depredation of wild animals. Each farm is separated by thorny fences or stone walls. Within separate enclosures, fields etc., each farmstead has to be isolated. There is hardly anything like a real joint village community¹. Habitations are scattered through waste and scrub.

Isolated homesteads are found in the mountainous tracts (Fig 108). Levels of occupation coincide with contour lines. Above 6,000 ft elevation the habitations consist mainly of isolated homesteads. The lower ground where arable land is available is covered with sprinkled dwellings but just above that in the precincts of forest,

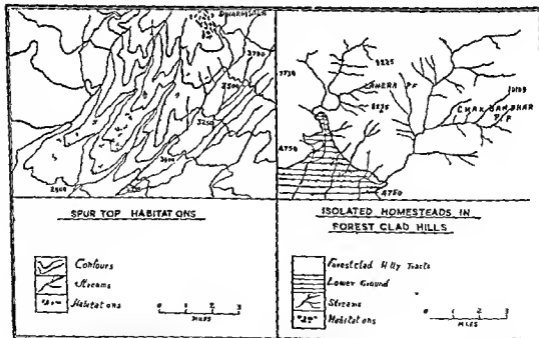


Fig 108

¹ Shuttleworth, H L., Final Report of the Land Revenue Settlement of the Dehra and Hamirpur Tahsils of the Kangra District 1913-15. Lahore 1916 p 1

isolated homesteads are found. Here are the dwellings of semi-pastoral people like the Gaddis who combine agriculture with pastoralism wherever possible. Life is hard for these people. Easier gradients are terraced in small patches. Crops have to be protected against the depredations of wild animals and the tiny farms do not provide sustenance for more than a few souls. Nature compels man to live in isolated dwellings (Fig 108). Some of the highest human habitations are found in the northern mountainous tract. Chakk Got above Hareri is situated at an approximate elevation of 9500 ft and a few huts of the Gaddis may be observed even above 11000 ft.

Human habitations add colour to the landscape. They are all descriptive traits of the country. They show definite relationship between man and his environment. Out of the varying conditions of different regions have developed the different types of human habitations.

E HILL VILLAGES OR HAMLETS

Hill villages or 'Tikas' as they are known, have picturesque settings. The appearance of villages in the Himalayan Basins is unique. The site chosen is usually the most worthless piece of land available in the near vicinity of the fields. In the valleys there are small groups of houses amidst the thickets of trees (Fig 109). A small water channel 'Kuhl' runs nearby, where may be found groups of women washing clothes or utensils, a fewurchins taking bath or a peasant leading cattle for watering. The houses are generally two storeyed and are

made of mud, bricks and roofed with slates or thatch. Small paths lead out to the scattered habitations and fields. In the village green cattle browse on the grass and bushes while the cowherds engage themselves in some such games as 'Guldanda' or 'Khunnu'. Adjoining each house is a small garden or 'Lahri' where vegetables and chillies etc are grown. Being near the farmstead this receives maximum care.



Fig 109 Kwarri Village Kangra Valley

Water for drinking purposes is obtained from the nearby springs. Spring is an important place for the village gossip. Where springs are not found water from the 'Kuhls' or streams is used for drinking.

In the higher hills dwelling sites are selected at a safe spot from the direct wind yet open to sun and commanding a view of the fields. Houses are grouped without any plan, arrangement depends on the nature of ground on which they stand. As this is generally rocky spur protruding from the wooded hill side or a stony hillock

on the edge of the forest, the general aspect is pleasing to the eye and natural drainage is unintentionally obtained. Rajput dwellings are isolated—they were built in secluded spots where women may be safe from prying eyes and the houses secure from the raids and plunder. The habitations perched on hills or tops of spurs are approached by a long flight of roughly made stone steps in many cases very narrow, only admitting two abreast. It is no exaggeration that to visit every house in a Kangra postal village would take one full day. Except at cross roads, where a few shops are generally located, all houses are widely separated from each other. The dung heaps are not calculated to improve the health of the hamlet, and render the near approach somewhat disappointing. There is no planning other than what site factors dictate. However, caste differentiations lead to separate areas for the various castes. The menial castes live on the outer margins. The higher sites in the village were often appropriated by the high caste residents but this custom is not universal.

Lack of means of communications and isolation, resulting from the very nature of their location in dissected hill tracts has made the village folk self centred and conservative. Endless toil gives them bare means of sustenance. There is no social coherence due to scattering of houses and caste restrictions, and each peasant literally ploughs his 'lonely furrow'.

Community projects and village welfare schemes may improve village paths, springs

etc and add wherever possible the much needed schools, dispensaries, panchayat ghars, and clubs, for education, health, recreation and social life.

F RURAL HOUSES

House Types

Rural houses are simple structures designed to provide for the sheltering of the peasant and his family and storing grain and implements etc. They are generally built of materials easily obtainable from the area. Three main types of houses may be distinguished.

1 The houses in the outer hills, where the rainfall is less, are made of mud or stone and have flat roofs (Fig 110 A). Such structures are found in the outlying tracts of Nurpur, Dhara and Hamirpur.

2 In the valleys and higher hills where rainfall is high the houses have pitched roofs so as to run off water (Fig 110 B). The plinth is made of roughly dressed stones and the rest of the building is made of sun-dried clay bricks. Where stone is abundant the entire structure may be of stone and some timber, with thatch or slate covering.

3 In Kulu and Mandi where the level land for construction of houses is very much restricted houses become taller in the same way as in the cities. Vertical expansion takes place due to lack of building space. This type of house also commands a good view (Fig 110 C).

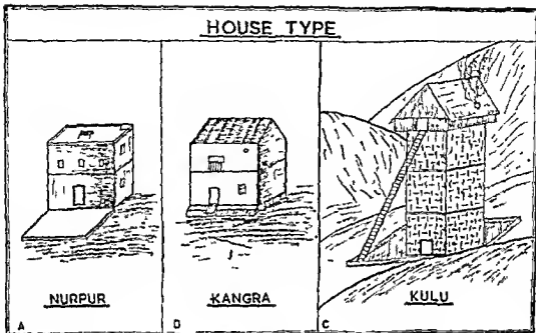


Fig 110

Nurpur House

It is a simple structure (Fig 111). The entire house may be made of sand or of mud



Fig. 111. Flat Roof House, Nurpur

and stone. The size of the houses depends on the means of the owner but usually they contain two or three rooms. In front of the house is a small courtyard, often paved with clay. During summer the roof may be used for sleeping. Houses are scantily furnished—a few pots and pans, one or two boxes, a few mats and possibly a cot or two make up the entire list. In all the houses individual or common courtyard is provided.

Kangra House

In Kangra, the farmer builds his cottage in some selected spot as a rule open to sun and sheltered from the wind. Often the house is two storeyed and is made of sun-dried

bricks (Fig 112) The inmates occupy the lower floor, the upper being used for greater part of the year as lumber room or store room for grain During rains upper room is used for cooking and also as bed room in order to escape the unhealthy air of the ground floor



Fig 112 Pitched Roof House, Kangra

The upper roof is covered with either thatch of serkanda or Kahi grass (in the lower part of the valley) or slates (in the upper parts) The inner portion of the roof consists of ridge pole and bamboo rafters The ridge pole is made of tun, sisu or ohi Outside walls are plastered with red or light coloured earth Front space is clean and the whole is encircled by a hedge of trees and brambles maintaining privacy and affording material for fuel, fodder and repairs On one side of cottage is Ghural or shed for cows and buffaloes Sheep and goat are kept in a smaller shed called ori Thatch of the cottage is renewed every third year

and fresh covering is added annually Each year, in the season of 'Navratras' in late September or October, the cottage is replastered inside and outside, a labour which devolves upon the women in all but the highest castes On festive occasions, the houses are adorned with mythological motifs and floral designs

Entrance to the cottage is usually to the east or to the south so as to secure the maximum sun but there is no general rule and the direction varies with aspect The west is superstitiously eschewed¹

The entrance to the cottage is secured by a wooden door In houses of higher castes, it is not unusual for sake of additional privacy to build cottages in the form of quadrangle, the windows and doors usually facing inwards Every ten years or so the houses require heavy repairs or rebuilding because of the timber being unable to withstand the attacks of white ants and rot Painting the timber with solignum would prolong its life and reduce repair costs

Kulu House

In Kulu and Mandi the structure of the house is very quaint and pretty (Fig 113) Being built of stone and timber, the houses give an appearance of solid comfort The houses are square or oblong turrets often much greater in height than in length or breadth and crowned by sloping roofs covered with slate or fir shingles

The length and breadth of the buildings are fixed according to standard plans They

¹ Should a cottage be so designed that the ridge pole of one crosses at right angles the entrance of another there would be an appeal to the authorities to prevent so unlucky an arrangement for there is a superstition current amongst the people that some disaster will befall the owner of the house thus menaced.

Around the house is a yard paved with flat slabs and enclosed by a low dry stone wall. It is used as a threshing floor and also for rice husking and other domestic purposes. Nearly every house has several bee hive holes let into walls. For house building, timber is available at low rates from the forest, which the farmer cuts alone or with the help of friends. For this the farmer provides free food and renders similar assistance to his friends when necessary.

Furniture

The houses are scantily furnished. Mats of straw are spread over the floor for sleeping. They may be used all the year round in higher hills, as they are quite warm and cosy, but are used only during winter in the lower hills. 'Khand, a sort of quilt made from old clothes is used as coverlet or mattress. Some houses may have a wooden cot or 'charpoy' but this is usually reserved for the master of the house or for important guests. There are one or two wooden or bamboo boxes for keeping clothes or other valuable articles. A wicker basket is suspended from the roof for keeping bread, milk or other eatables secure against depredations of cats and vermin.

Previously, earthen or wooden pots were in use but now all kinds of metal ware are seen. There is always the ubiquitous smoking pipe or 'Kali' in every farmer's house and whenever a guest comes, the first thing offered to him is the 'Kali'.

For storing grain, large wooden boxes and big bamboo receptacles or 'perus' are kept in the store room.

The equipment of the houses varies in quality and quantity with the prosperity and status of the peasant¹.

G DAULATPUR VILLAGE*

Location

The village of Daulatpur is situated in 32° 31' N latitude and 76° 15½' E longitude at an elevation of 2,100ft approximately, on an expanse of gently sloping upland, about 2½ miles just to the south of Kangra (Fig 114). The Dharmasala—Hoshiarpur motor road passes through its middle and the Kangra valley railway runs close to its west. The Kopar Lohr railway station is situated to its south west at a distance of less than a mile. The Banganga stream flows to its west in a narrow gorge, at a distance of about two miles from the post office. Daulatpur is one of fourteen hamlets in Mauza² Daulatpur.

Physical Setting

Daulatpur lies in the broken hill country to the south of Kangra valley. The appearance of the tract may be compared to an amphitheatre—a piece of gently sloping upland surrounded by higher ground on the three sides and open towards the Banganga stream. Daulatpur occupies a small area of about twenty acres in its midst. The wooded hills in its immediate neighbourhood rise to an average elevation of 2,500 ft. The land slopes from north east to south-west. Along the

¹ With the growing availability of manufactured articles and the spread of education and new ideas of standard of living various articles hitherto not used are gradually finding place.

* Based on personal survey.

² Mauza is a fiscal unit comprising of several 'Tikna' or hamlets.

Soils are shallow and stony. Excessive rainfall during 'barsat' (rainy season from July-September) causes soil erosion and leaching. Locally the soil of the village is classified as Barami (unirrigated).

Much of the original cover of vegetation has been destroyed to make place for settlements, agricultural land and hayfields. In the surrounding hills is found a mixed growth of deciduous and exotic coniferous trees. Excessive forest rights and grazing have mutilated the surrounding forests.

Economy

Agriculture is the mainstay of the people. 91.4% of the population of manza Daulatpur is classed as agricultural and only 8.6% as non agricultural. Land fit for agriculture is however limited. Out of an area of 20.15 acres in Daulatpur village, only 6.84 acres or 33.8% is cultivated. There are fields of all sizes. The biggest field is 1.37 acres and the smallest is as little as 0.005 acres only. There is no uniform shape or size. Not only the size is small but the area under each cultivating family is not enough to provide fully for the upkeep of the family. Holdings are uneconomic. Majority of the holdings are under 2½ acres and these are greatly fragmented. Thus cultivation of the land is no longer profitable and this compels the people to supplement their incomes from sale of firewood and grass, labour and service wages and other miscellaneous sources. Total family income from cultivation is about Rs. 300/ per year

but double of that amount is earned from 'other sources'. Annual expenditure comes to about Rs. 800/ or so, and therefore there is a very narrow margin of savings. In bad years the balance is unfavourable and the peasant runs into debt leading some times to mortgage and alienation of land.

Most of the cropped land is 'dofashi' (double cropped). This is due to the fact that the land is carefully manured and sufficient moisture is available from rainfall both during summer and winter. Plots near the farmsteads receive more manure and give better yields. Those at a distance do not receive the same care. In the uncultivable waste grasses grow and in autumn the grass is cut and dried for use as fodder.

Rice and maize are the important food crops during kharif. Rice occupies 23 Kanals², Maize 19 Kanals and other food crops 11 Kanals. In all food crops occupy 63.8% of the area under 'Kharif' crops. 'Mah' and other pulses claim 20% and rest of the area is devoted to linseeds and other crops.

During Rabi, 70.2% of the area is under food crops. Wheat is the most important food crop followed by gram and barley. Rest of the area is devoted to oilseeds and other crops.

The yields are not high but are not much below the average for Barami tracts. The following yields were observed:

1 Primary Census Abstract, Kangra District 1961 Census Handbook op cit pp XIV XV

2 One Kanal=3/3rd or 0.94 acres (approximately)

CROP YIELDS

Crop	Yield Per Acre (in seers)	
Food grains	Rice	256
	Maize	250
	Wheat	181
	Barley	181
Pulses	Gram	203
	Mah	96
	Til	85
Oilseeds	Alsi	43
	Sarson	160

People, their Dwellings and Village life

The population consists mostly of Ghrths. Others like Sunars, Khatris and memal castes form a negligible portion of population. Ghrths as a class are simple and hard working people. Ghrth women not only work in the homes but also assist in various agricultural operations from transplanting rice to weeding and harvesting. They also cut grass for fodder for their own cattle, and for sale in Kangra town. The institution of polygamy among Ghrths may partly be ascribed to the fact that women are not only domestic drudges but also field workers.¹

The peasants live in mud brick and thatch or slate covered houses.² The houses are usually two storeyed. They have three or four rooms (Fig 127) (1) Oan or living room (2) Obri or side room (3) Bohr or upper storey used as store and kitchen. There is a small compound in front of the house called 'angan'. In one corner is the ghural or cattle shed. Around the compound is thicket of trees and bramblies which afford privacy.

fuel and fodder. Adjoining the house usually on its back is 'Lahr' or kitchen garden in which some vegetables and spices etc are grown for personal use. The water from the kitchen irrigates this plot and being near the homestead it also receives heavy manuring, and may be considered the best piece of agricultural land.

The houses are pleasantly sprinkled in small groups near their farms (Fig 115). The existence of motor road through the middle of the hamlet has led to the building of shops and some houses on either side of it giving the appearance of a street village or Gassendorf to the whole habitation. The small bazar consists of half a dozen shops belonging to the silver smith, the sweetmeat seller, the grocer and cloth merchant. The room facing the road is used as a shop but the other rooms on the ground floor and first floor are used as living apartments.



Fig 115 Daulatpur

¹ The author met a person who was proposing to marry a third wife. The reason he gave for it was that he could not afford to hire labour for work in the fields.

² There is only one house looking like a city mansion which was built by Late Harish Chandra Sen, advocate.

The shopkeepers also own land. There are a few large trees which are at once temple, shrine, meeting place and often the only *hos tely* for the pedestrians to rest in. Thus, they function as social centres of village life. The village boasts of a primary school. The school is also housed in a small place, more like a shop. Children from neighbouring villages also attend this school. The pupils squat on the uncemented floor and in good weather open air classes are held. It was a good thing to hear the chorus of young boys repeating their lessons and to see Hindi words scrawled even on stones and house walls here and there. They are the sounds and symbols of infant literacy. The school has two teachers. One of them combines in himself the office of postmaster also. The post office is nothing more than a letter box, and a wooden chest to keep postal tickets etc. The National Extension Service has included this village in Block Development Work. During 1955-56 a young farmers Club, an adult literacy centre and a women's sewing centre were started with a total investment of about Rs 250/- only. Only if the people would keep these institutions alive, they may well form the nuclei of a healthy, literate community, enjoying a measure of corporate life.

The present picture is not a happy one. The sites of houses in ruins point to the fact that poverty had compelled some to seek means of livelihood elsewhere. Farmers are poor, illiterate and ignorant. There are no medical facilities. A visit to a farmer's house revealed the pathetic conditions in which he and his family live and work.

The farmer complained of continued illness of his wife and attributed it to the 'Kop' or displeasure of the 'Devta'. A child dressed in rags was playing in dust and a weak old man sat pulling at his pipe. One vagrant mendicant, who looked stouter and was surely better dressed than the farmer came along to collect alms. It is a strange world where the parasites thrive and the workers wither. A boy from the village who works as a coolie at the Kangra railway station had heard that the Government intended to improve the village and the lot of the poor peasants. The farmer enquired, with a gleam in his eye, whether it was all true. The people lead a life of poverty and hardship in this 'Baram' tract of poor soils. One could only wonder how this poor village came to be known as 'Daulatpur' or the abode of wealth'.

H GADIARAH VILAGE*

Location

Gadiarah is situated in latitude 32°N and longitude 76°17' east at an approximate elevation of 4 500 ft (Fig 116). It lies on the south facing hill slope about one mile from Jogindernagar. The Pathankot Main road runs by to the south of it. Parallel to the road and a little further south at not much distance runs the Kangra Valley Railway line. The terminal station of Jogindernagar is also about a mile from Gadiarah. Small tributaries of Rana Khad flow on its sides. They seam the hill sides and rent deep passages. The village lies in tahsil Jogindernagar of Mandi district of Himachal Pradesh.

* Based on Personal Survey during October, 1958 and June, 1959

Physical Setting

Gadiarah lies in the northern high hill

and mountain country. The hills are steep with an average slope of 15-20 degrees

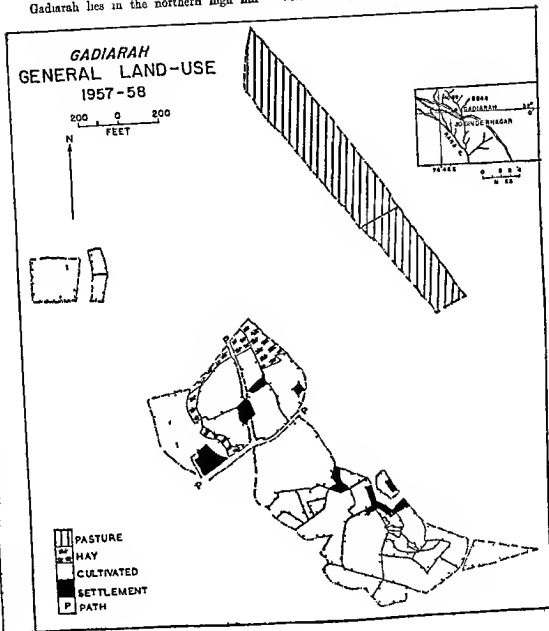


Fig 116

They rise from 4000 ft south of Gadiarah to over 8000 ft elevation north of Gadiarah. Land for agriculture and settlement is there fore highly limited Gadiarah occupies an area of 36 acres only There is a spring near the village which supplies water for daily needs of the people

The rainfall is high approximating to 90" per year 77% of this comes during the months of July, August and September, 19% comes during the winter months from October to February and only 4% from March to June The winter rainfall contributes to the production of rabi crops, while the heavy summer rainfall suffices for kharif crops Thus the area is able to bear two crops with out the help of irrigation The rainfall is variable and its variation affects the harvests and introduces an element of some instability The high intensity of rain during the rainy season from July September causes soil leaching and erosion. Hail and frost also damage crops

Winters are cold but summers are pleasant and warm The area is not shut in like the broken hill country in the south but gets cool air from high ranges

Soils are thin and have boulders and stones It is a very laborious job to terrace the hill sides and clear boulders and stones from the fields

Most of the natural vegetation comprising grass and deciduous trees has been removed for making fields and settlement sites Of the remaining excessive use has been made for timber for building houses and agricultural implements and for fodder and fuel. The trees are badly lopped There

are natural pastures in the north-east and some of the land is reserved for hay fields Fuel and fodder trees should be grown on the wasteland field boundaries and near the houses

Economy

Agriculture and livestock provide the main means of livelihood in the village Land for cultivation is limited It comprises only 22 acres Hayfields and pastures take up 12 acres (Fig 116)

LAND USE (1957-58)

	Area in Acres % of Total	
Settlements & Field		
Boundaries etc	2	5.50
Hayfields	2	5.50
Pastures	10	27.79
Cultivated	22	61.11

The fields are of different shapes and sizes They range in size from 0.1 acre to 3.7 acres for cultivated fields In one case there were 5 shareholders in 1.2 acres of land The holdings are uneconomic and people have to supplement their incomes with sale of firewood and milk and doing labour and service The following is a family budget of a Gupjar family who here combines agriculture with animal husbandry

ANNUAL FAMILY BUDGET

	Income (in Rs)	Expenditure (in Rs)
Produce of Land	300	Foodgrains etc. 500
Sale of Milk	500	Clothes Medi- cine, Education
Wages & Miscell- aneous	100	of Children etc 200
		House Repair 50
		Miscellaneous 100
Total	900	Total 850

The income and expenditure is precariously balanced often just making both ends meet. During years of unfavourable rains the peasant is hard put in providing for himself and the needs of the family. He has to take small loans in emergency, but by and large there is no indebtedness in the village. The produce from the land suffices for 4 or 5 months only and for the rest of the year food grains have to be purchased from the market. Cultivated area has somewhat increased during the last decade or so due to increased cost of foodgrains. During the earlier period the cultivation was less and people used to go to Jogndernagar and Mandi for work. Batches or seasons combine agriculture with unnecessary work. During employment it brings good wages about Rs 3 to 4 per day. The Rajput cultivators combine agriculture with service.

Most of the cultivated area is double or double cropped. Nearly 91% area bears two crops a year. This is largely due to rain fall both during summer and winter and the practice of good manuring. The farmer really depends more on manure than on rotation for successful harvests. Farmers keep livestock on account of availability of pastures and land for hayfields and thus there is good supply of manure. Cattle and sheep are penned on the fields too. The straw of wheat, maize and barley etc is left uncut and carefully burnt and ashes are ploughed down. Use of artificial fertilizer is very little. Soils are low in pH value and there is tendency towards acidity by use of ammo-

nium sulphate or super phosphate. Vegetables are grown for personal use near the houses.

The village lies in the maize wheat zone of Mandi district. Maize is the most important crop during Kharif (Fig 117). It occupies 16 acres or 72.7% of the cultivated area. Rice is not important. It gets only 2 acres on account of the limited facility for irrigation. Kodra (Eleusine Corocana) an autumn millet, occupies 2½ acres, pulses about 1¼ acres, hayfields 2 acres and pasture 10 acres. Kharif crops may be sown as early as May or June and cut in September and October. Maize comes after fallow barley or wheat. It is a hardy plant and grows well. Ripening period in late August or early September has to be guarded against jackals and birds who otherwise do much damage. It is considered that maize ripened on the stalk is not eaten by insects but to save it from the depredation of animals and birds it is cut when still unripe and put to ripen on the roof tops. Kodra is sown in May and harvested in November. It is an extraordinary grain as it is not attacked by insects. During rabi wheat occupies 17 acres or 72.8% of the cultivated area. Barley has 2½ acres, oilseeds and pulses have ½ an acre and current fallow is only 2 acres (Fig 118). Wheat is the universal winter crop. Best yields come from wheat sown on good rain land that is heavily manured. It is sown in late October or early November and cut in May. The following yields were recorded:

Average Yields (in seers per acre)

Maize	500	Kodra	400	Wheat	300	Oil Seeds	80-100
Rice	400	Pulses	150-200	Barey	350		

GADIARAH KHARIF CROPS 1957-58

200 0 200 400
FEET

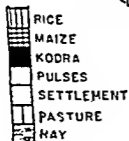


Fig 117

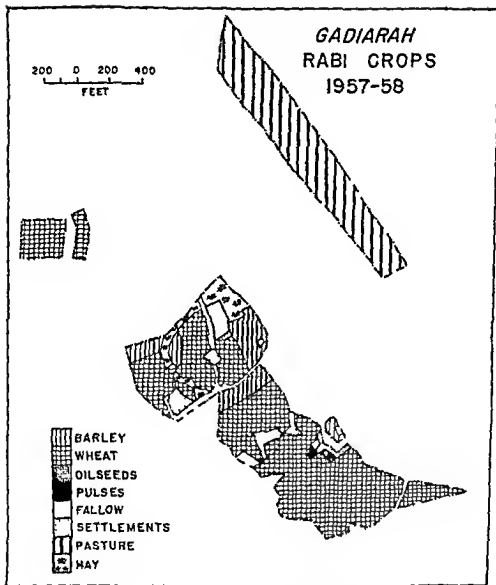


Fig 118

The large number of livestock is due to plentiful grass and pastures. The number of cows and buffaloes is 89 while the human

population stands at 80. Nearly 1/3 of the population consists of Gujjars who here combine farming with animal husbandry. They

Social Structure, Practices and Behaviours

A THE BASIS OF SOCIAL STRUCTURE

Aborigines-The Oldest Strata

No sources of information are available to help us to determine as to who were the original inhabitants. It appears that the aborigines of these hills are now represented by various scheduled caste tribes which form a considerable part of the population (Fig. 120). It is true of the plains and the same appears to be not unreasonably the case in the hills. Ancestor and spirit worship is an aboriginal cult prevalent here amongst these tribes.



Fig. 120 Aborigines Kula

These people are represented by such tribes as Koli, Halis, Chamars, Dumas, Darimas, Reharas, Lobars, Dhaugris, Dagis etc. They are all looked upon as outcastes. These tribes possess no traditions as to their original home. The people are short in stature and dark in complexion and it is possible that they come from the same original stock as the Kols of Central India. This is indicated by the fact that some tribes still bear the name of Koli, Dag, Megh and Sip. The 'Da' the Koli an for water is still used for many of the smaller streams of Simla Hills.¹ These tribes are of non Aryan origin but a great fusion has taken place by inter marriage and degradation from high castes a process which is still going on. This doubtless has led in a course of time to many changes in appearance and characteristics of the people and to these we may ascribe the fact that they exhibit traces of features of Aryan race and use words of the dialects of the Aryan family. Scheduled castes are employed in menial occupations and have also taken to farming. Even now they labour under social restrictions. They have continued to occupy since long a very depressed position in the social scale.

1. A Glossary of Tribes and Castes of the Punjab and North West Frontier Province Vol. II. Lahore 1910 p. 17

There is general conviction that the Chanals¹ are the original inhabitants of the hills. The Aryans came to western Himalayas at a very early period and probably before the hymns of Rigveda were compiled. The oldest strata of population is of very ancient origin.

There is an idea current in the hills that of the land holding castes the Thakurs, Pathis, Kanets and Ghurths are also either indigenous to the hills or indigenous by half blood and that Brahmans, Rajputs and others are the descendants of invaders and settlers from plains. We may regard Thakurs and Pathis as being now a conglomerate people representing the product of original and external contributions to their rank.

The Kolis, Damnas and Meghs are the only castes having names of ethnological character but many of the other castes though now distinguished by purely occupational names may have sprung up from the same source as Kolis.

We may safely conclude that the various scheduled castes such as the Kolis, Dags, Chanals etc. belong to the indigenous stock and in course of time have undergone certain changes in their original characteristics.

Castes and their Characteristics

General Features

The social structure is firmly based on the Hindu caste system. The people belong

to either of the four caste groups viz., Brahman, Kshatriya, Vaishya and Sudra. From time to time all of them have received accession from the plains at various periods as a result of invasions and immigrations.

In the former hill states the Raja or the ruler was the fountain head of honour and could promote a Ghurth to the clan of Rathi and a Thakur to that of Rajput. Two old royal and now essentially Rajput families of Kulehr and Bangahal are said to be Brahmans by original stock.² On the border between Tibet and India in these parts one could observe caste developing before one's eyes—the noble is changing into a Rajput, the priest (He may be from even Sudra caste) into a Brahman and so on down to the bottom of the scale.

Brahmans are divided into 120 subdivisions or sub-castes, Rajputs into 169, Vaishyas into 4 and Sudras into 31.

Brahmans

Brahmans are subdivided mainly into two groups

- (1) those who plough the land.
- (2) those who refrain from ploughing the land.

Brahmans who have descended to the occupation of husbandry and have 'defiled their hands with the plough' are not much acknowledged by their superior brethren. Nagar Lotias rank highest among the Brahmans. The purer Brahmans who abstain from work

1 Representing Chanals or low castes. Chanal is one of the low castes. There is a hill saving Chanal Jetha.

Rathi Kanetha"

"The Chanal is elder brother and the Rathi the younger

2 A Glossary of the Tribes and Castes of the Punjab and North West Frontier Province. Vol. I Lahore, 1919 p. 41

culture by no means restrict themselves to sacerdotal duties—they hold land cultivated by tenants, lend money, join the military, engage in services even as cooks and will enter any secular pursuit for subsistence. Majority of them know no language except the current hill dialect and do not abstain from eating meat. Public administration of temples is often in the hands of original tribes. Bhojks are a priestly sect and claim to be Brahmins but no Brahmin will eat Kaochi rotli with them. They appear to occupy much the same position as the Gangaputras of Banaras. Though priests, they are much debased. Some Sudra castes act as purohits (family priests) for the low castes such as Ma-sands who are Chamars by caste.

Kolatriyas

Rajputs are graded into primarily two groups

- (1) Mians
- (2) Thakurs and Rathis

The test line of distinction is marriage. A Mian Rajput will marry Thakur's daughter but not Rathis and will not give his daughter to a Thakur. There is however struggle among families to rise in social scale. Mians are accorded by the salutation *Jai-diya*¹. Mian Rajput will not say *jai-diya* at any cost to any one lower in the social scale by caste. The code of honour for high class Rajputs consists of four fundamental rules

- (1) He shall not plough land
- (2) He shall not marry below his rank
- (3) He shall not accept money for bet-rotal

- (4) His women folk will observe 'purdah' or seclusion

Plough is considered the badge of lower walk of life. The observance of the code of honour has meant numerous hardships. It is difficult to find suitable matches for the daughters, or get proper jobs. Driven by circumstances some have now taken to cultivation of land and other occupations.

Thakurs and Rathis are essentially agricultural classes. They are robust and industrious.

Vaishyas

The Vaishyas or the commercial classes comprise of Khatrias, Mahajans, Karthas and Karats. Gossains though claiming to be a priestly class are essentially engaged in trade.

Sudras

The Sudras consist of certain agricultural, pastoral and the menial classes. They include Ghurthas, Kanets, Lohars, Tarklans, Kohs, Dims, Dims, etc. According to the social scale the sudras may be divided into 4 groups

- (i) Rathis, Kanets
- (ii) Ghurthas, Jats
- (iii) Lohars, Naps, Kumbhars etc.
- (iv) Julahas, Dams, Chamars, Dumnas, Chanals—all outcastes

In the hills, occupations tend to merge into one another. It is difficult to distinguish outcaste classes. Artisans, Jhauwars and Chamars etc. are somewhat distinct. It is difficult to say how many of the people who call themselves Barhans have adopted occupation

¹ From Sanskrit *Jayntu Dorah* like the french *Vive le roi* means *g. Hail the King*

of caste under whose name they are addressed and entered. In the hills almost all menial castes occupy themselves very largely in field labour and in some parts Kols are known as Hals or Sepis. The Ghurths are a most important agricultural tribe. They live chiefly in Kangra valley. They are of medium stature and dark complexion and belong to the indigenous stock. Ghurth women take part in outdoor work. Ghurths are now asserting themselves for a better position in society. They refuse to put up with social restrictions such as prohibition of beating drums when passing a Rajput's house.

The Kanets are the cultivating class of eastern high hills (Kulu and Mandi). Kanets are identified as Kunindas or Kulindas of Sanskrit classics and according to General Cunningham¹, they belong to a race which before Aryan invasion occupied the whole sub-Himalayan tract from Indus to Brahmaputra. They were driven up into the interior hills by the advancing wave of immigration. Holland² is of the opinion that there has been a distinct infusion of Tibetan blood among the Kanets. Kanets of Malana are distinct from the other Kanets of Kulu and Saraj Malana is both physically and linguistically isolated from Kulu and has important differences of organisation and custom from those normally found in Kulu. People practise a sort of theocracy and need to be studied

thoroughly by an anthropologist.³ Kanets are divided into two groups:

- (i) **KHAMRA**—those who wear 'Janeo' or sacred thread
- (ii) **RAO**—those who do not wear 'Janeo' or sacred thread

Brahmins are scarcely distinguished from Kanet cultivators.⁴

Batwals are employed as village watch men, messengers, and coolies. The word Batwal is derived from Baharwala 'outsider'—meaning an outcaste living on the outskirts of the village.

Dumras make sieves, winnowing fans, matting, etc. They are also the village musicians and play *sahna* and drums on all ceremonies.

Koli Dagi and Chanal are scheduled castes of high hills. Their original stock belongs to Kohan group. Dagi is derived from the word Dag cattle, a word of reproach meaning a person who would touch dead animals and eat cattle flesh. Dagna also means to fall meaning thereby that Dags are the fallen group socially. They perform menial services.

Lohars are iron smiths. Daugris represent the same group in the eastern hills. The word Daugri is derived from Dhaukha to blow that is, they blow air for the Bhatti' or Kalm. Sois are tailors and derive their names from the word *seena* to sew.

1 Cunningham, Alexander. A Report of a tour in the Punjab, 18 3-2 Vol XIV. Archeological Survey of India, Calcutta 183 p. 16

2 Holland T. A., 'The Kanets of Kulu and Lahoul' Journal of Asiatic Society Vol XXXII p. 169

3 The author met Mr. Colin Ross of G. K. at Naggar Kulu in 1929. He was carrying out anthropological studies on Kulu and Malana. His article on 'A Hermit village in Kulu' is about Malana and has been referred to earlier in these pages.

4 It is a native saying about Kulu that no man who takes up his abode there retains purity. The ascetic sooner or later takes a woman to live with him and Brahmin or Rajput marries a Kanet girl.

Social position of menials is one of hardship and social restrictions and denials. They work as labourers for noncultivating land holders. They provide 'begar' or free labour, but this is now largely abolished. Depression of these castes is very marked. Their manner is subdued and deprecatory.¹ Their women were forbidden to wear gold ornaments; they were not permitted to build double storeyed houses. Their brides could not ride a palanquin or chair but instead walk to the bridegroom's house. They were not allowed to draw water from the same well or spring from which members of more privileged castes took their supplies. They were required to work as *Kamias* or unpaid servants at the house of the landlord. This was practically a form of slavery. Many of these and other restrictions are still observed but with education, new social ideas and the policy of the Government² they are disappearing.

Public services like the bus and the rail and public institutions like schools, hospitals etc. are working as solvents of caste and leading towards a social equality. However, caste still constitutes the framework on which the social structure has been built.

B SOCIAL PRACTICES, BEHAVIOURS AND REACTIONS

Chief Characteristics of the People

The hill people are generally good looking (Fig. 121). They possess fair complexion.

Their expression is mild and prepossessing. Features are delicate and well formed and average stature is of middle height. Here, as in Europe, dwellers in the hills are generally shorter than the people of the plains and within the hill region it may in both countries be observed that stature is often greater at high than at moderate altitudes, a fact which has been ascribed to the influence of rigorous climate in killing off all but vigorous individuals.³

The Gradations of Caste are well marked in the looks and the general appearance of the people. Generally, the higher the social



Fig. 121 A Lady from the Hills

1 If they had to deliver a letter they would throw it on the ground.

2 Under the Constitution of Free India no person can be treated as an outcaste. Social disability on account of caste is punishable by law. e.g. It is a crime to forbid any person from using a public well or spring. Jobs are reserved and large sums are being spent on their betterment.

3 Ethnology and Caste. The Imperial Gazetteer of India, Vol. I, Oxford 1907, p. 282.

are numerous variations of the same here and there such as Kandiali in Nurpur 'Bhattiali in Bhattiyat etc

In Mandi the Mandiali is the chief dialect Variations of accent etc are noticed in Jogin dernagar Sarkaghat and Chachiot

In Kulu the main dialect is known as 'Kululu' Kululu possesses most of the peculiarities of the western Pahari dialects¹ Here also there are numerous variations, the Sarajis of outer Saraj speak a dialect akin to Surmuri The people of Malana speak Kanashi which is different from the dialect of Kulu and shows some mixture of the Tibetan language Isolation of the canton in the circles of formidable mountains and early infiltration of Tibetan is responsible for this development The physical isolation serves as preserve of culture, some times more advanced than prevailing in more accessible advanced areas In the case of Malana, Colin Rosser observes² All in all the village provides an interesting example of advanced political and legal concepts obtaining in an entirely illiterate and economically backward society

Certain tribes speak other dialects such are the Gadi of Gaddis, the sheep and goat herders and the Guppuri of the Guppars the buffalo herders

There is no local script for these dialects Devnagari script is often employed and should be progressively adopted This will also help to establish kinship with Hindi the 'National Language of India' and will help the people in their further development

Commercial classes employ 'Tankari' as their script but this is not amenable to popular usage It is possible everywhere to communicate in plain spoken Hindi Hindi is the official language in Himachal Pradesh There was some controversy about Kangra district but recently according to demarcation of linguistic regions in the Punjab, the entire district of Kangra is included in the Hindi region³ Thus for purposes of education and office work the whole of the Himalayan Bear Basin is Hindi speaking This provides a cultural coherence to this natural geographical unit

Dress and Ornaments

The dress of the people varies according to the climatic requirements of different parts In the lower valleys and southern hills cotton fabrics are worn for most part of the year Only in winter, woollen coat or vest and socks etc are necessary to ward off the cold But in the higher valleys and hills, woollen dress is worn all the year round Cotton cloth is generally mill made but the woollen is mostly from home-spun yarn

The style of dress also varies according to tradition and custom of each area

In Kangra and southern hills the ordinary clothing consists of skull cap or turban, Kurta or (shirt) and pajama (trousers) (Fig 121) Jutta or country made shoe is also worn, though the canvas shoe which is light and quite cheap is also popular The hill dandy dons coloured scarfs and vests and a gray cap Among the higher classes the fa

¹ Grierson, G. A., Linguistic Survey of India Vol. IX and IV Calcutta 1916 p 670

² Rosser Colin A *Herm's Village in Kulu* Op Cit p 83

³ 'Linguistic Demarcation in Punjab' statement in the Tribune, Ambala dated 20.7.1937

abric and dress is made to suit the fashion and pleasure of the wearer. Female dress is picturesque. It consists of choga (Petti coat) choh (bodice) uthan (long trousers) and dupatta (mantle) for lead dress. The colours are usually gay. Salwar and Kurta is now more popular with the younger generation (Fig 12). The exposed parts are richly decorated with ornaments. Married women wear bahu or nose ring. Cheap jewellery of imitation gold and silver is quite popular.



Fig 124 Dal Fair Dharmasala

People turn out in their best local dresses.

In Kulu flowers and jewellery are much in fashion. People are usually well and comfortably dressed in home spun cloth of wool of the flocks that abound in the hills. For every day work they may wear ragged garments. A single Pattu (blanket) white, black and white or red is the only garment worn by woman. It is carefully adjusted and

pinned at the bosom and gathered at the waist by a sash. It forms a neat and modest robe. It is for her head dress that Kulu woman devotes all her arts of coquetry. The young girls go about bare headed with their hair plaited into long pig tails. Older girls make coils and don a coquettish little cap perched just above the temples. The favourite head gear is a black or scarlet kerchief. The combination of black or scarlet satin lead gear, marigold flowers, silver ornaments over black and white check plaids is most effective. Hill women wear great bunches of silver earrings. Necklaces, bracelets and anklets of different shapes are worn. The full show is exhibited at fairs and ceremonial gatherings (Fig 121).

Man's dress consists of loose woollen tunic girt in at the waist with a sash. Loose woollen trousers gathered in tight at the ankles are worn in cold weather and on festive occasions. A white or check blanket like a plaid lends something of the picturesque to this loose fitting costume. Some people carry a neat chain supporting a few small surgical instruments for operating on sheep and cattle. Anklets are worn by numerous people. The head dress is round woollen cap. On fairs and festivals plumes of monal crest are worn on the cap. Every person carries flint and steel. Though matches are available the older contrivance is more trustworthy in wet weather. Both sexes go shod, some with leather shoes but most with grass shoes plaited in their homes.

The dress of Gaddis is also quite picturesque. They wear a long loose woollen chola

1 It is told, that women who on account of mourning are unable to wear their jewellery hire it out to others.

(frock) reaching just to their knees and tied round with several rounds of thick black woollen cord¹

Each region has its own peculiar and characteristic costume necessitated by climatic requirements and traditions and it is possible to recognize people of various tracts, without difficulty by their very dress

Food

The habits of the people in regard to food are largely affected by local conditions. Food is simple and is obtained from local produce.

Rice, maize, wheat and some coarse grains are the staples of food. Rice is eaten in the irrigated tracts. People sell clean rice and retain chipped pieces for their own use. Unmixed wheat is also soid and mixed crop of wheat and barley or wheat and gram is consumed. In poor uplands, coarse grains like 'Kodra', 'Katha', 'Kangni' etc. are consumed and in the Barani or unirrigated tracts maize is the chief cereal. Maize is the favourite food from September till May. After that for 5 or 6 months wheat and coarse millets are eaten. Linseed or rapeseed oil is used by the poorer classes in place of ghee. In some areas walnut oil is also used for cooking purposes. In Mandi, curds almost entirely take the place of ghee. Sag (greens), 'dal' (pulses) and potatoes are much used. People also like to take *Jhal* which is made of buttermilk, salt, 'ghee' or oil and spices. Meat is eaten on festive occasions and ceremonies. Now and then people are able to

supplement their regular food with flesh of wild pig, fish and small game.

Generally, there are three meals a day. The first is the morning meal. In Kangra, it is known as 'dhatain' or 'noahn', in Kulu as 'kalar' and in Mandi as 'kalwar'. This meal is taken according to convenience but generally before going to work. It consists of bread reserved from the evening repast or some light meal of bread and vegetables is prepared.

The second meal is taken at mid day and is known as 'dupahn'. It is a full meal of rice and dal or bread of maize or millets.

The evening meal or supper is known as 'bisk'. In this meal rice is seldom taken.

On ceremonial occasions the feasts are elaborate. On marriage and other ceremonies common dinner is customary. Goats are occasionally sacrificed and their meat eaten on such occasions. Yams are favourite food and both the roots and leaves are eaten. Honey is available from the forest hives or the box hives. Butter milk is used and 'ghee' is generally sold.

Horse-chestnut flour is consumed in every village where nuts can be procured. Each nut is crushed flat on the stone floor by a wooden mallet and the hard kernel is removed. The white flour is called *sik* and is quite palatable. Hard wild medlar (*shegal*) is used for food. The acorns of *kharsu* or brown oak are prepared for food. Other products of the forest which lend variety to the food are mushrooms, several kinds of roots and herbs, the edible fern and the fruit and be-

¹ For a detailed description of Gaddi dress see Chapter XIII B Gaddis of Dhawaladhar—A Study in Pastoral Society.

ries A favourite wild herb is 'phaphru' the leaves of which are eaten as vegetable The edible fern (Lungru—young bracken) is also eaten

The use of tobacco is almost universal Both men and women of 'lower' castes indulge in smoking

The cultivating and other Sudra castes, Bhojias and Gaddis, and many others in other castes are all fond of liquor No other class will openly acknowledge its use though they may drink it secretly The favourite drink is hill beer, 'lugri', or 'chatki' and sur The former is made from rice fermented with 'phap', a kind of yeast which is imported from Ladakh or Balistan and the composition of which is trade-secret of the brewers Sur is the 'table beer' made from 'kodra' millet and fermented with 'dihli' a mixture of satu and various herbs Country liquor is cheap

Some Social Customs

Religion, caste and tradition play the chief role in the observance of various social customs and ceremonies

'Janeo' or the sacred thread is worn by the three highest castes of Hindus and the ceremony of investiture is quite elaborate. Some lower agricultural tribes have also started wearing 'janeo' to register a higher social status

For marriage, the three high castes prohibit giving of daughters to lower castes Infant marriages are customary Different tribes marry among themselves but not in the same 'sept' or 'gotra' Money for the bride is not taken among the high castes but among scheduled castes payment is common

Although immoral, it leads to girls being looked after better Marriage customs show some novel features. There are three kinds of wives—the 'bihata', the 'rakhorar' and the 'sarit'. The two latter will be stamped as concubines in the plains but here the 'rakhorar' ranks higher than a concubine Betrothal contracts are of five types:

- (1) 'Batta satta' This is arranged by fair exchange in which a girl is taken and a boy or a girl married to the girls' relation
- (2) Labour or 'Gharjwantri'. The bride groom elect binds himself to work for the bride's family, sometimes for five or six years before the marriage. Some suffer mortification of seeing the fiancée carried off to some one else
- (3) Cash payment or 'Mul dena' the bride is hegotten on making cash payment
- (4) Dharm or (Pun) No money is paid for the bride
- (5) Jararplukhi This is a peculiar form of marriage and is resorted to when the boy and girl want to marry before their parents come to know of it The couple walks round a bush fire and thus complete the ceremony even without the ubiquitous Brahmin This type of marriage is also called 'Man Marzi' or mutual desire and is a 'run away' marriage

The remarriage of widows is common among certain classes and is called 'Jhanjira' and courts recognize the same as legitimate union Illegitimate sons chiefly found among higher classes are called 'sartoras'. The

'Chaukandi' is an illegitimate son born to a widow who has continued to reside in her deceased husband's house. He is sometimes allowed a share in the deceased husband's property. Another striking feature of local custom is the almost universal adherence to the Chundavand, that is, the inheritance is made upon heads of sons.

Sale of wife is also practised among low castes. Sometimes such agreements are executed on stamped paper. Polygamy is considered allowable and practised among all tribes. Women is useful as a worker in the fields besides being a domestic drudge and one 'negi' in Kulu is known to have married as many as nineteen wives.

Polyandry is an exception rather than the rule. It is prevalent to some extent in Chohar Saraj and Rupi and is the rule among inhabitants of Malana Glen. It is like a 'community of wives among brothers who have a community of other goods. All these areas where polyandry is practised are also deficient in food, and the institution serves as a natural check on population increase.

Free open air life provides plenty of opportunities of making acquaintances and romance, and even elopement. Absence from home on account of service or forest work, may keep men away for long periods and domestic ties sometimes break down under this strain.

Social rules about eating and drinking are also peculiar. Inter-dining is permitted only among certain castes. When a party is dining none may come in or stand up, otherwise, the whole gathering will break up owing to what they call, unsocial conduct.

Death of old people is an occasion for festivity. Among some castes, it is a custom to bring an effigy of the deceased to the house of mourning accompanied by drummers and musicians and thus try to dispel the gloom by most boisterous tricks and the broadest jokes. Each tribe has numerous customs and any deviation from them is considered anti-social and punished by 'dand' (fine) or 'banj' (social ban).

Pastimes, Festivals and Ceremonies

The hill people are merry and light-hearted and with them sport and pastimes are more general than among the people of plains. Almost all of them are fond of music and dancing (Fig 12³). Dancing among men is vigorous and even boisterous. At village fairs, dancing is essential. The people are sometimes accused of laziness and waste of time but a close acquaintance with their yearly round of labour leads one to conclude that they put in fair amount of hard work. There is absence of labour-saving devices and it is impossible for the people to be idle. If after honest labour they enjoy fairs and feasts, it should be considered rightfully due to them.

Singing and dancing takes the form of folk songs and ring dances. Musical instruments are primitive. They include ban-ur (flute) sahnai (pipe) dhol (drum) chhaine (cymbal) narsingha' (curved trumpet) and tun (straight trumpet). Dances exercise muscles and develop rhythm and balance. The songs are about deities, ancient heroes, epics, various episodes the seasons and the hills and valleys. Music and dancing form part of ceremonies attending temples and godlings or deotas. The deota is carried

out of the temple with music to the village green where there is a congregation of other idols. Shops are also set up. People turn up in their best costumes. Somewhere in the background will be tents where the hill beer can be had. The deotas and other idols dance in the centre. This is done by rocking them to and fro. The people join in a ring round the deota, singing and shouting lustily. Merry revel lasts till dusk. Women with gay head dresses and check plaids form bright groups of spectators on tires of stone seats. In Inner Saraj women may join with men but more often elsewhere they either form separate ring or else do not dance. Only Brahmans and Kanets are admitted to the charmed circle. Other castes are excluded. Nearly every hamlet has a fair during summer and as care is exercised to prevent adjacent hamlets from having their festivals on the same day there is almost continuous succession of fairs. Before harvest the idol may be brought to the fields and danced in for the sake of good harvest. There is an annual parade of deotas of Kulu in honour of god Raghunathji at Kulu. The roads to Sultanpur (Kulu) are gaily thronged by people going to the maidan where the fair is held. Gods and godlings visit each other and the devotees dance around them. Some indefatigable dancers carry on dance even after the deota has retired for the night. On the last day a figure representing Ravana (Demon King of Lanka) is beheaded to celebrate triumph

of Rama or Raghunathji. This is the Dusserah fair. It is also frequented by picturesquely clad Yachandis, Ladakhis, Tibetans and traders from the hills and plains for business transactions. After Dusserah, few fairs are held till spring as it becomes too cold outside. Like the festival of lights Diwali in Kulu is celebrated as Koli ni Diwali. In the evening lighted torches are shown in every house. There is another fair at Malana in Sawan in honour of Deota Jamlu.¹

Numerous other fairs are held in Kulu, Kangra and Mandi. In April and October temple fairs are held at Kangra and Jwalamukhi. The fair of Nagrani Mata is held at Tika Kohri (Bhadwar). It is claimed that snake bitten persons are cured there. People combine worship with feasting at these fairs.²

People also celebrate all Hindu festivals like Holi, Shivratri, Baisakhi, Diwali, etc. In addition to this they have numerous local hill festivals.

Baisakhi is celebrated on 1st Baisakh Joru Patron on 1st Bhadon Sar on 1st Asu, Lohri on 1st Magh Haryali on 1st Sawan Mimran on every Saturday and last Sunday of Sawan and Basant in spring.

Of the Nature festivals the chief is Basant Panchami and is held at the advent of spring. The cold and harsh winter is nearing end and the days become longer. The spring is heralded with flowers and sunshine and

1 The word Jamlu is a corruption from the original Jamed—Agn, father of Purshu Rama, the legendary hero.

2 Fir Saluhi fair (Debra), Narbana fair (Kangra), Bhikhesah fair (Bhawarana), Balakrupi fair (Bajmath), fair baloh fair Asapur fair Salana fair Br Bhader fair Baba Fattu fair Lidbar fair (Nagrota), Nerti fair (Islamapur), Dal fair (Dharmasala) and Rawalgar fair (Mandi) are amongst the most frequented.

are still potent influences among the hill people along with these may be classed Shivaism which as phallicism associated with serpent worship was prevalent among all primitive people. On their settlement in the hills, the Aryans intermarried with the earlier inhabitants, resulting in fusion and amalgamation of two faiths. It was by the absorption rather than by annihilation of local deities that the conquest of the older by new creeds followed. A fitting home was found in the Brahmanic pantheon for the popular village deities—the gods of older faith were gradually modified into a supreme triad—Brahma—the creator, Vishnu—the preserver, and Shiva—the destroyer and reproducer. The conception of Brahma was too abstract to suit the ideas of coarsely animistic faiths. He has therefore gone out of popular worship. Vishnu by his numerous incarnations has been made the vehicle for conciliating the tribal gods or totems now within the pale of Hinduism. Shiva as Mahadeva with his consort Kali Dev or Durga has swept up and absorbed most of the demonolatory and indigenous forms of worship.

Hinduism has proceeded here as in the rest of the Himalayas by importing Hindu deities and assigning to them the local spirits and godlings found among hill tribes. Buddhism also made its way up here. But the prevailing religion is aboriginal worship dressed up in Hindu forms. Hinduism still preserves much of its early character. The region has been isolated by the hills and mountains and communication were few thus the early beliefs and religious practices were retained in these mountain preserves. The population is almost entirely Hindu. The area is

covered with numerous shrines and temples ranging from simple and modest deities placed under the pipal tree to the well known and much frequented temples of Kangra and Jwalamukhi.

Nature Worship

Nature worship is widely prevalent. The god of earth or Khetri pal is propitiated by the cultivators for securing a bountiful harvest. A goat is sometimes sacrificed. Its head is buried in the field and the rest of the body is taken home for a feast. Without due propitiation the ground is regarded as lifeless. Before beginning to build a house the earth god is propitiated with a sacrifice. Legends point to the prevalence of human sacrifice in former times. When building a fort or a palace the victim was buried beneath the foundations to ensure stability of the building. Weather changes are often sudden and violent. Lightning, thunder and snowstorms terrify the hill man and he worships the god of rain and thunder. Nags or snake gods too have the reputation of being able to give rain. In times of drought their shrines are much frequented. If rain falls too abundantly the Nag shrine is again resorted to with offerings to constrain the god to stay his hand.

Munran Ka Mela is a survival of the aboriginal worship of river god. Every river and stream is the habitat of a water spirit called Bir Batai. The opening of 'Kulk' or irrigation channel requires sacrifice of a goat to the god of water. River Beas and its presiding deity the Vyasa are worshipped on the day of 'Vyasa Puja'.

Nag or snake worship claims very large number of followers. Its temples are found all over. The worship of Nāg 'serpents' has been so important a factor in folklore superstition and poetry of India from the earliest times down today¹. The shrine of Nag contains figures of snakes with trident incense holder and chain like that in the hands of Egyptian god Osiris. Sankhu and Kali Nag are worshipped on Tuesdays in Har and Sawan, they are propitiated to protect crops from rats white ants etc. Springs of water are believed to be under the control of Nags or snake godlings and Nag is the name in common use for a spring of cool and refreshing water². A temple of Nag is usually found in the proximity to a spring. In worshipping Nags the alternatively beneficial and destructive power of water is propitiated. This water worship goes back to a remote age. That now a-days it is found chiefly in the hills is an instance of an ancient cult having been preserved in the highlands which in the plains has been swept away by the more advanced forms of religion.

Holy basil or tulsi (*Ocimum sacrum*) and pipal are universally worshipped. After the marriage ceremony Panch Pillai or twig, a from five trees are worshipped. Many forest trees are considered to be the abode of spirits. Tutelary spirits are supposed to dwell in large ancient trees³. Banbars or the spirits of forests, live in deodar lime and fig tree

etc. 'Bar' tree is also considered holy. The basis of worship in certain cases is found in their utility. Tulsi is an all purpose medicine especially for fevers of all types and a tulsi plant will be found in every Hindu house. It also provides an aesthetic setting for the 'Agan' or compound. 'Pipal' provides shade and cool air, and there is a general belief that it produces more oxygen than any other tree and therefore the cool breeze of 'pipal' is health giving.

Spirits of the mountains and hills are all dead realities to the hill man. Every peak and pass is the abode of demons who control its winds and storms. Falling rock and avalanche are the weapons of their wrath. A cairn with flags is found on the summit of every pass (Fig 12c). Jamlu the God of Malana has no image and it appears that Jamlu is in fact the deity of the peak Deo Tibba (20 417 ft elevation) that overlooks Malana glen. Fire worship is prevalent amongst the hill people. Fire worship is an ancient human institution and the people regard it as a manifestation of the divine or the unknown forces. The temple of Jwalamukhi--the Goddess of the flaming mouth is situated in a town of the same name some distance to the south east of Kangra. People offer incense flowers and sweets. Sheep and goat are sacrificed to propitiate the devi. The flame burns on account of the combustible gas that escapes from the small fissures⁴. But according to

1 Davis Rhys *Buddhist India* Calcutta 1904 p 146

2 Bhagesu Nag is a famous spring in Dharamsala. In Kashmir also Vair Nag and Kukar Nag are famous springs.

3 Ragoon Z A *Ved. India* London 1895 p 290

4 When recently exploration and boring for oil was started in Jwalamukhi area the temple priests strongly protested about such nefarious acts. They might be afraid that due to boring etc the gas would escape elsewhere thus giving out the flames of the temple.

the popular belief the flames are supposed to proceed from the mouth of a legendary demon Jalandhara whose head lies at Jwala mukhi and whose burnt body extends upto Multan (Pakistan). French traveller Thenevot (1866) refers to the Nagarkot (Kangra) and calamac (Jwalamukhi) temples as Pagodas of great reputation¹. During Navaratra fairs in October and March devotees come from all over the hills and plains. Bhoyas or temple priests make good money from the faithful.

The sun is also worshipped as sun god. After the bath water is poured in the direction of sun and prayers are offered to him.

Spirit Worship

Benevolent and malevolent spirits are regarded as spiritual and invisible beings and each is propitiated before every undertaking or in times of difficulty.

Seendu² is or the 'whistling spirit' is the god of wrath and supernatural. The shrine

of seendu is at Gangtha. Nearly all agricultural and other aboriginal tribes have faith in the spirit and at both harvests offer him sweets. If a person is declared possessed by the spirit they will make offerings of he-goat to ward it off. Seendu is supposed to burn down houses, steal corn and milk etc. The Chela or medicine man repeats a mantra (charin) to summon Seendu Bir³.

The mantr or charm is repeated 101 times each day for twenty one days with offerings at the cremation ground. After that he (the spirit) is said to appear in the garb of Gaddu (shepherd) and before his arrival he whistles.

Most of the women and large number of men worship the spirit known as Narsing. He is believed to give sons and assists in all difficult situations. Narel or eoconut is worshipped as Narsingh. When any one is sick a chela or medicine man is sent to charm away illness⁴. opari or supernatural

1 Kangra District Gazetteer Vol VII A op cit p 204

2 Seen in Hindi dialect means whistle hence seen du or whistling

3 Parbat Gupha of hase hap ters

Seen lu B r tun hain bhai mers

Ugur bir ka Petra ...

Guran ka Sikh

Hamara and us Ayo, Hamara Bhejays Aye

Hamara kam Sh lab har Aye

Guru ki Shakt Hamari bhagat

Ph ro manter Chalo bachecha

Mahadeo ka bachecha I har

Thy fall or dwells in the shade of mountain valley

O been lu B r thou art my brother Grand son of Ugarbir

D r ple of Chru, come at my call come for my sending you n quickly and do my bidding I worship the power of Guru work a charm, go voice let the voice of Mahadeo (Shi a) work

4 The chela arrives with ho tri the su er of sacred songs. As soon as the spirit of Narsing comes, the body of chela or the sick person begins to shake. The tremours continue for two hours or so longer which time the spirit possessed tells the fortunes of all those present there. The chela is often a low caste person. He inhales perfumes of cedar wood. Drums are beaten furiously and he begins to quarrel and tremble and the spirit is said to have entered. Coming to work him self into frenzy he springs to feet and dances madly scourging himself with chains etc. sometimes with such feverly as to draw blood. A goat may be belated and chela would drink the warm blood. Chela answers questions as the mouth piece of god. Having done this the chela sinks to ground exhausted.

from the gods and goddesses. The hill godlings are a legion. Almost every village has its own deities. The priests include Rajputs, Rathis and even the scheduled caste. The Devis are female deities and are believed to have power to inflict and remove diseases. In front of devi temple may usually be seen the figure of tiger, the 'vahan' or vehicle of goddess.

The celebrated temple of Vajreshwari Devi, the 'goddess of Supreme power' is at Kangra (Fig 101). It is a high place of worship¹. Devotees come to pay their homage and worship at the temple from far and wide. The spot has been held sacred since very remote times.

At Baijnath is built, the famous temple of Vaidyanath, the Lord of Physicians. It is represented by 'Juga' or Phallus. In the adytum of the temple is an inscription of A.D. 1201. In the east wall is the image of Sun god. The airtum is decorated with the images of river goddesses.

Shiva is worshipped by the people and his 'vahan' or vehicle is the Bull, which is built on one side of the temple and is also an object of veneration. 'Shiva Ling' or phallus worship is again common. The clan god of Gaddis is Shiva². Ganesha is also a very popular deity. Rati or 'Parvati' the consort of Shiva is worshipped by the unmarried girls as an object of ideal womanhood and also to receive blessings for getting a suitable match.

Numerous deotas are worshipped in Kulu and Mandi. Deotas have relations with each other and are on human like relations with the people. The deities are awakened, bathed and supplied with tooth brushes, food, and danced up and down the valley green. This amply shows the simple minds of their devotees. Indeed, various religious practices, such as these reveal the mental development and outlook of the various people. The people worship their gods and godlings according to their own particular ideas. The continual exchange of visits of gods from village

1 The praise of goddess is sung thus :

या श्री स्वयम्भुवतिनां भवनेषु लदमीः ।

पापानां हृदयिया हृदयेषु बुद्धिः ।

अद्या सता कुलजन प्रभवस्य लज्जा,

ता त्वा मना स्म परिपालय देवि विश्वम् ॥

O Goddess, we bow down to thee who art a veritable bliss in the abodes of the pious, adversity in those of wicked, a store of wisdom in the hearts of men of refined intelligence, faith in the good and modesty in the men of noble birth. Be thou guardian of the whole world. (Vide Brochure Sri Vajreshwari Devi Temple at Kangra, Lahore, 1932, p. 1)

2 As the verse goes :

Gad li: Charda bhedan—

Ga lian din li dhop

Gad li: jo dinda lhedan,

Gad lin Jo dinda rup—

The Gaddi grazes his flock, the Gollan offers incense (to Shiva). To the Gaddi he (Shiva) gives sheep and to the Gollan he gives beauty.

to protect against evil spirits. The kite and the owl are birds of ill omen. These are only a few of the numerous omens and superstitions prevalent among the people and indicate that culturally the people are still conservative and ignorant. Few amongst the people can explain the basis of these omens but all believe in them.

Some Religious Sects

Various other religious forces have tried to make their way. Islam could not get a foothold even though since 1005 A.D. when Mahmud of Ghazni first invaded Nagarkot (Kangra) continual attempts were made by successive muslim kings and chieftains to destroy the strong holds of Hinduism. Buddhism and Jainism have only left a few historical relics. Christianity made its first appearance in 1851 when under Rev. J. M. Merk evangelistic work was started in Kangra. With the encouragement it received during British rule and the good work done by missionaries in spreading education and hospital work, the mission has come to stay though Christianity claims few if any converts now¹.

Arya Samaj, the reformist movement among Hindus, took its first shape in 1857

at Dharmasala with the institution of an Arya Samaj Mandir. Since then, Arya Samaj Mandirs have been built in almost all important rural and urban centres and numerous Arya Samaj educational institutions function in the area. The Arya Samaj claims only a small following and that too amongst the educated classes. The educated generation is less attached to religious practices whether ancient or reformed, it does not mean any revolt; it is just in keeping with the non-religious spirit of the modern age.

The people in general continue to have faith in their gods and goddesses and worship them with joy and pageantry. The beliefs and religious practices of the people are the product of their environment and cultural evolution. They may appear coarse and primitive but the people are nevertheless happy with their gods and goddesses, in whose company they sing and dance. The modern man is perhaps not happier with all his advanced religious practices and civilization. With their primitive religion, superstitious beliefs and practices simple people of hills lead an unsophisticated yet a happy and contented life.

¹ Earlier some people from among the scheduled castes and tribes have become converts to Christianity.

the seclusion so often sought by the 'higher' castes. Moreover, the Ghrths belonging to the indigenous tribes did not care so much for the wars and the change of rulers. They remain on their lands and pursue agriculture since very early times.

The area of their habitat is gently dipping from the foot of the Dhauladhar in the north to the bank of the river Beas in the south. It varies from nearly 1500ft to about 1000ft elevation. Viewed from Dhauladhar it appears to be a level tract broken by ravines and isolated hillocks. In fact, the slope is so considerable that water from the ravines can be run on to the surface of land for irrigation.

Rainfall varies from north to south and east to west. Thus Dharmasala receives about

116" a year, Palampur has 105", Kangra 71" and Dehra 51". Although there is no rainless month, yet 2/3 of rain falls in July, August and September. In the irrigated tracts vagaries of rainfall are not felt so much as in the unirrigated or 'Barani' tracts south of Kangra valley. On the whole, the area is well watered. Winter rainfall is good for the 'Rabi' crops. Winters are everywhere *inagorator*. Summers are somewhat trying in the valley bottoms. The rainy season is the unhealthiest part of the year and digestive ailments are prevalent.

Valley soils are fertile. In the lower hills they are shallow and stony. Soil erosion proceeds fast due to unconsolidated nature of strata and leaching takes place due to heavy

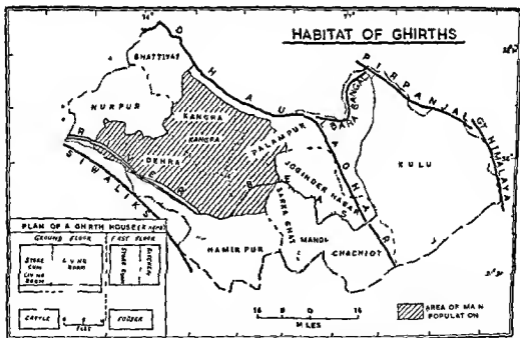


Fig. 127

The ghirths are not so well off as may appear from their fertile lands and rich harvests. Each family cultivates a small piece of land. Often the farmer happens to be a tenant farmer and has to part with a good share of produce which goes to the proprietor. Holdings though small are by no means in a single plot. Thus one owner may share in one or several plots in different parts of the village area. Average cultivated area per house of five persons comes to 2.6 acres in Kangra, 3.1 acres in Palampur and 4.2 acres in Dehra. Sub-division of holdings among ghirths is carried to an absurd length. In Kangra taluqa there are 7,763 shareholders and no less than 13,391 separate holdings. Fragmentation has reached far below the economic level. In fact as it is if all the people relied on their land for a livelihood, members would starve. The poor ghirth farmer often has no capital with which to withstand a bad season and has been constantly breaking down taking loans on high interest which it is usually difficult for him to repay. Hence

The agricultural density is high. In Kangra and Ushampur it is as much as 1,251 and 1,316 persons per square mile.¹ This is possible because the agricultural population is thrifty and their requirements are few and the standard of living is low. There is however, little scope for further extending the area under cultivation. Further improvements lie in increasing yields by more improved farming methods and animal husbandry and by supplementing income from other means. To a greater extent than elsewhere, does necessity drive the home loving hill man to seek employment in the plains and hill stations. There are tracts in which the very appearance of the people shows what a struggle they have to maintain to obtain sufficient food and clothing. Poverty compels them to keep large numbers of buffaloes, goat and sheep.² Poorer among them obtain their ready cash as much from the earnings of labour and service as from farming.

1 Stamp, L. D. *Our Under Developed World*, London 1933 p. 116.

2 Kayastha, S. L. D. *Geographical Features of the Himalayan Bas Basin*, op cit p. 30.

3 Shuttleworth H. L. op cit p. 4.



though coarse, is frank and truthful. Long oppression has made Ghurths into a submissive people. Theft and crime is negligible amongst them. The majority are illiterate and ignorant. They speak 'Kangri hill dialect'. Lack of education is a real obstacle in their development. They are superstitious and ascribe any illness or untoward incident to the 'khop' or wrath of supernatural phenomena, which they will propitiate in their own peculiar ways. As a whole the Ghurths are fond of fairs and put on their gay dresses on such occasions.

Their food is simple and is obtained from the local produce. Rice is eaten in the irrigated tracts. Clean rice is kept for sale and chipped pieces are retained for their own consumption. In unirrigated tracts, maize is the favourite staple. Maize is eaten till September. After that wheat or coarse millets are eaten. Greens, pulses and potatoes are much used. Meat is eaten on festive occasions. Sometimes they are able to supplement their food with flesh of wild pig, barking deer, fish and small game. Meals are eaten three times a day. On ceremonial occasions and festival days the feasts are more elaborate. Goats are sacrificed and their meat eaten. Butter milk is consumed and ghee is sold. The use of tobacco is universal. Ghurths are generally fond of liquor. On feasts, festivals and fairs, it is not uncommon to meet tipsy groups of them. Diotic deficiencies are common feature. Malnutrition and under-nourishment are proving ruinous to general physique of the people. Goitre, rickets, osteomalacia are common. Infant mortality is high and fevers take a heavy toll.

Poultry keeping, bee-keeping and vegetable growing will improve their diet as well as add a few rupees to their slender income.

The Ghurths dress in a simple way. The dress consists of Kurta (shirt) and pyjama (trousers). While working in the fields they find 'janghis' (short trousers) to be a more convenient dress. For head-cover they wear skull cap or turban. During winter, they put on a woollen vest or coat or may wrap around a woollen light pattu (blanket). They generally move about barefooted but most of them have a pair of country made or canvas shoes which they wear now and then. Often it is, when they have to traverse ground where there may be thorns or sharp stones or else the occasion may be a visit to the court town, a relation or a fair. Female dress consists of Ghagra (petticoat), Choli (bodice), Suthan (long trousers) and Dupatta (mantle) for head dress. Silwar and Kurta are now becoming more popular as general wear. Ghurth women are fond of profusion of necklaces of silver or beads. Married women wear bahu' or nose-ring. Cheap jewellery is in much use. The dress has improved a great deal lately among Ghurths whose women wear finer clothes now. Gold lace and jewellery is seldom sought. They can neither afford them nor they are necessary for their rustic life.

Their houses are simple structures (Fig 127) neatly kept. The houses are constructed with the materials available in the tract. The floor is made of paved earth and walls are of sun-dried bricks. The roof is covered with thatch of sarkanda or kahi grass or astes. Houses are generally two storeyed.

The inmates occupy the lower floor, the upper being used during the greater part of the year as lumber room or store room for grain. It is approached by a stair case from inside the room on the ground floor. During rains, the upper room is used for cooking and also as sleeping room in order to escape the close and unhealthy air of the ground floor. Some houses also contain a side room called 'obri' which is somewhat dark on account of lack of ventilation. Here, the clothes, cash and other precious articles are kept. It is a sort of private room. Outside walls are plastered with red or light coloured earth. The compound in front of the house is kept clean and encircled by a hedge of trees and brambles giving privacy as well as material for fuel and fodder. On one side of the cottage is shed for cattle known as Ghural. Thatch of cottages is renewed every third year and fresh covering is added annually. The houses may face east, south or north but the west is superstitiously avoided. The houses are scattered in pleasant and picturesque surroundings and not congregated. Each man resides, as far as possible on his own farm and builds his cottage in some selected spot open as a rule to sun and sheltered from the wind. The shape of Gharth houses and their broad massing into hamlets results from their particular needs of agricultural economy and rural life factors of site and materials available in the area. Truly

they are also "a function of the activity carried on the natural environment, the time period and traditions of the people".¹

The houses are scantily furnished. Mats of rice straw are spread over the floor in winter, for a warm bed cushion. In summer they may sleep on a mattress made of old clothes or platted from exotic date palm leaves. 'Khind' a sort of quilt is used both as coverlet and mattress. Utensils are of brass and clay. A wicker basket hangs from the roof and contains bread and other articles and is secure from the rats and cats. 'Kali' (or smoking pipe) is kept in one corner. A trunk or wooden box is kept for clothes etc. A few large baskets or 'dals' and long containers or 'perus' are kept for keeping grain. Then there are a few agricultural implements kept here and there. One or two pictures usually depicting scenes from the epics and purchased at village fairs or on a visit to the town may furnish the only piece of decoration.

Castes and customs, religious beliefs and superstitions play a dominant role in the social life of Gharths.

Gharths do not wear the 'janeu' or sacred thread. To assume a higher status some have begun to wear the sacred thread though brahmins refuse to perform the ceremony. Child marriage is quite common amongst them. There are three types of betrothal contracts amongst them¹.

¹ Bryan F. W. *Man's Adaptation of Nature*. London 1933 p. 12.

1. The first one is *Batta-Satta* or fair exchange by which two relations are settled at a time, one in each family. A girl may be married from one family and a girl from the other family is given in marriage as an exchange.

The second type is *Garb jwantra* and based on labour provided by the prospective bridegroom at the bride house. This labour may be for a period of five to seven years.

The third type is *mul domra* or by cash payment. The agreed price is paid to the bride's parents.

Jarar pukhi is an interest-free form of marriage and is resorted to in case of *man marai* or runaway marriage. The ceremony consists of secretly lighting bushfires and going round it, thus dispensing even with the priest.

Low class Rajputs marry the daughters of Rathis and Ghirths¹

A woman can also be married by 'Jhany rari' to another person if she is discarded by the first husband. The remarriage of widows is quite common². The sale and harter of girl has been a recognized custom. Polygamy has also been prevalent among Ghirths.

A Ghirth may marry more than one wife if he can afford, to have more persons to work in his fields and cannot dispense with the labour of females. Ghirth women work as hard, if not harder than their husbands. Women carry and distribute the manure, crush the clods, weed the fields, carry home the harvest and are a domestic drudge. In several cases land alienations were made to buy wives. 'The mortgages have almost entirely been made in order to buy wives and in some cases to pay revenue'³. Purchase and sale of women is however, looked down upon by the educated and the more progressive among the Ghirths.

Social customs are enforced by 'dand' or fine and 'Banj' or social ban.

Numerous temples, local shrines, holy trees and stones covered with foot prints

known locally as sidhs, testify to the religious spirit of the people who are remarkably free from crime. Trial by ordeal may be occasionally resorted to, water with a little oil from the oil press is given to the suspect to drink and if he is guilty, his stomach is expected to swell. Similar practice was prevalent in England when the suspect was given a trial piece of consecrated bread or cheese⁴. The Ghirths believe in numerous superstitions. Many forms of aboriginal faith are still potent influences among them. They worship nature often in form of nature gods and their spirits⁵. "The relationships between men and environments manifest themselves in the realm of ideas"⁶. The god of earth or 'Khetarjal' is worshipped, and snake or 'Nag' worship is a relic of aboriginal faith. Nags are many⁷. Some 'Nags' protect the crops from rats and other vermin, others preside over springs and waters. 'Tala', 'Tipal' and 'Bar' are objects of veneration. Homage to fire deity is made at the temple of Jwalamukhi.

Ancestor worship is prevalent among the Ghirths. Temples of 'Devas' and 'Devtas' or gods and goddesses are everywhere. Many villages have their own deities. In

1 Hence the proverb 'Satam Pira Ghirthu Ki dhi, Ransho jati. In the seventh generation the Ghirth's daughter becomes a queen.

2 As the local saying puts it 'Gurthi randa, Jhota Sandai', you cannot make a widow of Ghirths any more than a barren cow of a bull buffalo (because a Ghirth will marry again as fast as her husband dies).

3 Malraj. An Economic Survey of Hamir and Mangarh Talukas of the Kangra District of the Punjab. Board of Economic Enquiry Punjab, Lahore 1933 p. VI.

4 Taylor Sir E. B., Anthropology, Vol III London, 1946 p. 149.

5 A detailed account of Religious Practices is given in Chapter XI B.

6 White C. L. and Renner G. T., 'Human Geography—An Ecological Study of Society' New York, 1945, pp. 634-83.

7 According to local belief 'Aikarah Nag Atbarah Naram Nags are many and Narams are many (Aikarah means eighteen but in hill idiom it is often used to denote plurality).

Tahals (Fig 130) They are also found on the southern face of the Bhadravah hills across Ravi Gaddi home is exclusively on the snowy range A few have wandered down into the valleys that skirt the base of the range but the great majority live on the heights above They generally live between elevations of 3500 ft and 7500 ft The early home of the Gaddis lies in the upper reaches of the Ravi This tract is popularly known as Gaddheran, the land of Gaddis, and constitutes the greater part of Brahmaur tahsil of Chamba The Gaddi habitat is a rugged mountainous area occupied by the slopes and spurs of the Dhauladhar range (Outer Himalaya) and a small area in Pangri range The elevations in the area vary from low valleys to rugged heights exceeding 15000 ft Climatic conditions vary from modified tropical to sub arctic Summer is mild and the winter severer The chief period of rainfall is from mid June to mid September The amounts vary from over 80" along the southern slopes of the Dhauladhars to less than 25" in Brahmaur and Pangri Snow begins to fall on the higher slopes in September and with the coming on of winter, the snow line steadily descends till in the months of December January and February snow may fall in valleys 3000 ft above sea level Snow lies deep in the upper reaches of the Ravi and it is customary for the inhabitants to move to the lower valleys during winter Villages in Brahmaur wear deserted look Owing to low rainfall in Brahmaur, humidity is not great and climate is very invigorating In winter all communications are rendered difficult by deep snow

The yearly average of precipitation including snow, for Brahmaur, is 24"

GADDI HABITAT

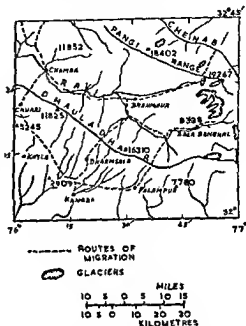


Fig 130

Natural vegetation consists of extensive forests of Chirpine deodar, spruce, silver fir, blue pine and oak Above 12,000 ft and to the limit of tree line, the birch (Bhoj Pattar) and dwarf junipers grow Higher up the ground is covered in spring and summer with grasses of lush green and flowers of variegated hues Above this, permanent snow line is reached at 15000 ft

There are extensive alpine pastures which provide nutritious grasses for the flocks of the Gaddis Where level patches are available and climatic conditions permit subsistence agriculture is possible Some hill

Dhauladhar, cultivate their patches. There they grow autumn crops, usually wheat and barley, and harvest it in spring, before they cross over the range for summer grazing.

Sheep and Goat Rearing

It will be seen that semi-nomadism has been developed not only because of pastoralism but possibly also due to the agricultural pursuits which as well involve change of habitat for the cultivation of crops during summer and winter. Gaddis live for not more than 4 months in a year in their dwellings. During rainy season they go to high pastures in Lahul, Pangi and even Spiti and in winter they descend to the valleys of Kangra, Julu and Chamba (Fig 131). Gaddi leads a hard life. Conditions of sheep rearing suit the migrant Gaddis only. Snow and frost in the higher parts and heavy rain and heat in the lower regions make it difficult to carry on sheep farming on any large scale in any one part of

the country. The only way is to change the habitat with seasons. Winter is spent in the low hills and valleys. Retreat march is made in spring before the heat of summer and staying on the higher slopes and getting behind on the leeward side before the rains. The shepherd's ordeal of march cannot be given accurately as it varies in different parts.

"Transhumance"¹ is a necessary part of pastoralism in the Dhauladhar. Those who go far into the mountains for summer grazing start earlier and are back later than others. The following dates are generally followed (Fig 131)

December to March

Gaddis arrive in their winter quarters in the low hills and valleys by the end of November or early December where they remain upto March.

PATTERN OF SEASONAL HABITATIONS OF GADDIS

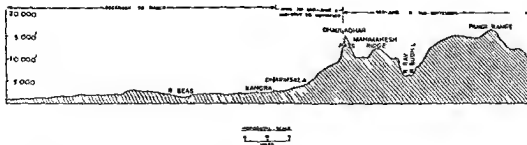


Fig 131

¹ Seasonal migration from winter to summer quarters for the benefit of the live-stock among the more advanced peoples in semi-arid or mountainous areas was formerly widespread in southern Europe and is generally referred to as "Transhumance" from the term used in Spain where it was until recently exceptionally well-developed—Vide C. D. Ford, *Habitat, Economy and Society*, op. cit., p. 396

April to Mid June

By the beginning of April, they move up the villages on the southern slopes of the snowy range and here they stay for two and half months, moving on gradually higher and higher.

Mid June to Mid September

In early mid June, they usually cross over the range and make for their summer and rainy season pastures in Pang, Lahoul, Bara Binghamal and even Spiti¹.

Mid September to November

They cross the Dhauladhar and again stay for two and a half months descending gradually till about the first of December they reach the low hills and valleys.

Gaddi movements are regulated by Shiv Ratri festival in spring and Sair (1st Asuj) in autumn—the first march being made on these days. Most families own 300 to 400 sheep, but some own over a thousand or more. They rightly call their flock 'Dhan' signifying wealth, for this constitutes the principal means of livelihood. It is on account of sheep farming that they are the 'most prosperous agricultural class in the State'². 800 to 1,200 sheep form a flock or Kandah. Three to four men and several dogs accompany the flock which camps out night and day, the whole year round. Shepherds who are hired are known as 'Bowals'. Shepherds pay taxes to the government for grazing.

Winter Pastures

Winter pasturage is somewhat poor. Scrub forests of the lower hills are heavily grazed. There is very little grass and mostly it is dry and coarse. The flocks feed mostly on *gurus* (*Clusia diffusa*) and *Basuti* (*Adiantum vasica*), both small rank bushes. Leaves of 'bul', 'Kangu', 'kembal', 'dhan', and 'klar' are also used as fodder. Every sheep run in the low hills or 'Dhan' as the Gaddis call it, is claimed by some Gaddi family as 'Warri' (inherited). Gaddi flocks may go as far as low hills in Hoshiarpur, Mandi, Suket and Bilaspur.

Spring and Autumn Pastures

In coming and going between winter and summer pastures, the shepherds spend some two months in spring and three months in autumn on the southern slopes of the Dhauladhars, called *Kandi*³ dhars. Mountain pastures in Dhauladhars are called *Dhars* in common parlance, although sometime the word 'Gothi' is also used but that applies strictly speaking to level places on which the flock is penned for the night. There are three or four gothis in each dhar. Each dhar bears a local name. The high pastures are called 'nigahrs' and those in the forests as dhars⁴. In early September the returning flocks spend a fortnight or so on the 'nigahrs' and then descend to 'dhars' where they stay for a month and half. After the harvesting is over in the fields below, they leave dhars and descend first to upper hamlets and then to the valley.

1 Punjab District Gazetteers, Vol XXXA, Pt IV Spiti, Lahore, 1918 p 287

2 Chamba State Gazetteer, op cit., 140

3 Kandi villages are situated along the south-side of the Dhauladhar from Boh to Bur—14 to 15 in all. They contain most of the alpine country in Kangra.

4 Kangra District Gazetteer, op cit., p 273

Pasturage is found in the stubble and hedge rows and the flock is penned each night in some field for the sake of manure. Shepherds tumble in as they can and the first comer occupies any ground he chooses. Farmers in the valley very much value the droppings of the sheep and goat for manure.

Summer and Rainy Season Pastures

These pastures are higher up above the tree line and at other seasons are covered with snow. In Kangra these pastures lie in Kothi Kodh and Kothi Sodar, which contain approximately 57 dbars. All but eight are in the Outer Himalayas. On the northern side the rainfall is not heavy, it is fine rain or 'scotch mist' with several bright clear days in between. Shepherd's family does not accompany him to the high pastures. The grasses are so nutritious that a few days grazing refreshes and fattens the famished sheep and goat. The marches from one pasture to another and particularly over the high passes call for intimate experience with the flocks and the terrain. Gaddi shepherds seem to know every sheep and goat and soon misses one which has strayed. Gaddi dogs are powerful and even ferocious and can keep at bay leopards, bears and other wild animals. It may be mentioned here that a prominent feature of Gaddi life is their faithful dog. It is either black or tawny brown in colour. When fully grown this dog is about 2 ft in height and is stout enough to give fight to a panther (*Cheeta*) or a bear. No Gaddi house or flock is without this faithful and ever watchful servant. Generally, it is very quiet so long as nobody interferes with the flock or household property. When fully

grown up, it looks majestic with its hairy tail. By its very appearance one can say at once that it is a Gaddi dog. The Gaddi never carries a gun to protect the flock or kill game, as he believes that mountain divinities will avenge the blood of 'Teror Naturee' and bring misfortune. Rolling rocks and storms and attacks of wild animals cause stampede and thus several sheep may be killed by falling into the crevasses and gorges below. On an average 5% sheep are lost each year due to the reasons stated above.

It is a pretty sight to see a Gaddi bringing his flock down some steep mountain khad (ravine). The shepherd leads the way with a bundle of faggots on his back and an axe in his hand which he uses as support. He comes down the awkward and steep inclines and along paths which are no paths at all, with an easy gait. He turns around at intervals to utter quaint musical calls to his flock, the yodel of the Himalayas. Sheep proceed in a zigzag manner feeding busily but holding on their way steadily. The shepherd keeps his eye on the young and encourages them by special calls and enchanting whistles. Sometimes he goes back to administer reproof with a gentle hand. When a brawling torrent has to be crossed, the largest of the flock—the mountain hero—is seized and thrown into the cold waters. He buffets his way across, the rest follow with a little persuasion. The timid young ones are carried over in the arms of the shepherd. As he walks he hums tunes and his hands keep busy with the spindle with which he spins wool.

Furniture and Food

The necessity of constant migration affects his habits and equipment. As he has to move long distances and there is no beast of burden except sheep and goats he manages with the *minimum necessities of life*. Unlike the Kirghiz the Gaddi manages to do without the tent. His baggage consists of articles which are light and easy to pack. He packs everything in sheepskins and a good deal of equipment like pots and pans are such that they can be 'telescoped'. His powers of endurance are tremendous. He can suffer fatigue, hunger, thirst and elements of weather like wind, rain and snow. Often he camps out under the cover of sky, whether in the valley, forest or mountain pastures. Exposed to cold icy winds he will envelop himself in home spun blanket and for an extra blanket he will keep a few sheep and lambs huddled to himself. In rainy weather he would creep into rock shelters or khuds and spread twigs to keep off the wet ground. Even Gaddi sheep are strong and Bhotia traders from Kumaon buy them at high prices to serve as beasts of burden for trade between the snowy ranges and Tibet. When he camps in the fields he receives free food in return for penning the flock there and therefore needs not carry large stocks of provision. His march consists of series of tiresome ascents and descents. Gaddi is well practised in carrying heavy loads and it is amazing to see young boys and girls carry loads that seem too big for them. Gaddi's good health is partly due to seasonal movements by which

he avoids damp heat of the valleys and the extreme cold of the higher regions. Gaddis are resourceful and fearless and can face carnivorous animals and mountain storms and provide first aid both to themselves and their sheep. On account of wide travel and association with people of different localities, Gaddi has developed a friendly and genial temperament but he often is more shrewd than he apparently looks. He is addressed by other people as mitra or friend, because of his friendly attitude. As he is used to travel without the help of guides, charts or maps, he has developed a keen sense of direction and never loses his way. If in a storm or in darkness he finds difficulty in getting direction the dog and even sheep are able to keep to the track, if once they happen to have traversed that way. His dress also fits him for nomadic life which takes him from high mountain ranges to low valleys. He dresses himself in home made cloth in the manner of a hill scout, which makes him look very interesting. He secures his long Chola or gown with a thick woollen chord round his waist to which he fastens various articles essential to his nomadic life—steel and flint for fire, long knife or Dhat for chopping firewood and leaves for sheep and goats, and sheep-skin pouch for miscellaneous articles. His legs are bare to permit freedom of movement.

The food of Gaddis consists of goats and sheep's milk, maize, buck, wheat, hill millets, phullan and pul-e. The bread is dipped in milk and eaten. Occasionally

1 A hill rhyme goes thus, Gaddi Mitra Bhotia Dunda top ta mangda Chola—Gaddi is a simple friend, he gives his cap and asks for the coat.

mutton and liquor are consumed, especially on festive occasions. Gaddis' favourite drink is Lugru, a mild alcoholic drink made from fermented rice or barley and flavoured with roots of shrubs. At high altitudes where it is difficult to procure provisions, the Gaddi lives for days together, on milk of sheep and goat. Gaddis also eat some edible plants like 'Lungru' and 'Phaphru'. Parched barley made into flour is consumed on their journeys from place to place. Instead of sugar they use mostly honey which they get from the forest hives. They prefer the crude salt of Mandi.

For clothing they use the wool of their sheep which their women spin and weave. Sheep and goats provide wool for clothing, leather for shoes and bags, dung for fuel and manure, milk and mutton for food.

Wool and Woollen Articles

There is no industry except the making of woollen cloth and blankets by handloom on a small scale cottage industries basis. In some cases they pay the land revenue from the proceeds of the wool. At present the sale price is Rs. 160/ per maund. During hill fairs and religious fairs like Navratras and Dusserah, they bring for sale their goods of blankets, woollen cloth, walnuts and walnut bark, wooden utensils etc. A rough type of floor cloth 'thobis', is also made from the hairs of goat. Thobis are woven in strips in a variety of pleasing colours. In winter, when there is no other work for those who stay on in their houses the time is spent partly in weaving and spinning. Mostly 'pattus' or blankets are made. Women tease out wool and spin it into yarn and weave it. Mobility

of life and contacts with lower valley towns have restricted the development of crafts. Gaddis are not traders like the Bhotiyas. Gaddi wool is not so fine but is still much esteemed and ranks with that of Hissar as the best in Punjab. Sheep are clipped three times in a year i.e. in February, June and October. February clipping takes place in the valley and the second one on the main range and the third one in Gaddheran. The amount of clipping varies in each period.

Period	Clipping in seers for flock of 100 sheep
February	8-12
June	10-12
October	24-30

The average total for the year varies from 60 to 80 seers per year. Per sheep, it is 8 to 10 chattaacks per year. Better grazed ones yield 12 to 16 chattaacks. High yields in October are due to better grazing but the wool is not soft. It is important to improve the local breed of sheep. Some 25 merinos introduced in 1908 were obviously not enough to improve the stock. Sheep are kept chiefly for wool. Due to constant movement over long distances the quality of mutton is not good. The skins are practically useless. More facilities for better breeding and more veterinary hospitals are required. Cooperative sheep farming and cooperative industries will save costs and improve the quality of goods. Gaddis are often ignorant about market prices and traders from Amritsar and other towns buy his goods at prices which leave him very little profit.

Education

Literacy is almost absent. In Brahmaur, out of 30 915 people, only 237 could read or write, giving a percentage of 0.8%. Gaddi is sceptical about the benefits of education¹ and thinks that education will beguile the young from the professional work of rearing sheep. Such is not true and the sheep herders of Altai and Tianshan like the Kirghiz are now becoming more and more literate. Even in Australia, sheep herding is carried on by literate persons. However, the wandering people have little opportunity for schooling and itinerant teachers as in Switzerland should accompany the migrant Gaddis. Primary and middle schools are working in some big Gaddi habitations like Brahmaur and Kothli Koth. Gaddis have maintained a *Randhawa* puts it "a distinct culture pattern of their own and have so far escaped the levelling effects of modern education"². Education the Gaddis must have, but it must be suitable to their work and life.

Caste-Sub-divisions

Gaddis are divided into four classes: Brahmans, Khatrias, Rajputs, Thakurs and Rathis, and Sudras, or memals like Beharas, Kols, Sipris and Habas. The first two classes wear sacred thread. Gaddi society is organised on the Rajput hypergamous system³. Gaddis are much stricter in the observance of Hindu customs and social practices than

most other inhabitants of the high ranges of the Himalayas. The customs and social practices vary amongst different classes of Gaddis. Such variation is not unnatural. As Forde⁴ remarks, 'the character and scale of the social and political organization among peoples who mainly rely on livestock for their support varies as widely as among agricultural people'.

Dialect

Gaddi dialect belongs to what is known as western Pahari language of the northern group of the Sanskrit Arvan family. There is no script for their dialect but Devnagri script can easily be adopted. However, the dialect is being preserved through spoken language and through songs and folk tales. *Folk Songs and Dances*.

A study of folk songs reveals a rich emotional life. Open air living, healthy diet and hardy habits combine to produce a race of healthy and cheerful people who enjoy life with a gusto. In meadows and mountain pastures opportunities are not lacking for young people to meet and sing of their romantic episodes. They sing in soft low tones as they spin. Gaddis delight in festive gatherings and are fond of singing and dancing, the latter is a style peculiar to themselves. Dancing is vigorous and even boisterous. At village fairs dancing is essential part of procedure and is often accompanied with drinking. *Dhuladhar* and its peaks are well

1 An old veteran sarcastically remarked to the author 'Today our children will go to school and tomorrow our lambs and kids will sit for learning'. And the simplicity of the Gaddis may be judged from the fact that whenever they were fined by Kangra authorities they used to pay a similar fine into Chamba treasury, as they were subjects of both.

2 *Randhawa* M. S., 'Gaddi shepherds of the Great White Range'. *The Tribune*, Amal, June 21, 1954.

3 Chamba State Gazetteer, op. cit., p. 137.

4 Forde, C. D., op. cit., 407.

known in Gaddi songs and legends. They address it as 'Mother Mountain', for it provides pastures for their sheep and goats, fuel, and fields for cultivation. It is the source of numerous springs and streams which irrigate their fields. 'O Mother Dhaukadhar! You have made Kangra into Paradise, sing the Gaddi songster.

Dress

Gaddi dress is very striking as it is so very different from the rest of the populace of the area. The clothes are made of home spun yarn. Dress is made of wool and is worn both during winter and summer. It weighs from 6 to 10 lbs. Men put on loose frock or 'Chola' tied round the waist with black woollen rope for the waist band (fig. 129). In their clothes the Gaddis store miscellaneous articles, meals and even new born lambs. For head dress they wear a high peaked cap, which can be pulled down over the ears in case of severe cold. Some Gaddis wear turbans too. Men wear gold ear rings and silver magic-tablets. They adorn their head-dress with wild flowers and tufts of feathers. Legs are usually bare but sometimes Pattu pajamas may be worn. Shoes are in common use. Flint and steel knife and leather pouch are tied with the girdle rope. Ladies wear similar dress called Cholu. The garment fits rather tighter around body and reaching to the ankles, is both modest and becoming. Cotton gown is also worn during summer. Legs and feet are bare but head is covered with Chaddar. Gaddi women are fond of ornaments like bangles, ear rings and necklaces. They also wear strings of red, white and green beads. Silver rupees and other coins are used for making

necklaces. Some red beads or seeds of parasitical plant growing in the forest are also worn. Women decorate their hair with flowers. They also practise tattooing chiefly in the face and apparently for adornment. Gaddis compare their dress to that of Shiva and Parvati.

Dwellings

Gaddi house is made of wood, stones and slates. These are the materials available in the area. For the house, favourable aspect is important. The house does not always face the village road and generally there are no windows on the shady side. The pursuit of the sun is obvious even in the arrangement of the houses. The houses are usually two storeyed. Living rooms are in the upper storey but during winter it is too cold up there and winter is spent in the lower storey. Floor is of mud. Houses are generally neat and clean and are nicely placed in rows on the hill side. The habitations are generally between 3,500 ft and 7,500 ft elevation. In Gaddi hut many balls of combed wool may be seen hanging from the roof. Some farming implements are also seen in the house. Wooden boxes are kept for clothes. Hand mill (Chakki) for grinding grain, a winnowing fan (Chhay) and a spinning wheel (Charlha) will be found in every home. On the average, each house has two rooms but the more well-to-do have more spacious houses. The room in the upper storey may be used for cooking, living and storing grain and wool, and the sheep and goats are herded on the ground floor. Most Gaddi habitations consist of one caste.

1 Peak represents the Kaibah peak of Manu Nishesh ridge.

Religion

By religion Gaddis are all Hindus, but their beliefs, customs and manners are different from the rest of the inhabitants. Nature is harsh in its environmental elements—cold, rugged and wild. The simple hillman struggling for his existence sees spirit in every rock, tree and spring and propitiates it before undertaking any operations and at all ceremonial occasions. In the case of Gaddis, the clan god is Shiva, and therefore Gaddheran, is called 'Shiv Bhumi' or the land of Shiva. Shiva is supposed to live on the Kailash peak in Mani Mahesh. According to the Gaddi legend Shiva lives there for six months and when it becomes too cold he moves down to Piyalpur where he stays till March. It is clearly a reflection of their own winter migration. These are the months in which the Gaddis move from the winter pastures to summer pastures. Gaddis worship sheep at full moon in Asarh an instance of the worship of means of livelihood which custom is also prevalent amongst people in other part of India. Priests as illiterate as themselves are consulted on ceremonial occasions. List of Gaddi gods is endless. There is hardly anything the Gaddi does which is not under the influence of one or the other presiding *genu* of the mountains, without whose goodwill, he believes his labours will be doomed to failure. These spirits are all devil realities to him. Banasats precede over quarries and rock extractions and are conciliated before any operations are undertaken. When a storm rages on the mountain pass or avalanche occurs with a roar, 'Rakshasas' or demons are said to be

fighting. When crossing a pass they pray to the deity of the pass for fair weather and safe passage for themselves and their flocks. The deity of the pass has his abode in the cairn decorated with flags. Out of respect, silence is maintained till the pass is reached. The god is believed to be resting in mountain avalanches. Forest trees are believed to be animated with spirits or 'Bin Birs'. Tree worship is common. Nag and Devi temples are found in cedar groves, and Cedar deodara is regarded as sacred and may not be cut down. The tun, kamthi, sambal, and walnut trees are also favourite resorts of the spirits. On the mountain slopes lives 'Kohlu Bir' who rolls landslips when in anger. Guga is the protector of cattle within the village cattleshed. 'Jakh' is controller of the products of cow and every cow has its 'Jakh' whose name is asked at the time of purchase. When any sickness or calamity is believed to have been caused by the spirits, the local Chela or spiritman is consulted who tells which spirit ought to be appeased and acts as the medium of cure. 'Batal' is the spirit of rivers, waterfalls and springs. He too is propitiated by offerings of food. Young girls are worshipped when new ground is broken for cultivation and first harvest is offered to god. In front of every Gaddi house is placed and worshipped the presiding deity of the household. 'Bailung' the raja of all snakes is worshipped in the form of sickle which is always carried by the Gaddi when grazing his flocks. Different days are dedicated to different gods such as Shiva, Devi, Birs, 'Nags' and 'Salhs'. Khetrapal is the god of soil and is propitiated to secure a good harvest. Until this propitiation, the ground

economy, some new avenues like arts and crafts on small cottage industries scale, just as in Kashmir, should be introduced and in this the government will have to provide assistance and lead. They should also be

encouraged to form cooperatives. Opening of roads, schools and hospitals will provide much needed improvements. The education of Gaddis should have a bias for hill agriculture, pastoralism and cottage industries.

Conclusion

Adjoining the plains of Punjab in the north-east lies the Himalayan Beas Basin where a succession of hills, valleys and raou ntain ranges make up the Himalayan tract. Its boundaries are topographically well marked being delimited by natural features and the area constitutes a homogeneous Himalayan District. The Siwalik hills veil this area from the plains thus making it somewhat remote and obscure. The Dhauladhar range, the Pir Panjal range and the Great Himalayan range separate the Beas Basin from those of the Bari, the Chenab and the Sutlej. The heights of the ridges and intervening valleys increase in elevation progressively as they recede from the plains. Since the Beas and its tributaries are not navigable there is not a very close physical unity in the area. Numerous hills and streams dissect the area. Massive mountain tracts in the north are not even fully explored and charted. East of Bijnath Mandi line except Kulu Valley, the area is highly mountainous, while to west, it is for the greater part below 4,000 ft elevation. From the human point of view the valleys of Kangra and Kulu are most important. River Beas collects the entire drainage of 5,638 sq miles of Himalayan area and the tributary streams make a pattern like a bunch of ferns. The river at its place of debouchment on the plains records a total fall of 12,000 ft from its source. Average bed slope is 1:400. Rainfall recording stations are confined to tahsil and district

centres and over a large area precipitation conditions are not known. No regular snow survey has been made but snowmelt contributes large quota of water during spring and summer. Monsoon rainfall raises problems of flood and soil erosion. Forest destruction is resulting in increased detritus load and large variation in volume of discharge. The bed of river Beas is 600-700 ft higher than that of the Sutlej and the water parting is bound to retire further northwards. The river catchment area is being studied for a number of years. Problems of landuse, irrigation, floods, forests, hydroelectric power and water supply are interconnected and there is need of a unified study. It is well known that the solution of river problems lies in the catchment area and this requires unified management and study. The Himalayan Beas Basin should receive such care and attention if solution to present and future problems is desired. The development of Beas project makes the need for such study all the more necessary.

The area has remained neglected by geologists. Large areas are still unexplored. The lithological characters of the three stages in the Siwalik series are represented by conglomerate sand rock and sandstone. The Himalayan zone consists of metamorphics and fragmented rocks of sedimentary origin. The entire region constitutes a zone of weakness and underload and Kangra earthquake

of 1965 was connected with area of negative gravity anomaly

Although the Himalayan Deas Basin lies north of tropic of cancer, yet its climate is strongly governed by the tropical monsoon rhythm. Two main climatic characteristics prevail in the area, namely the seasonal rhythm of weather and the vertical zoning due to differences in altitude. Compared to plains, the climate is distinguished by shorter and less severe hot weather, somewhat higher precipitation and cooler and prolonged winters. Change of seasons involves change of habitat amongst certain people like the Gaddis who descend to the valleys during winter. In winter, inversion of temperature is marked in valleys. Rabi crops profit from winter precipitation. In winter people seek sunshine and perform their tasks outside in the sun. The anomaly of high rainfall in Kangra valley is explained by the interplay of monsoon currents and sudden rise and peculiar alignment of mountain ranges and hills. Relief control of rainfall is observed. 2/3 of annual precipitation falls during July, August and September. Crop failures as characterized mostly by irregular and untimely arrival of rains and intervening breaks. Droughts and floods cause hardship to the peasantry and the populace in general.

Owing to great range of elevation from 1500 ft to over 20000 ft and differences of rainfall there is rich and varied wealth of natural vegetation from the sub-tropical scrub and bamboo to birch and high level pastures. All evidence goes to show that there has been large scale depletion of natural vegetation. Conservation of forest wealth constitutes in some respects the most impor-

tant single item. Misuse and destruction of forests may end in killing the goose that lays the golden eggs. In the interest of land and people and to fulfil the tasks of Five Year Plans, the author would suggest the pursuit of a vigorous and enlightened policy for conservation of forests. Efforts should be made to improve grasslands, develop sound land development management and protect and develop the wealth of forests.

The mountains, forests and streams still provide habitat and sustenance for numerous fauna both tropical and temperate. In discreet ways and methods of killing them are responsible for depletion in their number.

Soils of the Himalayan Deas Basin are often shallow, stony, and leached. Their general carrying capacity is low except in areas of alluvial deposition. Main classification consists of irrigated or Kuhl and un-irrigated or Barani soils. Soils near the homestead get more manure and better care, and gradation of soil takes the form of concentric zoning. Single or double-cropped soils do not mean two types of soils but only that one class of soil gets more manure, better husbandry and irrigational facilities. Detailed soil surveys which are lacking are necessary as a basis for manurial practices, agronomic operations and forest management etc. Widespread and extensive soil erosion has been observed. The main contributing cause is the destruction of natural vegetation due to overgrazing and other abuses. The pressure of animal population on forests is high and the forest-rights of the people are more than liberal. The region constitutes an important catchment area.

and erosion here means not only loss to the area but considerable harm to the Bear Project and devastation in the plains below. Conservation measures must be adopted without loss of time.

The area falls into three well defined natural regions namely, the mountainous region, the valley region and the low hill region. Each region displays a high degree of homogeneity of relief, climate and natural vegetation and cultural practices. In the mountainous region slopes are too steep, minerals, water power forests and pastures are its main wealth. It is a region of high mountains, snow, glaciers, forests and pastures. Here the natural fauna and flora are more intact. Certain areas could be demarcated as National Park Areas. Man has made highly limited ingress into the region. Valley areas lie between the forbidding northern mountainous region and the denuded and agriculturally poor southern tract. Valleys have fertile soils, plentiful irrigation and a climate free from extremes. Particularly the Kangra and Kulu valleys are the best areas from the point of view of human occupation. The low hill region is an unattractive region of poor soils.

In the Himalayan Bear Basin, 87% of the population depends on agriculture. In some areas this dependence is absolute. But the general percentage of cultivated land is only 19.5. The rest of the area is mostly forest or wasteland. In Kulu the cultivated area is only 6% of the total. On account of small arable area and large agricultural population, the pressure of population on land is severe. In addition, the incidence of livestock to cultivated area

is as high as 19.20 per sq. mile and this makes for extreme pressure on land of average low yields. In Kangra and Palampur irrigated area comprises 50% of total cultivated area elsewhere irrigation is much less, even negligible. Irrigation in general can step up production as is evident from higher yields of rice (620 seers) as compared to smaller yields (420 seers per acre) in Kulu. Although the percentage of cultivated area is higher in southern 'Barani' tracts, yet the most productive areas lie in Kangra and Palampur which have the best irrigated land. Irrigated tracts have large areas of 'Dofasi' land while 'Barani' tracts have only a small area bearing two crops in a year. In the northern taluqs nearly 50% of the area is under forests. Hay fields are important all over and occupy 5.13% of the area. Damage from natural calamities like uncertain rainfall and ravages of wild animals is considerable. On account of the rugged nature of terrain, terraced cultivation is the rule rather than the exception. Fields are laid out with eagle care to secure every cultivable inch of land that shows wonderful diligence on the part of peasants. Where the slope is rapid the fields are no bigger than a billiard table. Nature is here a stern mother and mere sustenance has to be earned by the sweat of the brow. Holdings are small. Fragmentation is excessive and alternative sources of income are few. Peasantry is poor and illiterate and the peasant and his cattle are undernourished. Possibility of extending cultivation is not much. Keeping of large number of livestock however ill bred and ill fed is indicative of insufficiency of agricultural produce and not

and the Pakistani embargo on transit tea cultivation has shown signs of neglect. Emphasis on internal markets must be increased.

Himalayan Beas Basin has large areas suitable for the cultivation of both tropical and temperate fruit. If properly developed, the area can become the fruit garden of Punjab. The need for the development of hill fruit is greater now when large hill fruit growing tracts have gone to Pakistan. It may be mentioned that tree agriculture is a very suitable form of economy in this area of uneven land and stony soils. There is need for the development of fair weather roads, progeny gardens, fruit preservation industry and encouragement from the Government. At present, the only organized fruit industry is that of Kulu. Kulu apples have especially good reputation. Large quantities of fruit go waste in the absence of preservation industry and suitable transport facilities. It is indeed a sin, to waste such valuable article of diet when there is an overall food shortage in the country.

The importance of livestock in the predominantly agricultural economy of the Himalayan Beas Basin is obviously very great. Livestock provides practically the only source of manure and agricultural power. While organising agriculture and horticulture on right lines, there is scope for improving animal husbandry by the introduction of rational methods in farm planning and farm organisation. Quantitatively the livestock is impressive but qualitatively it is poor and is often not an economic asset. Experiments

should be undertaken in cattle breeding to enhance milk yields by cross breeding. Although there is no well organized and trusted machinery to carry out livestock census yet the indication is clear that the number of livestock is somewhat excessive. It is surprising that the number of transport and pack animals is so low (1 per 100 persons) in an area where better means of transport are so few and confined. This puts premium on human transport. The low number is due to lack of organized breeding and caste prejudice against keeping such animals as well as due to development of motor transport. The general density of animal population is 1920 per cultivated sq. mile and that of goats and sheep is 820. These densities are very high and have led to overgrazing and soil erosion. Many cattle are kept just for manuring and breeding purposes. One of the problems of livestock rearing is to secure enough fodder for winter and summer months. Ecological survey of grazing herbage and grasslands should be made and suitable grasses grown. Suitable breeds of hill cattle have to be selected and bred. For the rearing of large flocks of sheep and goat, transhumance is a necessary practice. Poultry is not kept to any extent mainly owing to caste prejudices. Peasants can increase their income as well as improve their diet by keeping poultry. The best hope for improving hill breeds and maintaining them lies in selecting good local bulls for breeding and castrating the unfit and by improving the feed of cattle. There is necessity for sheep farms to supply good rams for breeding purposes. Wool and meat yields should be increased by scientific breeding of sheep and goat.

Majority of the people live in tiny hamlets. In upland villages, the cultivators depend on the forests as much for their livelihood as on their fields. Without free grazing, fallen leaves for manure, free firewood and as far as necessary free timber for building purposes, a cultivator could not in the hilly and mountainous area pay so high a revenue as he does. Average value of forest produce per household in the northern areas according to author's estimate comes to at least Rs. 150/ per annum. Privileges involve reciprocal responsibilities but it is not a happy thing to find that the cultivators are lacking in wholehearted cooperation in maintaining a healthy forest management. Nowhere does the question of grazing and other forest rights and at the same time preserving the forests, presents a more difficult problem than in this area. The cultivator and the forester must learn to cooperate in meeting the needs of both agricultural economy and healthy forest management.

Destructive methods hitherto in vogue and floods have caused diminution in the number of fish. Larger number of sanctuaries and hatcheries and greater vigilance would vastly improve the stock of fish. The rearing of larvicidal fish can be an important anti-malarial measure as well as addition to food resources. Fish growing in tanks and rivers would be the easiest method of getting meat in densely populated areas and much scope exists in this aspect of food resource economy.

The hillman's implements are few and simple and are well adapted to hill agriculture. Recent increase in the number of

ploughs is due to extension of cultivation and fragmentation of holdings. However sceptical the hill farmer may be of the advantages of deep ploughing and constant weeding, he is fully alive to the importance of manuring his lands. Poverty of land reduces the fallow land to the minimum and hence manuring is a highly necessary practice. But the usual open dung heaps lose large amounts of organic matter. Compost pits would be better and may be made obligatory by legislation like the Conservation of Manure Act. Use of fertilizers is limited and steps should be taken to subsidize its sale. Practice of green manuring is negligible and should be encouraged as it not only enriches the soil but also improves the texture. In rural areas proper arrangements do not exist for the disposal of night soil. This fouls the air, endangers health and spoils the geo-aesthetics of a beautiful region. Values of scientific scavenging are not yet realized. Owing to the availability of firewood very little of cow dung is burnt and treatment and use of this manure is one of the most advanced in India.

The value of crop rotation in retarding the exhaustion of soil is well understood and crop rotation is a general practice. The supplies of seeds are everlastingly drawn from the same store and only lately have the farmers realized the value of improved seeds. Local varieties are generally low yielding and impure. No systematic seed survey and study of local varieties has been made and experimental trials are necessary to ascertain good and bad points. It has been found that under proper crop management, irrigation

and use of fertilizers etc the average yields on the whole can be at least doubled in this area

The crops and cattle are exposed to damage by natural elements, wild animals, pests and diseases and the cultivator has to spend fair amount of time and energy in combating them. The various devices to combat them bear the stamp of environment. The hill agriculture is highly strained due to several other factors and can hardly afford to bear losses due to aforesaid causes. Agriculture Department must cooperate with the cultivators to reduce these losses.

The average size of holdings is too small and hence uneconomic. 80-90% of the cultivators have holdings of less than 2½ acres. Small holdings have shattered the economic basis of agriculture. They do not provide adequately for the needs of a family and the cultivator cannot pull himself out of depths of poverty when he is faced with several other adverse conditions. Farm cultivation provides only ½ to ⅓ of the total income. Rest of the income is derived from military service wages from labour and domestic service sale of grass, fire wood etc. Small uneconomic holdings and low yields are important causes of rural poverty. Rural indebtedness and lack of necessary enthusiasm for improvement are natural corollaries of small holdings and cultivating tenancy. Increase in production is a necessary means of removing want and improving the carrying capacity of the land. This would involve not only better agricultural practices but also land reforms and further changes in socio-economic structure. Agricultural

development in an area where cultivation cannot be much extended, must be mainly vertical through an intensification of scientific agricultural practices. There exists much scope for intensive mixed farming and should be developed in this area. Animal husbandry and dairy farming have to be integrated with the economy of the farm. Poultry and bee-keeping will form an integral part of intensive mixed farming. Productivity by new agricultural methods must be raised and output increased so that every one has enough income and enough food and a better standard of living. The natural and economic conditions offer scope for such development.

With such variety of relief, rainfall, temperature and soil conditions, there are bound to be several micro-regional variations but on the broad basis of agricultural practices, crop distributions and stock rearing, three agricultural regions may be distinguished. These regions show correspondence with natural regions and emphasize the larger control of physical factors of habitat over agricultural practices and crop distribution. In the south is the Baran, maize and pulses low hill region. In the middle is the wet, rice and plantation valley region and to the north is the cool, sheep and goats, mountain farming region. Agriculturally the northern region is the poorest and the central region the best.

Man and animal power still constitute the primary basis of economy in the Himalayan Beas Basin. The abundant water power is used directly for running water mills while generation of hydroelectricity

is confined to a single project. Beas project, now under construction will augment the supply of electric power. Greater use of the abundant resource of water power and hydroelectricity is necessary for economic development. Use of hydroelectricity would lead to less demand for firewood and charcoal and thus conserve natural vegetation. It can also help industrial development reducing pressure on land. Most important development in use of water power is the generation of hydroelectricity at Jogindernagar in 1933. Although a few more towns in the area have been provided with electricity since 1947, yet large areas go without this modern amenity. Electric supply should be extended to other centres. This may not be a paying investment but for rural electrification, the usual yardstick of financial returns cannot be always applied. Long transmission lines over vast uninhabited tracts would make transmission too costly. Small generating sets of 10-250 KW of automatic type for local hydel generation could be used on numerous hill streams. Increased development and utilization of hydroelectricity will greatly energize the economy.

Mineral wealth has not been fully charted. Physical isolation, absence of adequate transport facilities and lack of technical skill or organization and capital hamper development even wherever it is possible. Slate production is of significant importance. Wire-saw method for splitting slates would reduce costs and make thinner splitting possible. Since slate has to compete with other roofing materials, it should be quarried and prepared more efficiently and cheaply and the

by products utilized. Some lands of limestone could be utilized for the manufacture of cement. At present there is not a single plant for cement manufacture. A number of mineral and thermal springs that exist need be developed as tourist centres. As cheaper products are available from outside, the even limited smelting of local iron ore is now practically non-existent. The only rock salt deposits in India are found in Naush. The method of working them is primitive. The situation of Jogindernagar at rail head together with advantages of abundant water and electric supply make it a suitable place for development of chemical industry. A new chapter in mineral exploration was opened with the inauguration of oil drilling operations near Jwalamukhi on 20th April 1957.

Large scale manufacturing industries are unknown in this area. Various small scale industries are adapted to resources and requirements of hill economy. In the absence of economic survey and inventory of industrial resources it is not possible to give elaborate and detailed suggestions about industrial development but the author has attempted to provide some indications from his personal survey. Previously the area had been neglected. It served as a recruiting centre for defence services and economic development was restricted as a matter of policy so that people may not be beguiled from recruitment to more remunerative employment at home. Undoubtedly scope exists for industrial development. As density of population on cultivated area has reached saturation point, surplus manpower could be utilized for industrial development.

In the absence of organisation and capital, the area is at present suited to cottage and small scale industries on cooperative lines. The worker is often at the mercy of money lender and bazaar agent. Kulu shawls and Kangra blankets are notable products but their manufacture could be improved so as to meet the demands of modern needs and fashions. Sericulture is not developed though suitable conditions exist and it could provide a profitable side occupation. Apiculture is another profitable undertaking as suitable flora exists for the bees. But at present, the advantages of bee-keeping for honey and for pollination of field and garden crops are not appreciated enough. Finer arts and crafts like the renowned Kangra paintings and the beautiful embroideries are no longer practised and have died out, as patronage declined. The author would like to suggest the institution of 'Museum of Kangra Arts and Crafts' to serve as an attraction to the tourists and as a perennial inspiration to the generations of artists and artisans. The trade of making utensils and implements is dwindling as machine-turned articles are becoming available. Articles of stone, wood and clay suffer from lack of uniformity, design and finish. There is need to establish an industries school to impart instructions so that the products may compare well with those of Kashmir. Although bamboo is found in great profusion in the lower hills and valleys yet bamboo-work is not done extensively owing to caste prejudice attached to the profession. The forests of the Himalayan Beas Basin represent the chief source of timber and resin for Punjab. Exploitation of these is not easy due to remote

location, difficult transport and irregular labour supply. With departmental working and elimination of forest abuses more income could be collected from the forests. Match, paper and pulp, rayon, wood working sports goods and a number of other industries would be possible on local resources of forests, water and electricity. Further, Kangra and Himachal can become 'the drug house for the whole of India'. A large number of herbs and plants, from which official drugs are made, grow in the area. Export of crude drugs and import of purified principles is sheer economic waste. Therefore, there is ample scope for the development of medicinal plant farms and pharmaceutical industry. Evidently, the area need not remain dependent upon agriculture. The solution of the problems of its underdeveloped economy lies in a happy marriage of agriculture and industry. The natural resources of the Himalayan Beas Basin are in no way less than those of Switzerland or Norway and there appears to be no reason why with resourcefulness, scientific and technological assistance, and the will to a better standard of life, the people here cannot achieve what the Swiss and Norwegians have accomplished in their mountainous habitats.

The importance of tourism to these underdeveloped areas can hardly be underestimated. Fortunately large unproductive areas possess great natural charm and must be cashed in. There is need to organize tourism with some imagination and in a better way so that the profits of this invisible trade may be available more abundantly. Suitable transport, hotel facilities, guide and publicity services are lacking and must be

living which is already fairly low. With population rise parallel economic developments must be made to reduce high and increasing pressure on land. The author could scarcely find a single untenanted plot. Many a rugged spot is cultivated which with lesser pressure of population and alternative means of sustenance would not be considered worth tillage. The population is largely rural. Five out of eleven tahsils have 100% rural population and the remaining have above 80%. All urban centres lie on the important Pathankot Kulu road, the life line of the Himalayan Beas Basin. Heavy pressure of population compels large numbers to earn their livelihood outside the area.

At present, land is the main source of livelihood and there is general absence of secondary resources. Physical environment in general affects the choice of occupations. Upland areas of forests and pastures have led to lumbering and stock rearing. The southern 'Birani' tracts which are agriculturally poor have become important centres for recruitment to defence services and for the supply of labour and domestic services. In the valleys, people live mostly by agriculture. Nevertheless general dependence on agriculture remains high everywhere. Other occupations claim small, even negligible percentages of population. The very limited development in the means of transport is reflected in the transport employment group comprising only 0.5% population. With general economic development, the employment patterns are bound to show greater share in occupations other than agriculture but as it is there is no likelihood of any rapid change.

Human habitations were established in the Himalayan Beas Basin long before the Aryan infiltration. The hamlets of the aboriginals are found scattered throughout the length and breadth of the area. Availability of agricultural land is the main consideration in the establishment of human settlements. The earlier fort site towns have decayed with the fall in the significance of forts and new centres have developed where advantages of nodality and access exist. A new lease of life was provided to some of the older towns by instituting there some administrative offices. Pathankot Kulu road remains the cultural dominant. The raison d'être of small urban and suburban centres is their accessibility to rural areas and their function as collecting and distributing centres. Absence of large urban centres is due to the fact that village communities have few needs for urban services and thus do not provide the sap for the growth of large towns. More over dissection of relief and inadequate communications inhibit growth of large habitations. Urban centres carry strong agricultural elements. Kangra provides an example of a well placed Himalayan town. Its pre-urban centre developed below the fort, between the two streams and at a contact point. Since 1816 when followed a period of uninterrupted peace diffusion took place as the initial advantages of security from external danger were no longer important. Kangra Bhawan steadily developed from a suburb to a township on account of natural geographical advantages and greater accessibility. 96.6% of the population is Hindu. Commerce, transport services and miscellaneous sources engaged 85.9% of

population and only 11.1% is agricultural. 42.5% of the population is literate, mostly on account of the missionary zeal of the Arya Samaj and the Christian Church. Kangra is a sprawling town (16 miles long), carries small population (5,775 in 1961), and has a picturesque setting. It has all the advantages of good site, road and rail communications, water and electric supply, schools and hospitals. There is need of a college and a few new industries for further development.

Most of the population resides in rural habitations varying in size from isolated hamlets to somewhat agglomerated habitations. The nature of hill and mountain habitat does not permit the growth of compact habitations like those of the plains. Thus, we find only semi-sprinkled, sprinkled and isolated habitations. The houses are promiscuously scattered on account of the broken nature of country and the necessity to be near the cultivated patches of land. In valley areas, common agricultural routine, necessity of mutual help or 'Jowari' in irrigation and cultivation of rice, has led to the growth of small hamlets with a common village site, but here too dwellings are not grouped in a compact manner. Mountainous regions are areas of true dispersal where isolated homesteads are found. Some of the highest human habitations are found there. Chalk Got is situated at 9,500 ft. but the graziers huts may be met with at 11,000 ft. or so. Out of the varying conditions of low hills, valleys, and mountains, have developed the sprinkled, semi-sprinkled and isolated habitations showing a correlation between natu-

ral regions, agriculture and human habitations. Hill villages are very picturesque. There is no plan except what factors of site dictate, and there is no social coherence due to caste restrictions and scattering of houses. Community projects and other village welfare schemes may provide much needed amenities for medical treatment, education, recreation, and agricultural development.

The rural houses are simple structures designed to provide for the sheltering of peasant and his family and for storing grain and implements etc. The houses are built with local materials. They exhibit in their build the influence of local construction materials, climate and relief. Houses in the low hill region are mud and stone structures with flat roofs. Valley houses are usually mud or stone and slate with pitched roofs to run-off heavy rainfall. In the northern mountains and forested areas, houses are of stone and wood. In Kulu, where level surface is restricted, houses are often taller than those of valley areas. The houses seek the sun usually by keeping their entrance either to the east or south. Direction may vary with aspect. Furnishing is scanty and the equipment varies with the prosperity and status of the peasant.

Type studies of the Villages of Daulatpur and Gadiarah and of the Ghurths and Gaddies present a clear picture of the agricultural economies of various regions ranging from southern hill country to northern hill country and from the valley area to the mountainous region. They bear out the truth of remarks made earlier that land for agriculture is inadequate, irrigational faci-

lities are restricted yields are low, income from land is not sufficient to meet the expenses and has to be supplemented from other sources and that there is general absence of good roads, pure drinking water, educational and medical facilities. Intensive mixed farming can help to increase incomes and improve the diet. Both the people and the government must join hands to improve the economy and life of the villages.

The oldest strata of society or the aborigines are represented by various scheduled castes. Fusion with later immigrants has resulted in many changes in appearance and characteristics. Several of the agricultural tribes are either indigenous or indigenous by half blood. The social structure is firmly based on Hindu caste system. However there are instances where a hill chief could promote a Rathi to the status of a Rajput and one could observe caste developing before one's eyes. Plough is considered the badge of lower walk of life and both Brahmins and Rajputs are divided into distinct groups consisting of those who plough and those who have not 'defiled their hands with the plough. The area has long remained the stronghold of Rajput Rajas and the ascendancy of Rajput society is well marked. This area might almost be called ethnographically 'the Rajputana of Punjab' as it has been called Switzerland from its physical characteristics. With the end of hill states this ascendancy is on the decline. All sudra castes engage themselves in field labour. Social position of scheduled castes and tribes is one of restrictions and hardships. Public services like the bus and rail and public institutions like schools and hospitals and the

Government are working as solvents of caste. The hill people are generally good looking and of fair complexion. Here as in Europe the dwellers in the hills are shorter than the peoples of the plains. The gradations of caste are well marked in the general appearance of the people. Living in isolation, they are generally suspicious of strangers. Like all highlanders they are exceedingly attached to their hills. Living in harsh environment they fear the malignant moods of nature and propitiate every natural phenomena. The priest and medicine man still wield great influence. The people speak various hill dialects. Physical divisions often tend to introduce linguistic divisions and numerous examples of such physical influences are available. Isolation of the canton of Malana is responsible for the different dialect. Now that Kangra district has been included in Hindi speaking area of Punjab the whole of the Himalayan Beas basin shall have Hindi as its official language. This provides a cultural coherence to this geographical unit and vindicates the plea for the formation of the district of Himalayan Beas Basin. The dress of the people varies according to the climatic requirements, fashions and customs. In the cooler northern tracts, woollen dress may be worn all the year round. Elsewhere cotton fabrics are good enough except in winter when woollen clothing becomes necessary. Food is simple and is obtained from local produce. Use of tobacco is almost universal amongst the male members of the cultivators and pastoralists and various scheduled castes. Liquor is consumed largely by Sudra castes though varying numbers from other castes.

also take it secretly but they do not acknowledge its use due to social taboos. Peculiar marriage customs show new adaptations to social needs. Polygamy is customary and is practised for acquiring more labour for agricultural work. Polygamy is socially on the decline. Polyandry is confined to certain areas in the north east. The institution appears to serve as a natural check on the population increase in these areas of food deficit. Moreover, there are not enough means to establish separate families. Each tribe, in the Himalayan Bear Basin, has its particular social customs. Any deviation from them is considered anti-social and is punished by 'dand or fine and hanj' or social ban. Sports and pastimes, singing and dancing express the hilarious spirit of the hill people. They combine worship with festivity. This provides relief from the monotony of field labour. Nature festivals are many and are celebrated with great enthusiasm.

The aborigines practised a form of demonolatory and nature worship from which have come many of the beliefs and practices prevalent in the hills. On their settlement in the hills the Aryans intermarried to some extent with the earlier inhabitants, resulting in the fusion and amalgamation of two faiths. It was by absorption rather than annihilation of local deities that the conquest of the older by the new creeds followed. Local spirits and godlings were assigned to Hindu deities. Hinduism still preserves here much of its early character largely on account of physical isolation of the area. Nature-worship is widely prevalent. *Mi*

ujran Ka Mela' is a survival of the aboriginal worship of river god. In sickness, disease and hardship, relief is petitioned from the gods and goddesses often through the media of a priest or medicine man. People distinguish between 'Opri' the supernatural, or 'Sarni' the physical diseases. This is in some way in keeping, though in a crude way, with the modern concept of psychological and physical therapy. 'Deotas' have relations with each other and are on humanlike relations with the people. This amply shows the simple minds of the people. Exchange of visits between gods helps to keep up connections between peoples separated as they are by barriers of hills, rivers and forests. People also worship means of livelihood. Educated generation is less attached to religious practices, which is in keeping with the similar trend elsewhere too. With their religious beliefs, which may appear crude, the people lead somewhat fatalistic and contented lives.

The study of Ghurths is the study of an agricultural community in a valley habitat. Various customs, religious practices, and physiognomic characters point to the fact that the Ghurths belong to the indigenous stock. Mostly they live in Kangra Valley. With their labours they have fashioned the agricultural landscape of the Kangra valley and the habitat has similarly moulded the pattern of their economic activities, houses and living. Thus there exists a reciprocal reaction between organism and environment. Ghurth economy is becoming more diversified as many amongst them are now compelled to take to other services on account of paucity of land for tillage.

the general Louse-types and certain cultural patterns correspond broadly to the natural regions. Physical conditions therefore, enter fairly intimately into economic and cultural developments though they do not act as sovereign controls. Certain religious practices current amongst even the aboriginal elements of population were the direct outcome of environmental conditions, while others were imported. Such is the more refined worship of Brahma, Vishnu and Shiva which came along with the later immigrants. Physical conditions must certainly affect economic developments which in turn affect the size and pattern of human settlements, trade and transport and even social practices. Polygamy is in places directly related to the advantage of obtaining more labour for agricultural work. Small holdings which result from social laws of inheritance largely weaken the economic basis of agriculture. Certain human societies exhibit distinct patterns in their particular habitats yet they also show the influence of neighbouring societies. On account of numerous contacts with the valley people, the Gaddis have adopted certain elements in their life, which distinctly belong to the valley areas. A close relationship is nonetheless observable between a culture pattern and a particular region. Such are the distinct culture patterns of *Ghurths* of Kangra valley and Gaddis of Dhauladhar range. There may be minor local variations in each but basically they represent distinct patterns. In the Himalayan Beas Basin, where people lead simple lives in the lap of nature the worship of nature-deities appears to be a

common cultural dominant though in varying forms and proportions. It would seem that in all mountainous countries the grandeur of their natural features and the magnitude of their physical forces displayed led the inhabitants to deify the natural objects by which they were surrounded. Comparative physical isolation and conservative outlook is responsible for the fact that Hinduism in its earlier form is still preserved here. A dynamic socio-economic change, underway, is the gradual breaking down of the joint family system on account of the fact that members of the same family are taking to different occupations and at times in far removed places, amongst the agriculturists it is due to paucity of arable land. It becomes evident that habitat, economy and society affect each other though in varying proportions and the trinity weaves the intricate design of human activities and institutions.

The picture emerges of an underdeveloped economy and a conservative society in the Himalayan Beas Basin. Changes in traditional economic and cultural patterns cannot be affected rapidly on account of the particular features of the habitat its isolation and the poverty illiteracy and conservatism of the people. With ominous developments across and along the border in the east and the west this area needs to be developed and strengthened rapidly. For affecting improvements in various aspects, there is little doubt that the approach will have to be based on a full and proper understanding of the habitat, economy and society.

APPENDICES

APPENDIX A

HILLMAN'S SEASONS, MONTHS AND DIURNAL DIVISIONS OF TIME

Seasons

- 1 Taundi or Hot Season (From March to June)
- 2 Barsat or Rainy Season (From July to September)
- 3 Hyund or Cold Season (From October to February)

Hillman's Months

1	Cbet	approximates	to March	15 to	April	13
2	Basakh	"	" April	14	" May	11
3	Jeth	"	" May	15	" June	15
4	Asarh or Har	"	" June	16	" July	16
5	Sawan or Soan	"	" July	17	" August	17
6	Bladon	"	" August	18	" Sept	17
7	Asuj or Suj	"	" Sept	18	" Oct	17
8	Kattak or Kati	"	" Oct	18	" Nov	16
9	Muggar	"	" Nov	17	" Dec	15
10	Poh	"	" Dec	15	" Jan	14
11	Ma, h	"	" Jan	15	" Feb	12
12	Phagun	"	" Feb	13	" March	14

Diurnal Divisions of Time

1	Bhuagla Pahr	refers to	A couple of hours before sunrise
2	Mun Nehra	"	" Early dawn
3	Jasmusa	"	" Dawn
4	Bhuag	"	" Sunrise
5	Kalwar or Pallla	Pahr	" Forenoon
6	Dopahar	refers to	Noon
7	Triya Pahr	"	" After noon
8	Chautha Pahr	"	" Early Evening
9	Sanj	"	" Late evening or sunset
10	Trikal	"	" Twilight
11	Rat	"	" Night
12	Adhrata	"	" Mid night

APPENDIA B

HILL WEIGHTS AND MEASURES

Weights

16 Chataks	= 1 Seer
2½ seer katcha	= 1 seer (pucca)
2 seers (pucca)	= 1 Bat
40 *Seers (pucca)	= 1 Maund

Grain Measures

2 Paths	= 1 Thumbi
8 Thumbis	= 1 Drun
6 Drun	= 1 Topa

(Topa of 50 Thumbis is called Panjora and
of 48 Thumbis is called Athara)

1 Thumbi contains	= 8 seers katcha of husked rice
	6 seers katcha of unhusked rice
	7½ seers katcha of Wheat
	7 seers katcha of Maize

Land Measures

20 Biswansu	= 1 Biswa
20 Biswa	= 1 Bigha
1 Bigha	= 5/24 Acre
1 Karam	= 57½" (12' = 1' and 3' = 1 yd 220 vds = 1 Furlong 8 furlongs = 1 mile)

9 Sarsahi or 3 sq Karam	= 1 Marla or 3/640 acres or 22.96 sq yards
20 Marlas	= 1 Kanal or 3/32 acres or 459.2 sq yards
8 Kanals	= 1 Chumaon or 3/4 acres or 3673.6 sq yards
1 Acre	= 4840.0 sq yards

Metric System Equivalents of Weights and Measures

1 inch	= 25.4 millimetres
1 foot	= 30.48 Centimetres
1 yard	= 0.9144 metre
1 Mile	= 1.609344 Kilometres
1 Acre	= 0.404686 hectare
1 Sq mile	= 2.58999 sq Kilometres
1 Seer	= 0.93370 Kilogram
1 Maund	= 0.379212 quintal
1 ton	= 1.01605 metric tonnes

Temperature Conversion

C	= 5.9 (F-32)
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*Grain measures vary somewhat in Chamba, Mandi and Kulu.

APPENDIX L
CLIMATIC DATA
Average Rainfall (in inches)

Station	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
1 Kula	4.22	4.36	4.31	3.04	2.14	2.31	5.70	0.19	3.22	1.02	0.68	1.72	36.91
2 Palampur	4.63	4.61	3.50	2.06	2.29	7.76	31.22	32.51	10.10	1.15	0.44	1.92	102.19
3 Nagar	5.02	5.32	5.72	3.71	2.43	2.73	5.51	7.02	4.06	1.21	0.90	2.15	48.38
4 Hamarpur	2.66	2.39	1.75	0.95	1.14	3.79	15.54	15.86	5.60	0.48	0.20	1.16	51.58
5 Dehra	2.46	2.50	1.91	0.94	1.15	3.69	15.51	15.84	5.80	0.50	0.24	1.20	51.80
6 Kangra	2.69	2.83	2.35	1.14	1.49	5.85	21.76	26.05	7.05	0.83	0.32	1.37	73.74
7 D Sala (Lower)	4.59	4.51	3.57	2.07	2.23	9.32	30.84	33.26	11.73	1.16	0.50	1.99	116.77
8 Nurpur	3.74	3.15	2.42	1.14	1.20	4.00	17.10	19.40	5.92	0.69	0.35	1.61	60.72
9 D Sala (Upper)	4.05	4.40	4.30	2.53	1.52	7.69	30.48	34.30	11.66	1.72	0.37	2.17	107.24
10 Ranjart	3.00	2.95	3.05	2.45	2.26	3.59	8.92	9.09	3.07	0.87	0.55	1.27	41.67
11 Mandi	2.73	2.44	1.68	1.12	1.05	5.22	19.54	22.75	5.74	0.62	0.32	1.53	65.36
12 Jogindernagar	3.41	4.01	2.45	1.79	1.62	4.54	27.50	33.83	8.79	0.65	0.47	1.12	90.67
13 Sarknaghat	2.56	2.71	1.43	0.97	1.53	5.56	25.41	20.15	7.02	0.72	0.33	1.53	76.29
14 Chaebhot	2.18	2.82	2.06	1.76	2.83	5.64	19.05	23.79	7.08	1.15	0.43	1.65	70.45

Average number of rainy days

Station	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
1 Kula	6.3	0.8	6.6	5.7	4.8	4.6	9.1	9.8	4.5	1.7	1.2	2.6	63.7
2 Nagar	7.2	7.3	7.9	6.2	5.0	5.8	13.2	13.8	6.4	2.4	1.5	3.4	80.1
3 Palampur	0.0	6.2	5.7	4.1	4.4	8.6	20.3	21.5	10.0	1.8	0.8	2.6	91
4 Hamarpur	4.2	4.3	3.4	2.2	2.5	6.0	14.5	14.9	6.3	1.1	0.5	1.0	61.8
5 Dehra	3.8	3.7	3.2	2.0	2.1	3.2	12.9	13.6	5.2	0.6	0.5	1.8	51.5
6 Kangra	4.6	4.6	4.2	2.0	3.1	7.2	16.9	17.8	6.7	1.1	0.7	2.2	71.7
7 D Sala (Lower)	6.1	0.4	5.5	4.1	4.4	9.5	21.1	23.5	10.9	1.9	0.8	2.6	96.8
8 Nurpur	4.2	1.3	3.9	2.1	2.4	4.9	13.8	11.4	5.5	1.1	0.6	2.1	59.3
9 D Sala (Upper)	5.0	7.6	6.4	5.3	3.9	10.3	24.3	24.1	13.4	3.6	0.9	3.6	108.1
10 Banjar	5.4	6.0	6.4	5.3	5.4	7.2	13.5	13.6	6.4	1.9	1.1	2.1	74.6
11 Mandi Sadar	5	9	12	3	3	5	27	18	8	2	1	1	98
12 Jogindernagar	5	10	9	2	3	5	24	16	8	2	2	2	84
13 Sacknaghat	2	8	6	1	2	1	23	12	6	6	1	1	62
14 Ghacbot	2	5	7	2	2	4	23	15	9	1	1	1	70

APPENDIX D

Land Use

S No	Taluk	Total Area (in sq. mi.)	Total Area entered in Land Kitabh	% Surveyed	Cultivated Area, %	Net Sown Area, %	Current fallow, %	Cultivate waste, %	1 or less, %	May fall, %	Net available for culti- vation, %
1	Kanara	122	122	100	20.0	19.0	2.0	5.1	70.1	6.0	6.9
2	Talampur	711	519	300	22.1	21.7	0.4	11.5	50.5	7.0	0.7
3	Nurtur	619	519	100	30.8	23.7	6.9	11.2	33.1	1.8	11.1
4	Hannur	790	590	100	37.4	31.2	0.2	12.0	27.6	13.0	0.7
5	Dehira	105	105	100	31.1	25.3	5.1	10.1	30.9	12.0	15.0
6	Hobli	1615	112	6.7	6.0	5.5	0.5	0.8	0.1	0.3	1.2
7	Mannasar	202	101	51	32.9	31.9	1.0	1.7	0.2	11.5	1.8
8	Jekirlemakar	415	87	19.5	12.3	11.9	0.1	0.0	0.2	4.3	2.1
9	Chelur	951	63	18	27.3	21.8	1.5	0.3	0.1	2.5	1.5
10	Sarkaghat	202	97	18	27.5	27.4	0.1	1.2	0.1	13.1	5.2
11	Bhattiyat	270	37	13.0	11.7	12.9	0.8	0.8	2.9	0.3	0.8

APPENDIX C

LIST OF HERBS OF MEDICINAL VALUE FOUND IN THE HIMALAYAN BEAS BASIN

Local names	Botanical names	Place of origin
Atis Patis	<i>Aconitum heterophyllum</i>	Beas valley
Baleh, vaub	<i>Acorus calamus</i>	Kangra Beas valley
Katha	<i>Acacia catechu</i>	
Basuti	<i>Adhatoda vasica</i>	
Bil	<i>Aegle marmelos</i>	
Kwar gandol	<i>Aloe</i>	Kulu valley
Jangh pios	<i>Allium (Kiballum)</i>	Kangra valley area
Gulkhair	<i>Althoea officinalis</i>	Parbati valley
Jon Khmani	<i>Anagallis arvensis</i>	
Blukeri	<i>Apium graveolens</i>	
Astanul bahar	<i>Artemisia vulgaris</i>	
Astamd bahar	<i>Artemisia maritima</i>	Kulu
Not known	<i>Atropa belladonna</i>	Kangra, Upper Beas
Bhoj Pata	<i>Betula utilis</i>	
Dhak la gund	<i>Butea frondosa</i>	
Al	<i>Calotropis gigantea</i>	
Zira	<i>Carum carui</i>	Nagrota Ranital
Bhang	<i>Cannabis sativa</i>	Mangwal Guler
Amaltas	<i>Cassia fistula</i>	Beas and Parbati valley
Dhania	<i>Coriandrum sativum</i>	Harabagh, Mandi, Kangra valley
Taj patra	<i>Cinnamomum tamala</i>	
Hamn tutia	<i>Colchicum</i>	
Sufed Dhantura	<i>Datura stramonium</i>	
Kela Dhantura	<i>Datura fastuosa</i>	
Does not grow in these hills but can be cultivated	<i>Digitalis</i>	Beas valley
Hazar dana	<i>Euphorbia pulifera</i>	
Karo	<i>Gentiana kurroo</i>	Shahpur, Kangra, Nagrota, Bajnath
Brahmi	<i>Hydrocotyle asiatica</i>	Kangra valley
Bajar bhang	<i>Hyoscyamus niger</i>	
Kapur kachui	<i>Hedychium spicatum</i>	
Jalnim	<i>Lycopus europaeus</i>	
Tuki	<i>Ocimum basilicum</i>	
Kakarsingh	<i>Pistacia integerrima</i>	
Isabgol	<i>Plantago ovata</i>	Kulu Mandi and Rehlu
Bankakri	<i>Podophyllum emodi</i>	Kangra valley
Rattan jot	<i>Populus nepalensis</i>	Kangra and Beas valley
Amla	<i>Phyllanthus emblica</i>	
Kashmiri Pata	<i>Rhododendron</i>	

Local names	Botanical names	Places of origin
Not known	<i>Rheum emodi</i>	
Chireta	<i>Swertia chirata</i>	Kulu and Kangra
Harar	<i>Terminalia chebula</i>	Kangra valley
Bahera	<i>Terminalia bellerica</i>	
Arjun	<i>Terminalia arjuna</i>	
Mamina	<i>Thalictrum foliolosum</i>	
Gokhru	<i>Tribulus terrestris</i>	
Banjowan	<i>Scscl indicum</i>	Beas valley
Banafshah	<i>Viola odorata</i>	Mandi Kulu, Rehlu and Palampur
Muskwala	<i>Valeriana wallichi</i>	Kulu Mandi, Rehlu
Banna	<i>Vitex negundo</i>	
Nil Kanthi		
Chura		
Shatjatori		
Daut Kakau		
Rasount		Dharmasala
Austr Khadua		
Zakhunbyut		Kangra, Dehra Tehsil
Manori		Beas and Kangra valley
Senna		
San ka tomli		
Chila		
Shankar dana		
Patbar phor		
Chitrak		
Jaman		
Keor kurchi		
B deana		
Farsho-shan		Beas valley Mandi
Gandila		
Ghanera		
Karru		Kulu Bhuntar Palampur
Hitha Du hili or Shikakai		
Anjbur		
Kuth		Kulu valley
Dhu hili		Kangra
Brahm dandi		Mandi Kangra
Tejj hal		
Amardana		Parbati valley

APPENDIX F

MOUNTAIN PASSES

Mountain Passes between Chamba and Kangra

Name of Pass	Condition	Places across	Elevation
1. Bohar	Easy	Bisu Boh	11,602 ft
2. Baleni	do	Basu Daren	12,000 ft
3. Bhm Ohasutri	Somewhat difficult	Kothi Koreri	13,225 "
4. Indrahac	Easy	Kuarsi Dharmasala	14,150 "
5. Kundli	Easy	Kuarsi Kanjara	14,570 "
6. Toral	Difficult	Lamu Norwana	14,808 "
7. Talong	do	Holt Narwana	15,500 "
8. Singrahar	do	Deol Kandi	13,038 "
9. Satnalo	do	Groh Bandla	13,800 "
10. Wahar	Easy	Chaniar-Bandla	14,101 "
11. Sarni	do	Sarai Lanodh	14,082 "

Passes between Chhotta and Bara Banqahal

1. Thamsar	}	all exceed	15,000 "
2. Gauri			
3. Makori			

Passes between Bhattiyar and Chamba

1. Kali Nali	Between Mahla & Raspur	8,900 "
2. Mahl	" " & Tundi	8,600 "
3. Lao	" " & Bhatti	10,500 "
4. Chuari or Basodan	" Chamba & Tikri Bhattiyar	8,000 "

Passes between Kangra and Kulu

1. Bhabu	11,000 ft
2. Dulchu	8,721 "

Between Kulu and Rampur

1. Jalori Pass	12,288 "
2. Basleo Pass	11,918 "

Between Kulu, Lahul and Spiti

1. Rohtang	13,050 "
2. Hamta	14,000 "
3. Pin Parbati	15,751 "

Glossary

Abada	A village site
An	Hail
Baggar	A kind of grass used for fodder and ropes (<i>Andropogon involutum</i> and <i>Ercophytorum cornosum</i>)
Bairi	A sing r of sacred songs
Ban	Forest
Bandar	Brown monkey
Banj	Social ban
Ban-onk	<i>Quercus incana</i>
Bar	<i>Ficus indica</i>
Barani	Land dependent on rain or the unirrigated land. Also known as Ambar land (from the word 'ambar meaning sky)
Barera	Mixed crop of wheat and gram or wheat and barley
Barsat	Rainy season
Basa	Dwelling
Bat	Road
Batai	Rent paid in kind
Bathil	Unirrigated soil
Baterah	Stone dresser
Battar	Moistening of land by irrigation or rain
Begar	Free labour
Bhand Banjar	Inferior stony land occasionally cultivated
Bet	Riverine land
Bbeth	A 1 recipice
Bir	Ridge or earthen dyke between fields
Bival	Level grassy plain
Bokale	Hired shepherds (Gadhi word)
Chahi	Irrigated from well
Changar	Dry ravined hill land
Charandh	Crazing growth
Chaukan lu	Illegitimate son born to a widow
Chela	Medicine-man
Chhalli	Maize
Chola	Loose frock usually worn by the Gaddis
Ch'k	Soil

Chil	A specie of pine tree (<i>Pinus longifolia</i>) Also known as Clair Pine
Chip	A fish trap of bamboo, or oster
Chitrera	Painter
Chundavand	Inheritance custom based on division of property among the sons
Dal	A lake
Dal	Pulse
Dand	Fine
Danga	Stone wall
Darati	Sickle
Datuala	Morning meal
Deodar	Himalayan Cedar
Devta	God or godling Also called 'deota' (Kulu)
Dhan	Paddy
Dhân	Wealth Term used by Gaddis to mean flock of sheep and goats.
Dhar	Hill or range
Dhonsu	Drummer
Dofash	Bearing two crops a year
Durbat	Royal audience chamber
Gahr	Sheep-run
Gaggal	Full of stones (Chamba)
Gal	Abuse
Galen	A moraine (Gaddi word)
Garent	A glacier (Gaddi word)
Ghati	Hill road with steep slope
Ghee	Clarified butter
Ghoral	Cattle shed
Gillar	Goutre
Gohar	Path to hamlet
Goru	Herd of cattle
Goth	Place where sheep and goat are penned for the night
Gotra	Sept
Handu	Earthen pot
Hangu	Sieve
Har	Good, level land by streams
Hen	An avalanche (Gaddi word)
Hent	A snow drift (Gaddi word)
Hiun	Snow
Hyund	Cold season
Jagr	A grant of revenue, the lands included in such grant

Glossary

Jama	Land revenue demand
Jamabandi	A record of rights in land
Jatali	Messenger
Jhari	Steady drizzle or fine rain
Junjarara	Ceremony of second marriage of a woman
Jmswar	Crop return
Jowari	Mutual help in labour work
Kaccha	Unmetalled or earthen
Kail	Pinus excelsa
Kanki	Straw of wheat
Kasda	Embroidery
Katha	Acacia catechu
Khad	Hill stream or torrent, also called choi
Kharaba	Crop damage
Kharetar	Hayfield
Kharif	Autumn harvest
Khata	Holding of land
Khili	Fallow land
Khind	Coverlet and mattress, usually made from old clothes
Kobli	Canal watchman
Konwi	Part of the high ranges above the limit of forests Also known as nigahr
Kronk	Village watchman
Kud	Temporary shelter in hill side rock cave Also known as rowar in Kulu
Kuhl	Water channel, usually for irrigation
Kutal	Steep unterraced hillside where snow lies late (Kulu)
Lahri	Small garden plot attached to dwelling houses
Langur	Grey ape
Leh	A crevasse in a glacier
Lha	Ship on hillside
Loha	Dip slope
Lugri	Hill beer Also known as 'Chatki
Mach	A process of sowing germinated rice seed in flooded field
Mahi	A heavy horizontal beam of wood used for smoothing surface of ploughed fields
Maidan	Level ground used for encamping sports etc
Malhain	Dung heap
Manza	A collection of hamlets with patches of cultivation and surrounding waste
Monal	A small fiscal unit
	Lophoporus refulgens A hill pheasant

Nad	Swampy land.
Nala	Small stream A smaller one may be called Nalu
Nega	Headman
Nehri	Land irrigated from perennial source
Nohari	Light early breakfast
Oan	Main room of the house
Obrn	Side-room
Odh	Land in shade of trees in which little or nothing grows
Opra	Supernatural
Ori	Sheep or goat shed
Oti	Rugged and uneven land (Chamba)
Ottar	Baran land
Pabu	Tenant
Pandol	The watershed
Paral	Rice straw
Path	A measure of grain etc
Pattn	Blanket
Patwar	Village accountant in charge of revenue records of the mauza.
Peepal	Ficus religiosa
Peru	A large cylindrical container with narrowing mouth.
Phakku	Threshing flour
P.W.D	Public Works Department
Pucca	Metalled, built of stone cement or bricks.
Puja	Worship
Rabi	The spring harvest
Raja	Ruler
Rakhorar	Kept or mistress
Rakkar	Stony or hard land
Reh	Pinus webbiana
Rihri	Spur
Ropa	Irrigated soil (Kulu)
Rubban	Quicksand
Saibl	Porcupine
Saulab	Land subject to inundation from the stream
Sari	Autumn harvest
Sanyala	Evening meal
Sappar	Rock, shafa in Kulu
Sartora	Illegitimate son
Seend	Whistle
Shamlat	Wasteland

Glossary

Sik	Horse chestnut flour
Sit	Cold
Sowana	Defined area with grazing rights
Suhr	A spring of water, known as Jahru in Kulu
Sur	A kind of intoxicating drink
Swaru	A small vegetable plot of land in front of a house
Tahsil	A revenue sub-division of a district
Tal	Taru, Dal is commoner
Tan	A machan Also called Jaira A watch tower in the fields
Tandan	Ice or icicle (Gaddi word)
Tapri	A small shed or thatched house
Taundi	Hot season
Thob	A rough type of floor cloth
Tika	A sub-division of mauza consisting of one or more hamlets with cultivation and surrounding waste
Tilla	A peak or point of a hill
Tohl	Boulder
Topa	Measure of grain
Trangan	A small bridge over a rivulet
Waris	Inherited
Zamundar	An agriculturist

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