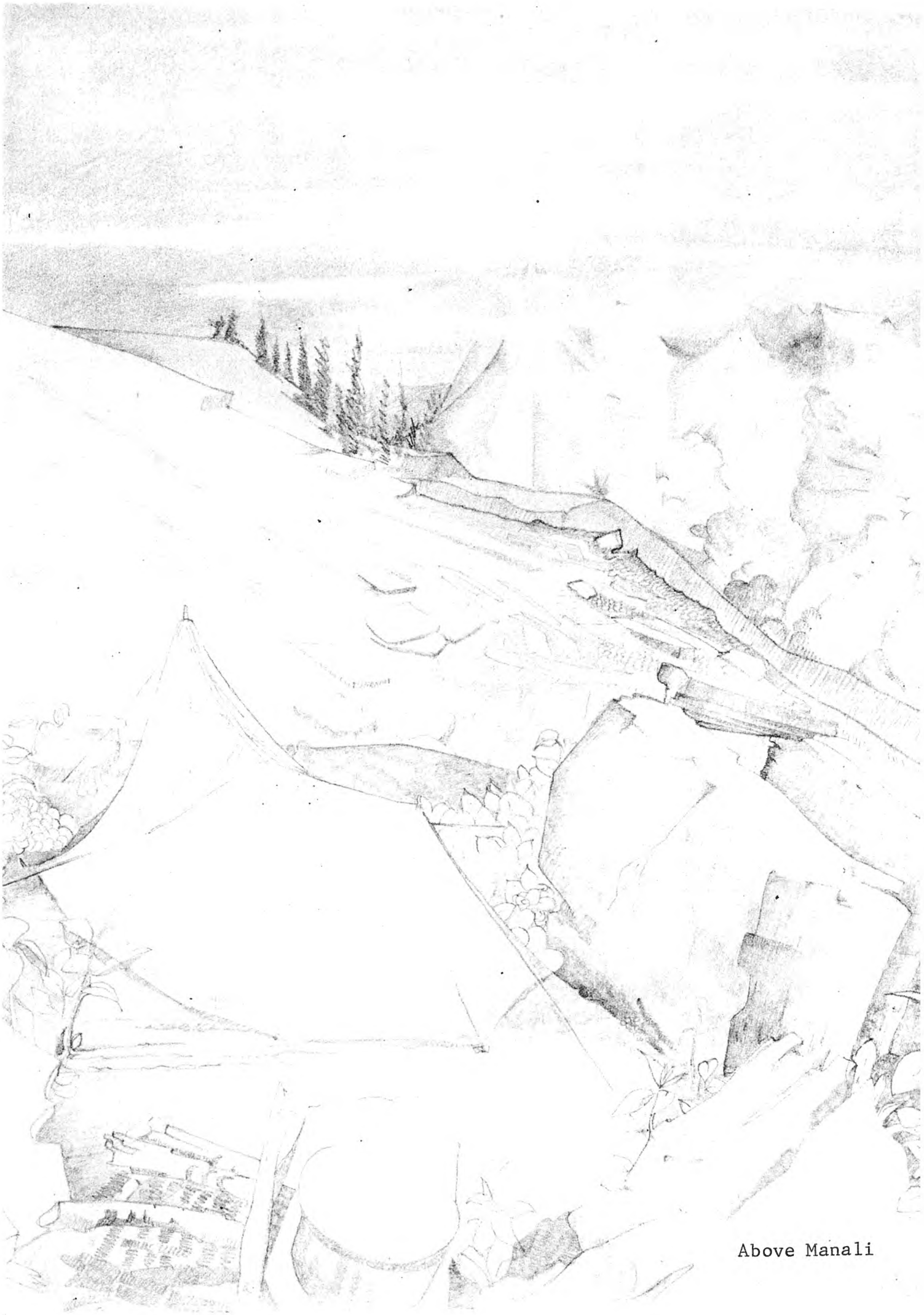
University of Southampton

HIMALAYAN EXPEDITION 1977

REPORT



Above Manali

UNIVERSITY OF SOUTHAMPTON

HIMALAYAN EXPEDITION 1977

- REPORT -

MAY 1979

Expedition members

Simon DELANY

Mark DRAVERS

Simon FRASER (Leader)

Michael RITCHIE

Charles WILLIAMS

Miss Helena Norberg-Hodge (of the School of Oriental and African Studies, University of London) was affiliated to the expedition and joined it for some time in the field.

Mr Eric GORDON, Senior Assistant Registrar, University of Southampton, acted as Home Agent.

* * * * * * * * * * * * *

Drawings by Michael Ritchie
Photographs by : Charles Williams : (1 - 4)
Mark Dravers : (5 - 19)
Simon Fraser : (20)
Maps by Dravers and Ritchie, Nicola Dugan and the University Cartographic Unit.

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(Authorship is indicated by initials where appropriate)


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Miles

UNIVERSITY OF SOUTHAMPTON HIMALAYAN EXPEDITION 1977

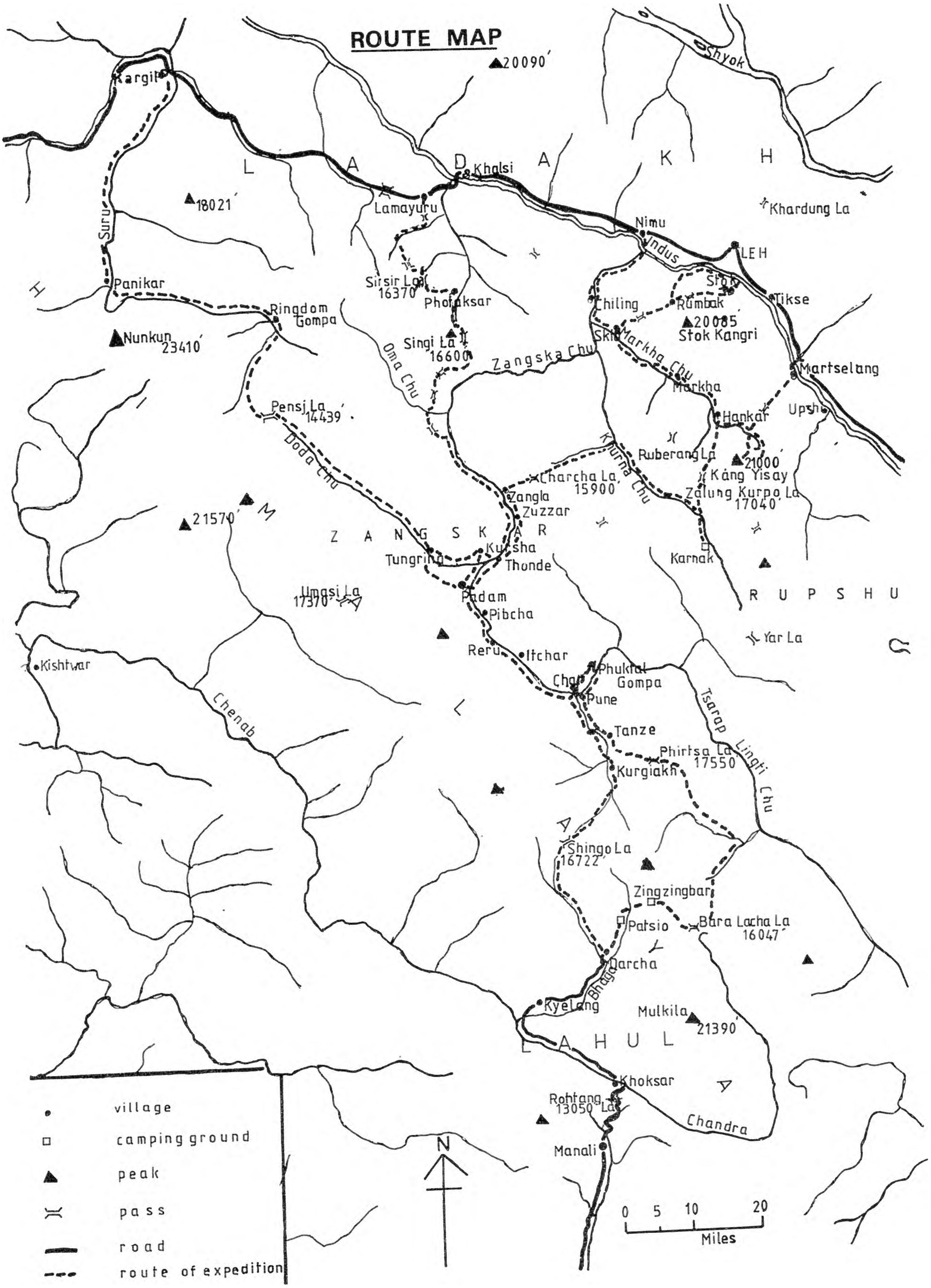
I - ABSTRACT

The destination was the remote trans-Himalayan region of India known as the Frontier District of Ladakh in Jammu and Kashmir state. The expedition set out with three objectives : geographical research; ornithological research; and exploratory mountaineering. This directly followed up the Ladakh expedition of 1976. *

The team left England in June 1977 and divided into two independent units (see maps). The two ornithologists travelled to Kargil via Srinagar and spent four weeks making a survey of the breeding birds of the Suru Valley. They then moved to a site at Tikse in the Indus Valley and undertook a netting and ringing programme for nine weeks, gaining valuable data on the breeding birds in the valley and on trans-Himalayan bird migration.

The other three members crossed the Himalaya on foot from Himachal Pradesh and during a two month period in Zangskar and Ladakh, explored two separate mountain groups in the Zangskar range, and climbed a number of peaks of 20,000 - 21,000 ft and crossed almost twenty passes. One member of the team stayed on during October and November to complete a study of the villages of the Markha Valley. This isolated valley lies between Ladakh proper and Zangskar and was an ideal area to study settlement patterns, production and economy and the social system of communities as yet unaffected by modern external influences.

* Ladakh Expedition 1976 : Report : University of Southampton (1977)


ROUTE MAP
Kargil
Suru
Panikar
Nunkun 23410'
18021'
L A D A K H
Khalsi
Lamayuru
Sirsir La 16370
Phot aksar
Singi La 16600
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Zangskar Chu
Ringdom Gompa
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Doda Chu
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LEH
Khardung La
Shyok
Tikse
Stok
Rumbak
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20085' Stok Kangri
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Markha
Martselang
Upshi
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21000' Kang Yisay
Zalung Kurpo La 17040'
Ruberang La
Khurna Chu
Charcha La 15900'
Zangla
Zuzzar
Karnak
R U P S H U
Yar La
20090'
21570'
Z A N G S K A R
Tungri
Thonde
Padam
Pibcha
Umasi La 17370'
Reru
Itchar
Kishtwar
Chenab
Phuktal Gompa
Cha
Pune
Tanze
Tsarap Lingti Chu
Phirtsa La 17550'
Kurgiakh
Shingo La 16722'
Zingzingbar
Patsio
Bara Lacha La 16047'
Darcha
Bhaga
Kyelang
Mulkila 21390'
L A H U L
Khoksar
Rohtang La 13050'
Chandra
Manali
N
0 5 10 20
Miles
village
camping ground
peak
pass
road
route of expedition

II - INTRODUCTION

The 1977 expedition was conceived sometime during the 1976 expedition. * Fraser and Dravers planned a small, two man expedition to Zangskar. The ornithological results of the 1976 field work by Denby and Phillips were so promising however that although they could not return to Ladakh themselves, we managed to find another ornithological team, Delany and Williams, to follow up their work. Ritchie had disappeared to East Africa for the winter of 1976/77 but joined the expedition on his return.

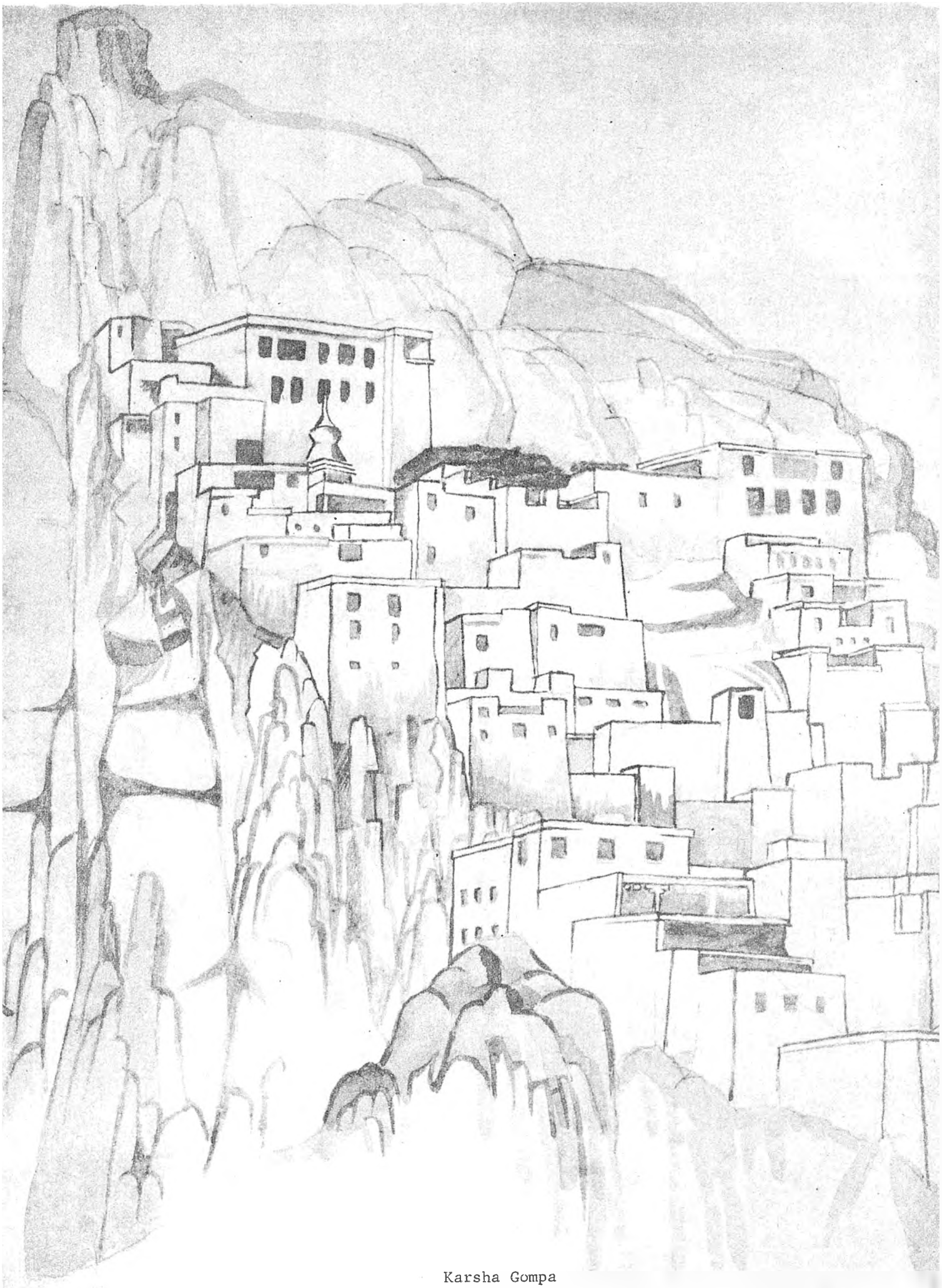
Six months were spent in planning the expedition and dealing with the paper-work inseparable from fund-raising. This year we were particularly fortunate in receiving a number of generous grants which solved the financial problem. Advice and help came from many quarters.

The full results of the expedition, and all other relevant information is contained in the following chapters and appendices. The main objectives of human geography and ornithology are dealt with in the two following chapters which form the main body of the report. The appendix on ornithology is lengthy but it was thought that it would be useful for future field ornithologists to have the results of the field work fully written up. The third objective of exploratory mountaineering is summarised in chapter V, and for those interested is written up as a story of travel at appendix A.

Himalayan research is limitless and we hope that our report, though a trifling contribution to unravelling the fascinating ethnographic, ornithological and geographical complexities of the Himalaya, may provide a base upon which others can build in future years.

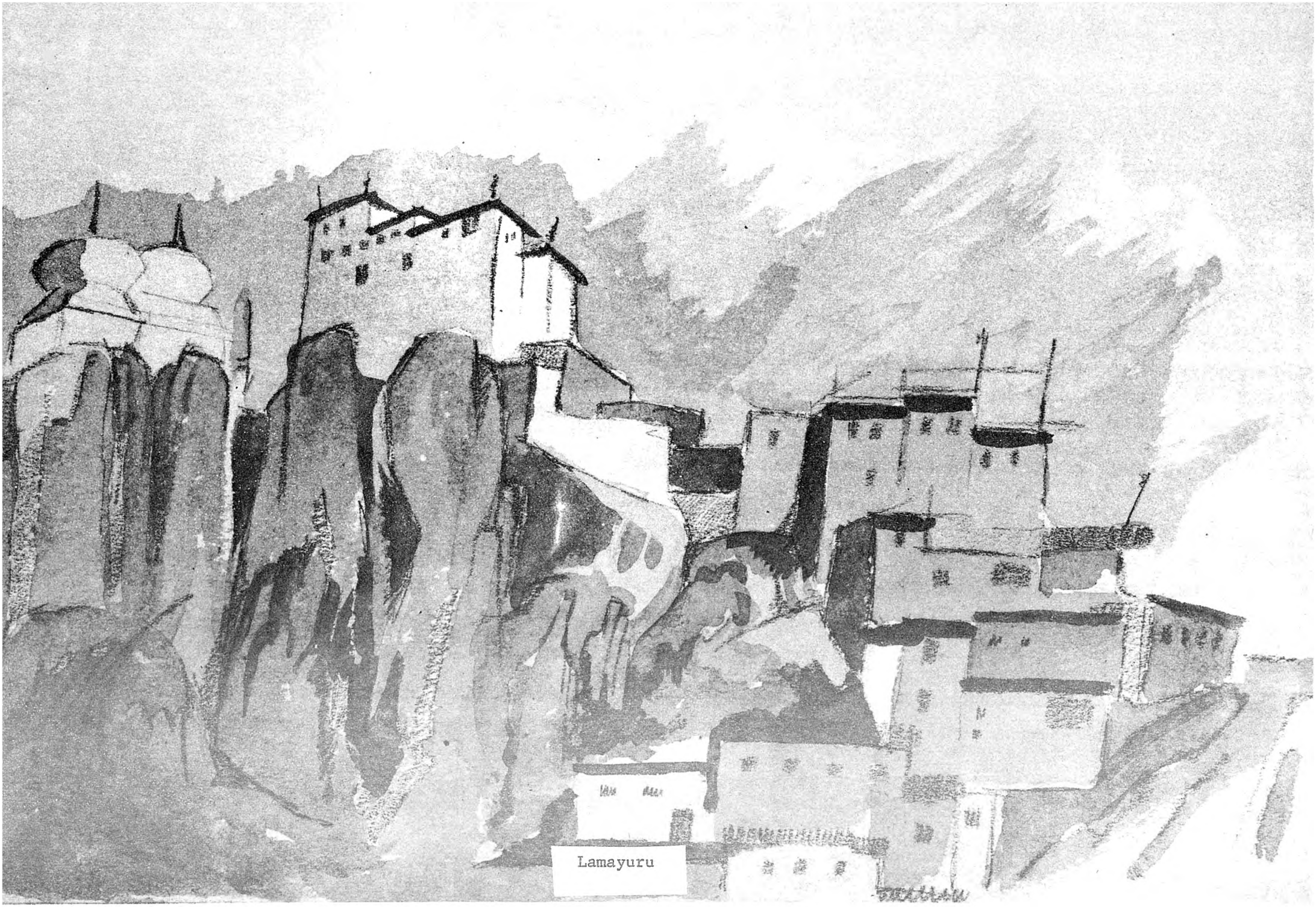
All faults, whether misnomers or inexactitudes or incorrect information, are the responsibility of the authors.

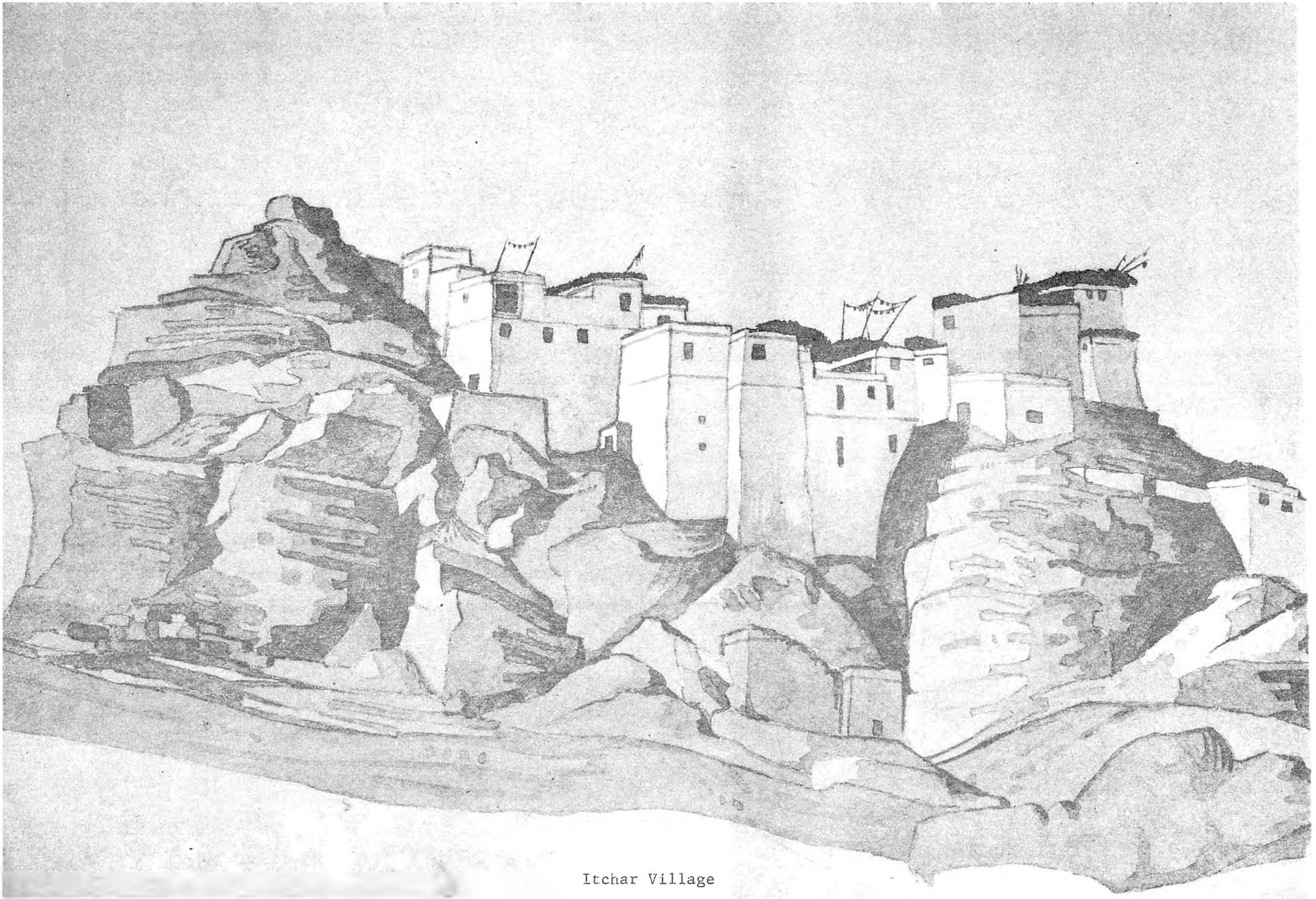
* The members of the Ladakh expedition were Fraser, Denby, Dravers, Maxwell, Phillips and Ritchie.



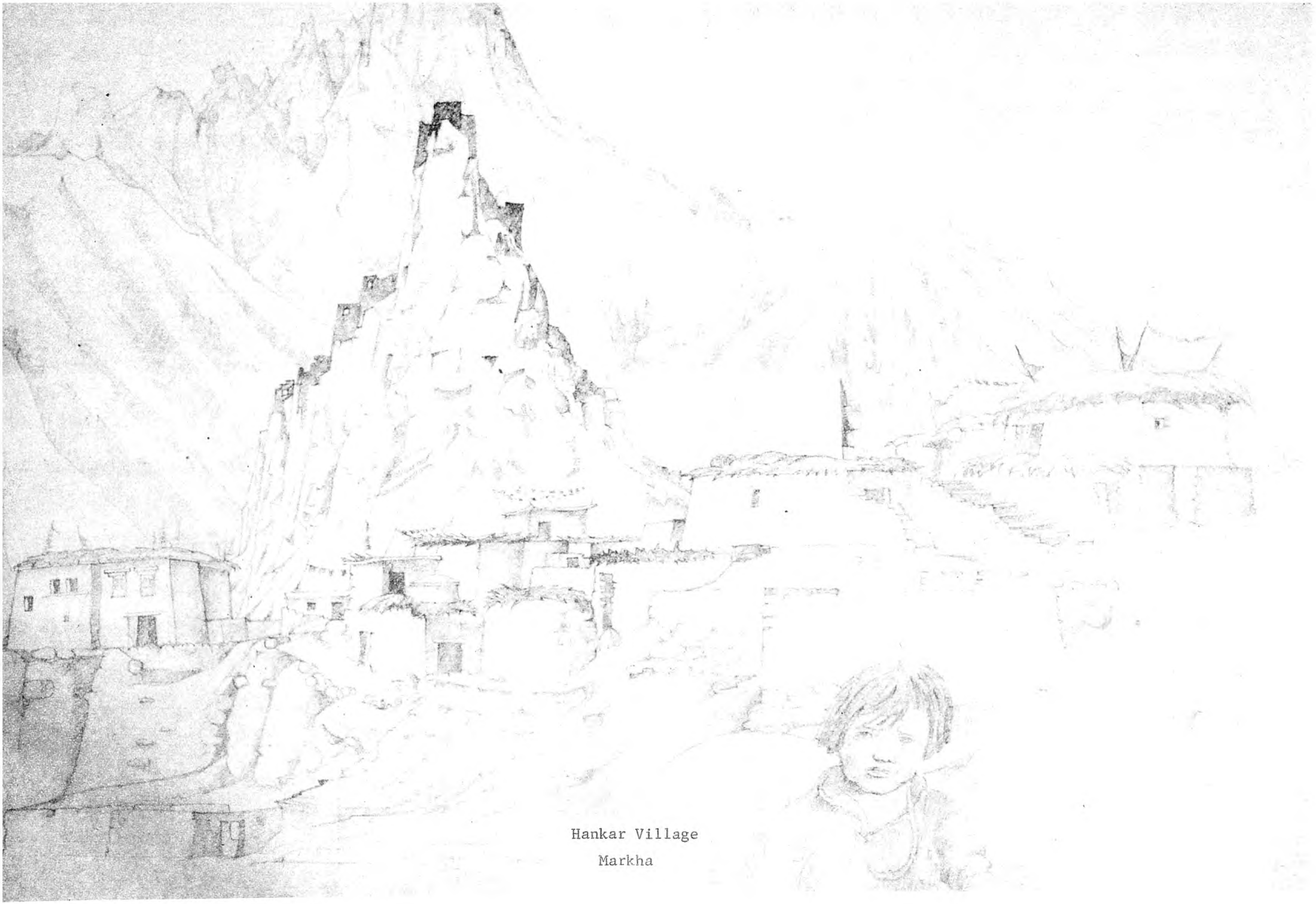
Karsha Gompa

Markha

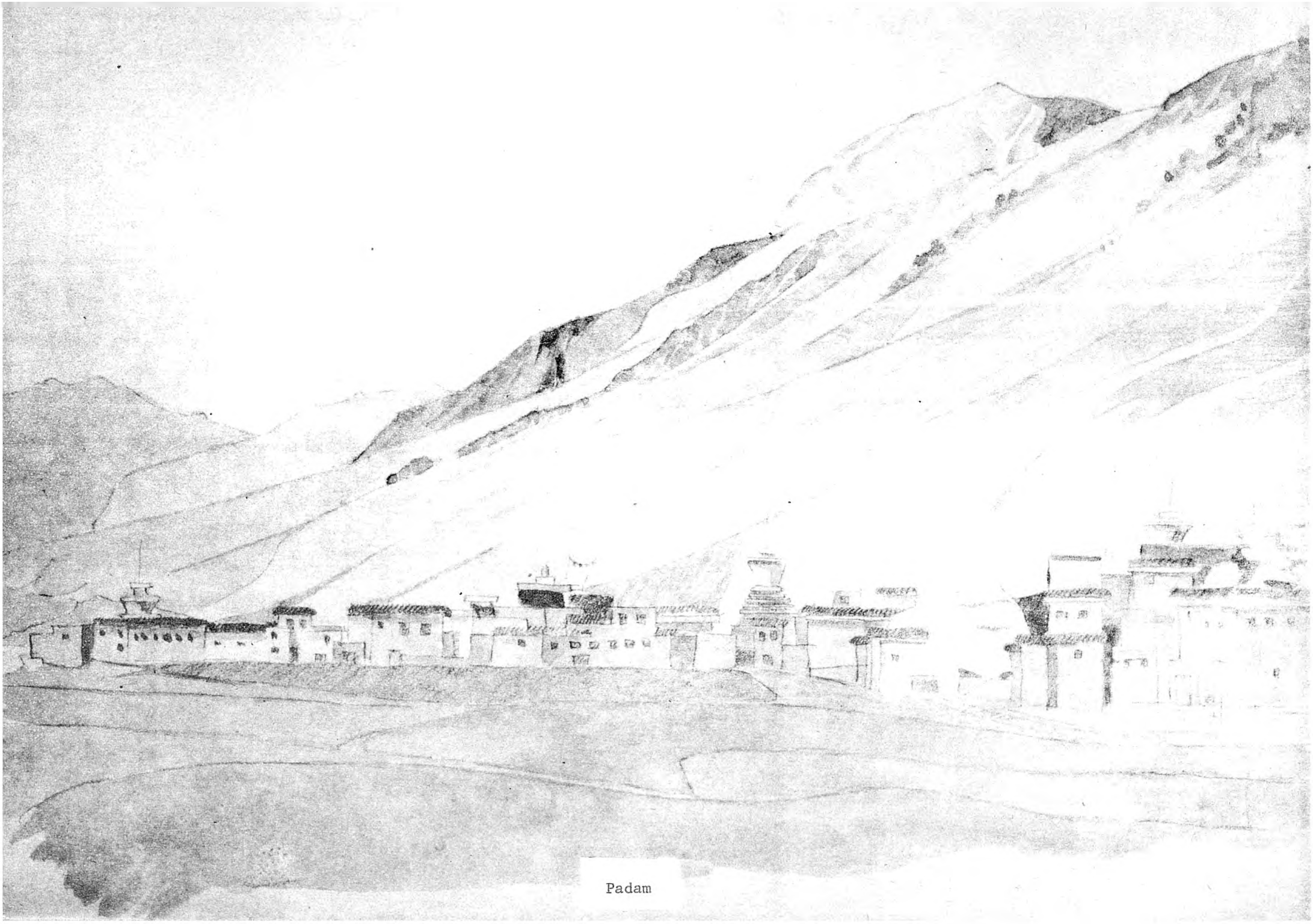

Lamayuru



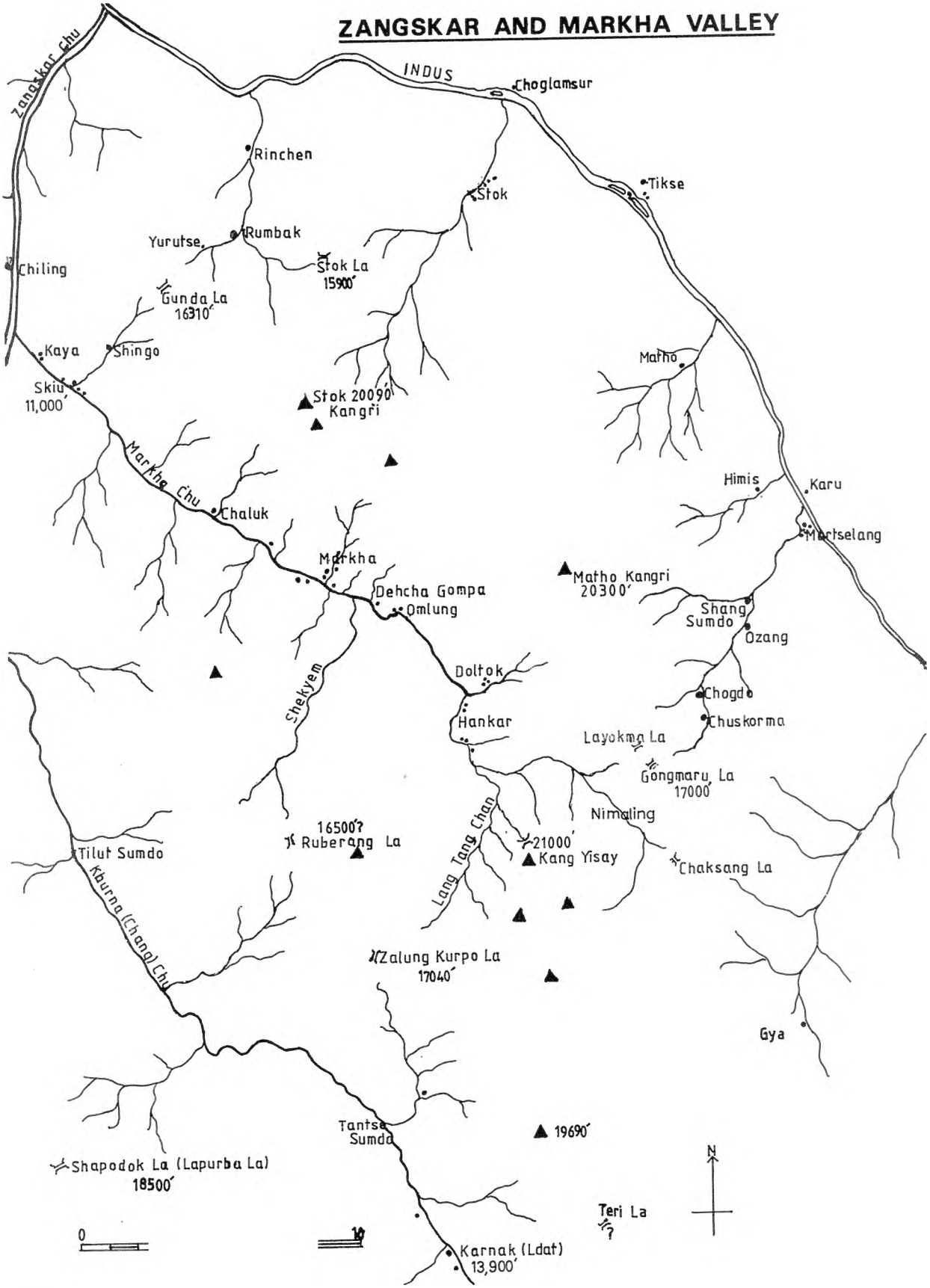
Itchar Village



Hankar Village
Markha



Padam


ZANGSKAR AND MARKHA VALLEY
Zangskar Chu
INDUS
Choglamsur
Rinchen
Stok
Tikse
Yurutse
Rumbak
Chiling
Stok La
15900'
Gunda La
16310'
Kaya
Shingo
Matho
Skiu
11,000'
Stok 20090'
Kangri
Markha Chu
Himis
Karu
Chaluk
Markha
Matho Kangri
20300'
Dehcha Gompa
Omlung
Shang
Sumdo
Ozang
Doltok
Shekyem
Chogdo
Hankar
Chuskorma
Layokma La
Gongmaru La
17000'
16500?
Ruberang La
Nimaling
21000'
Kang Yisay
Tilut Sumdo
Khurna (Changi) Chu
Lang Tang Chan
Chaksang La
Zalung Kurpo La
17040'
Gya
Tantse
Sumda
19690'
Shapodok La (Lapurba La)
18500'
N
Teri La
0
Karnak (Ldat)
13,900'

III - HUMAN GEOGRAPHY OF MARKHA

1. THE ENVIRONMENT

.1 The Tibetan cultural zone

The political frontier between Tibet and its southerly neighbours India and Nepal does not correspond to the limits of the Tibetan cultural zone. Along the length of the Himalayas, the Mongoloid populations of the high valleys, of Buddhist faith and Tibetan speech, form communities with Tibetan cultural and ethnic origins.

The west Himalayan districts of Lahul and Spiti in Himachal Pradesh, and Ladakh in Jammu and Kashmir, are areas that to this day retain Tibetan cultural and linguistic characteristics. These areas are situated between approximately $32\frac{1}{2}^{o}$ and $34\frac{1}{2}^{o}$ of latitude North and $76\frac{1}{2}^{o}$ and 79^{o} of longitude East and may be considered an offshoot of what is now the Tibet Autonomous Region of the Chinese Peoples Republic.

.2 Markha Valley : physical setting

The Frontier District of Ladakh covers some 40,000 square miles of Jammu and Kashmir state and includes virtually the entire administrative unit of trans-Himalayan India, stretching into the south eastern extremity of the Karakoram. Amongst the inhabitants, the name Ladakh refers to the region centred around the Upper Indus Valley. The Markha Valley lies between Ladakh proper and Zangskar, isolated by high mountain passes and deep gorges, but somewhat more accessible from Ladakh than from Zangskar. Locally the valley is known as 'Skiu-Markha', derived from the names of the two largest villages. It is located between 33^{o} 47' North, 77^{o} 37' East at the summer pastures on Nimaling plain, and 34^{o} North, 77^{o} 16' East at the confluence of the Markha Chu (river) and the Zangskar Chu.

The valley varies in altitude from 11,000 feet at Kaya to over 13,000 feet at Hankar, the highest village. The highest cultivation is at 14,000 feet at Tatchungtse and the highest summer settlements are at 15,600 feet on Nimaling plain. Access to the valley is not easy for it is separated from the Indus valley by rugged mountains to the north-east reaching an altitude of over 20,000 feet. This range may be crossed by the Gongmaru La, a 17,000 foot pass above Nimaling or by the Gunda La, (16,310 feet) above Skiu. The only other means of communication with central Ladakh is the Zangskar gorge, leading to Nimu at the confluence with the Indus and Zangskar rivers, but this is a very difficult route, impossible for pack animals except in the winter months when the surface of the river freezes. To the south and west, the country is uninhabited and extremely rugged and inhospitable. The Jhung Lam (middle road) to Zangskar is passable only in the autumn months when the colder weather reduces the levels of the glacier fed rivers, but before the intense cold of the winter sets in. This area is

rarely visited by the Markhapa (the term 'pa' indicates that people belong to the same group or place of origin), but some routes are regularly used by Changpa nomads trading in Zangskar and by Zangskaris on trading visits to Leh. The usual route crosses the Ruberang La (16,500 feet) and the Charcha La to the village of Zangla, crossing ranges of almost 20,000 feet.

Alternatively, there is a route via Zalung Kurpo La (17,040 ft), but this involves an arduous journey down the gorge of the Khurna Chu before crossing the Charcha La. Another route exists over the Shapodak La (18,530 ft), but very few people seem to know of this pass and it is probably disused. To the south-east of Markha, passes lead to the nomad country of Chang Tang and Rupshu.

These various regions - Zangskar, Ladakh and Chang Tang - comprise the known world of the Markhapa, but hardly anyone in the valley has been further than Ladakh and Chang Tang. Kargil, Kashmir, Lahul, Spiti and Tibet form the edge of the known world.

.3 Climate

The Markha valley endures a harsh climate on account of its geographical situation. There are considerable daily and seasonal extremes of temperature, and very marked differences at any time of year between sun and shade temperatures. There are considerable climatic variations at different altitudes but like the rest of Ladakh, winters are bitterly cold and prolonged with temperatures dropping to -30°C in the valleys, whilst the short summer months can be fiercely hot. Rainfall is scanty and the landscape is arid though the Kang Yisay range (21,000 ft) above Nimaling attracts moist weather so the pastures of Lang Tang Chan and Nimaling enjoy a moderate rainfall and are remarkably green and fertile. In general the Markha valley is less arid than the Indus valley, but receives much less precipitation than Zangskar where there are heavy snowfalls in winter. Ladakh is usually unaffected by the monsoon but the last few years have had cloudy days and significant rainfall in July and August.

2. SETTLEMENT AND LAND USE

.1 The people of the Markha valley and similar regions of the Himalaya, live in difficult conditions imposed by altitude and climate. The shortage of water due to sparse rainfall means that farmers rely on water from glacial sources to irrigate the crops. The limiting factors of climate and high altitude mean that all economic activities such as agriculture, animal husbandry, exchange have to fit into an annual cycle. Since the agricultural period is so short - (only six months) - all work has to be synchronised and fitted into this crucial period. The agro-pastoral work is also closely connected with religious rites, and the pattern of settlement imposed by the physical conditions.

2 Settlements

In Ladakh settlement follows the principal drainage lines, and the upper limits are determined mainly by climatic and physiographic conditions. These general factors impose severe limitations on the location of settlements, since much of Ladakh is utterly barren and mountainous. Specific factors are the availability of water and the extent of level, cultivable land. There is no particular pattern to which settlements invariably conform, since the topography of inhabitable land varies considerably, and settlements are located to take maximum advantage of the difficult environmental conditions so that land may be used in the most profitable manner. The following general observations may be made :

Settlements are always located near a suitable source of water such as natural springs and rivers, (often at the confluence of two valleys), and near level land or land that may be levelled by terracing.

Level land, suitable for cultivation is not used for habitation except when there is a surplus of level land which exceeds the agricultural requirements of the settlement.

Permanent settlements rarely exceed 13,000 ft, an altitude approaching the highest limits of cultivation which is reached at 14,000-15,000 ft.

The settlement patterns of the Markha valley are varied, as a result of different physiographic conditions in each village. In general, the upper villages are nucleated settlements, the lower villages are dispersed settlements, both categories resulting from the most suitable exploitation of the terrain. The upper villages are situated 1,000-2,000 ft higher where cultivable land is much more sparse. Hankar the highest village consists of a cluster of houses on a rugged spur beside a tributary stream of the Markha Chu at the foot of a spectacular fang of rock, 200 ft high that juts out of the end of the spur, creating a narrow defile through which the river passes. A ruined fort perches precariously on top of the rock tower. The valley sides are steep and almost totally arid and lifeless. The narrow floor of the valley is intensively cultivated with barley, the fields carefully terraced and meticulously irrigated so that the maximum possible area is productive. With all cultivable land in use, the spur is a fine location for the main part of the hamlet, several small houses set amongst threshing floors, Mani walls, Chortens and various shrines to local deities. Not far up the valley is the confluence of the Nimaling Chu and Lang Tang Chan, the entrance of the latter being the only other possible settlement site. It remains unsettled, because the rough meadowland there provides good grazing for the herds. Thus Hankar was built on barren land, its location being secondary to farming. Higher up the narrow valley of the Nimaling Chu, the entire valley floor is terraced and cultivated, and there are the few scattered huts called Tatchungtse, used temporarily during the year by the Hankarpa. At about 14,000 ft there is no level land at all, and cultivation ceases.

Below the Kar (fort) at Hankar, towards Doltok, the valley is relatively wide and fertile. Here there are two households belonging to Hankar, standing isolated from each other amidst the barley fields. The houses are somewhat larger and more spacious structures than the main nucleus of Hankar. There is also extensive grazing land here, level and very wide and fertile. When such land exists, it is often left as grazing land rather than for cultivation, since much of it tends to be waterlogged when the river is in spate, and also irrigation systems are more easily applied on terraced, sloping land. A large tributary valley is the location for Doltok, another small hamlet with scattered houses along the valley sides on the margin of cultivable land and the barren, precipitous hillsides above.

Some distance down the Markha valley lies Omlung, like Hankar built on a stony, barren spur, overlooking the fields which cram the valley floor. Again, this is the only possible site, if land use is to be maximised. There is very little suitable land here, and so the settlement is merely a hamlet of three households. The next settlement is Markha, the largest in the valley.* Importance would be a misleading term to associate with Markha for it is of no commercial or administrative significance. Each village in the valley is socially and economically self- sufficient to a large extent. Markha happens to be larger than the other settlements and is thus more important in a narrow, geographical sense. Life there is just the same as anywhere else in the valley. The main part of the village is a compact cluster, aligned along the foot of a conspicuous spur of conglomerate that projects across the floor of the valley. The crest of the spur is dominated by another, quite large, ruined Kar, whilst a monastery is situated higher up the spur, where it joins the side of the valley. The floor of the main valley, and a tributary valley, is extensively cultivated, and there is also meadowland and scrub woodland not far away. Of potential settlement sites, the spur is the best choice on account of its commanding position, and its proximity to the confluence of a tributary, a useful water source. Other houses are scattered up the tributary valley; and lower down the main valley there are several large houses with abundant land for grazing and cultivation. The valley is cultivated spasmodically for a considerable distance, to just beyond the temporary settlement called Chaluk a couple of hours walk from Markha. Descending the valley, woodland is increasingly common and cultivable land is in fact extensive enough to support a large population. The valley which at present has a total population of 267 (1971 census) could probably support twice that many if the country between Markha and Skiu was fully exploited. All the field systems scattered between Markha and Chaluk have different names which are too numerous to mention here. Beyond Chaluk, the valley is completely uninhabited as far as Skiu, a village of substantial households scattered on the edge of the valley floor in relatively luxurious agricultural and climatic conditions where wheat, vegetables, apples and apricots thrive. There is abundant scrub and woodland and sizeable trees, a rarity in Ladakh. There is no need to conserve every possible piece of land, for unlike the terrain at the head of the valley, Skiu-Kaya is a region which enjoys an abundant water supply, relatively temperate climate, with no shortage of good

* The 1971 census gave 267 as the total population of Skiu - Markha

land. In contrast to the harsh, dramatic landscape of the upper valley, where settlements cling incongruously to the rugged terrain. Skiu-Kaya is a pocket of green and warmth; of large trees and dense thickets, an appropriate spot for man to live despite the formidable surroundings. Here there is space for large houses and courtyards, meadows and vegetable gardens, and man is free to choose how to use his land. In Markha, and particularly in Hankar, man's freedom of choice is severely limited. In order to survive as a sedentary agro-pasturalist, he has to build his home on barren land above the valley floor, terrace and level the land for cultivation and exploit as much of the cultivable land as possible. Because of land shortage, he has to till the soil at a considerable distance from the main settlement, and construct small huts there, temporarily occupied during the agricultural cycle. Even then, much of the economy is based on animal husbandry, and other temporary settlements are occupied on the high pastures, for there is not enough grazing land in the valley. And yet in spite of considerable difficulties, man has adapted to the environmental conditions so successfully that his survival in this wild country is far from precarious. He makes full use of his surroundings by simple, yet often ingenious means and knows the importance of conservation rather than exploitation. An appropriate balance has been evolved and maintained between man and his resources during centuries of inhabitation of this remote valley. The mark he has made on the landscape is an agreeable one, which is no less dramatic and picturesque than the high mountains which surround him on all sides.

.3 Houses

As in the rest of Ladakh, the houses in Markha valley are Tibetan in style. The main family house invariable has a ground floor and an upper floor. The ground floor contains stables and store-rooms and sometimes serves as the winter quarters, being well protected from the cold owing to the absence of windows. Houses are ostensibly designed primarily to withstand the cold of the winter but in this respect, little progress has been made. The winter quarters have very small windows (if any) and are poorly ventilated, the inhabitants living in smoky, stuffy discomfort during the cold weather. In Markha, some of the winter rooms are upstairs at the back of the house, the cliff upon which the houses are constructed comprising the rear wall. The front upstairs room is used in summer (from April to October.)

The walls are generally of stone for the lower storey, and of sun-dried mud bricks for the upper one. The mud bricks are often whitewashed outside, and sometimes inside. The flat roofs consist of trunks of poplar trees laid across from wall to wall, which support a layer of slender willow branches. This is covered by a layer of straw and finally by hand packed earth. The walls slope in gracefully towards the top at about 85°. The houses are generally rectangular in ground plan, sometimes with an adjoining courtyard, and have ornamental details such as decorated roof edges and small balconies. The roofs are hung with coloured prayer flags.

Interior furnishing is sparse and consists primarily of stove or fireplace, long shelves with rows of copper and brass pots and utensils, tea bowls, tea pots, low wooden tables, small rugs and sheepskins on the earth floor, food sacks and religious items or even a small shrine. The houses are thus of spartan simplicity, functional yet pleasing to the eye.

.4 Temporary huts

There are a fair number of temporary settlements in the Markha valley itself, in Lang Tang Chan and on Nimaling plain. Those in the Markha valley are used for agricultural purposes, being occupied during busy periods in the summer and sometimes during winter grazing. In Lang Tang Chan, the lower huts are close to a few fields cultivated by the Hankarpa but the other ones, like those on Nimaling, are located beside grazing grounds. Nimaling is continuously occupied during the summer months, Lang Tang Chan only occasionally in the autumn and winter. The huts are extremely primitive, some are no more than stone hovels to provide shelter. The larger groups on Nimaling are equally primitive, but include large pens to herd the animals at night, away from predators such as wolves and snow leopards.

.5 Monasteries and forts

There are four monasteries in Markha, very small and only important for the local communities. They are part of Himis gompa and each is served by a monk from there. They are probably no earlier than the 17th century and there is no record of earlier religious establishments, although no doubt Buddhism has been practised in Markha as long as in other parts of Ladakh.

The forts in Hankar and Markha were possibly rest houses for the kings of Ladakh during visits to the far corners of their domain and are probably contemporary with the palace in Leh. Quite possibly there have been fortifications there for many hundreds of years, although it is unknown when Markha valley was first settled.

Markha is very much a backwater of mainstream events in Ladakh and is virtually unmentioned in historical texts. Scholarly investigations may shed some light on the age of the chortens and other religious monuments of the valley, and indicate the origin of and date of the earlier inhabitants.

.6 Wolf traps

There are six of these structures, of which there are three kinds : Shangdong : deep pits, dug into sloping ground, built of dry stone masonry, overhanging at the top. A live goat is used as bait and wolves when caught are stoned. Gal : a low stone structure with small concealed holes. The wolf enters the enclosure, and is trapped by rope loops set in the holes. Gordung : meat bait on the ground below a large boulder perched on a stake. When the meat is taken the boulder topples and crushes the wolf.

Usually several wolves and an occasional snow leopard, are caught each winter. One night in October 1977, seven goats and sheep were killed by wolves, so the precautions are not uncalled for.

3. PRODUCTION AND ECONOMY

.1 Agriculture

In Markha village, as in the rest of the Markha valley, the majority of the fields (jhing) are situated on the valley floor, the layout of the cultivable land depending directly on the nature of the terrain and the availability of water for irrigation. The sides of the valley are so precipitous and barren that cultivation is not feasible, but on the relatively level floor of the main valley and some of the main tributaries, with a continuous supply of water draining from the glaciers and snowfields of the high peaks, the land is suitable for cultivation. Where necessary, the fields are gently terraced and are separated from each other by low earth ridges and irrigation channels. The soils vary in quality but are generally sandy and slightly alkaline.

Irrigation.

The source of water is the Markha Chu, fed primarily by the glaciers of Kang Yisay, a group of mountains above Nimaling reaching a height of 21,000 ft, and, to a much lesser extent, by the snows of Stok Kangri and Matho Kangri, the 20,000 ft range dividing Markha from the Indus valley. The main torrents fluctuate considerably at different seasons. The Markha Chu never runs dry, and is never completely frozen in winter on account of hot springs in various parts of the valley. Irrigation involves the following tasks:

the construction of channels to conduct the water,
the levelling of fields by terracing,
the control of the flow of water from the main source to individual fields,
regular maintenance work.

The main irrigation channels (Mayur) are constructed of earth and stones, a couple of feet deep and two or three feet across. Larger canals six or seven feet in width are sometimes constructed to conduct large quantities of water from the main stream. These can be of considerable length, carefully contoured to negotiate rugged hillsides, as for example above the village of Martselang near Himis monastery. Small channels (Yura) conduct the water along the edge of each field, and the fields themselves have small ridges (Shangu) of earth a couple of inches high, criss-crossing the surface in grid patterns to permit the equal distribution of water across the surface of the field.

In a land such as Ladakh where water is scarce and yet of critical importance, constant maintenance work and meticulous control of water distribution is essential. Many villages use a system whereby a man is appointed to control the distribution, an easy task if water is abundant but very difficult when water is particularly scarce. There may be one or two men in each village responsible for this job. They are known as churpun, and some sort of rota ensures that different households will undertake the task in turn. In fact, this is not practised in the Markha valley, for the amount of water available is ample for the small population. Since the fields are scattered along the valley floor, water is taken from the river

at different points, whereas in the larger villages on alluvial fans above the Indus valley, the water from one torrent above the village is distributed in ever declining quantities across the fan and necessitates careful rationing.

It is the responsibility of each household to look after its irrigation channels and sluices and during the summer months this requires a fair amount of work using long-handled shovels.

Cultivation

Barley and wheat are the only cereals cultivated in the Markha valley and Skiu and Kaya are the only villages at a low enough altitude to permit the cultivation of wheat. Barley is hardy enough to grow at the highest altitudes. There are several kinds of barley (Hordeum vulgare) grown in Markha valley. The huskless barley is known locally as yangmar, nas and so-shirok, although nas is also the name for barley grain in general and nas and yangmar are names referring to the same crop. Yangmar is the best quality barley and grows everywhere. The husked barley is known as soa but is grown in much smaller quantities than huskless barley. There are numerous local varieties of barley in Ladakh and the local terminology can be confusing, but in the Markha valley, for general purposes one would simply distinguish between nas/yangmar, so-shirokh, and soa.

The yield varies according to the altitude and the quality of the soil but is roughly from fivefold to eightfold. In Markha, four or five kilograms of barley are sown on an area of one kanal (8 kanal equals 1 acre) and yield twenty-five kilograms or more. Therefore one acre yields something in the order of 200 kgs of grain. Fields vary considerably in size. Wheat (Triticum aestivum) is known locally as tro, but again there are numerous local names for different qualities and varities. The yield is about 20% higher than for barley. The crops are sown in May - early June (the third or fourth month of the Tibetan calendar) and are harvested in September (the eighth Tibetan month).

Cultivation of cereal crops in Markha valley.

Village name	Altitude (feet)	Crops	Ploughing/ sowing	Harvesting	Growing period
Tatchungtse (part of Hankar)	14,000	Y. S.	mid May	mid.Sept.	4 months
Hankar	13,500	Y. S.	mid May	mid Sept.	4 months
Doltok	13,400	Y. S.	mid May	mid Sept.	4 months
Omlung	12,950	Y. S.	late May	mid Sept.	3½ months
Markha	12,500	Y. S.	May/June	mid/late Sept.	3½ months
Chaluk (part of Markha)	12,000	Y. S.	May/June	mid/late Sept.	3½ months
Skiu-Kaya	11,100	Y.S.SH.T.	May/June	September	3 months barley 4 months wheat

Barley Y = Yangmar, S = Soa, SH = Shirokh
Wheat T = Tro

The agricultural cycle.

By March, the winter snow has melted, and despite the cold nights, the sun brings warm days, and agricultural work can begin again. The irrigation channels are inspected and repaired and an auspicious date for commencement of work is declared by the monks so that the land will provide a good harvest. Almost everyone is involved in working to prepare the soil for cultivation, clearing out and preparing the irrigation channels for use and consolidating the sides of the main channels. Thereafter, maintenance is generally but by no means exclusively the responsibility of the women. This work occupies the last half of the second Tibetan month. During the third month, manure is carried to the fields either by donkeys or in large square baskets carried on the womens' backs, deposited in piles and then spread by shovels over the surface of the fields. The manure consists of earth mixed with the dung of cows, horses, goats and sheep, dogs, yaks and dzo (cross-breeds) and man. Human dung accumulates in the pit latrines in each house and is sprinkled with earth from time to time to provide a suitable mixture which is less distasteful to handle. Animal dung accumulates in the pens on the high pastures and in the downstairs rooms of the houses where they are penned at night after returning from the summer pastures. Due to the relative abundance of wood in the Markha valley, dried animal dung is only used as a supplementary fuel, unlike the more treeless regions of Ladakh where the inhabitants rely on dried dung as a major source of fuel. About 95% of the dung in Markha is therefore used as manure, and no artificial fertiliser is used at all, unlike in the more accessible villages of the Indus valley where its use is being encouraged by the authorities in Leh. Ploughing and sowing takes place in late May to June, the third to fourth Tibetan months.

In Markha village the twelve households (jhingkhang) are divided into twelve khangchen (main family property) and then khangu (secondary family property), the latter generally being occupied by parents of a family when the son(s) marry; (see below 4.1 p.25) There are thus twenty-two ploughshares in Markha, one for each khangchen and one for each khangu. Each khangchen usually owns two dzo (hybrid of yak and cow) and the khangu owns only one dzo. Two khangu join together to plough the fields, using the same plough and ploughshare as the khangchen, but often ploughing lighter soils, whereas the khangchen tend to till the land with heavier soils since there are younger and more able-bodied men in the khangchen. One particular khangu owns two dzo, for the husband Tsewang Rinchen (from Leh) has a government job outside the valley and can afford two dzo. Ploughing is exclusively man's work, and involves a team of five or six men and boys to plough the land, sow the seed, clear the ground of stones, and to level the surface of the soil. The task of ploughing is taken in turns, a fit man being able to plough for two or three hours at a time. Very heavy ground is ploughed by two ploughs, one behind the other. In Markha the seed is sown by hand in the furrow, not broadcast. In the corners of the field untouched by the plough, the furrows are dug by hand. The period of ploughing lasts for two or three days for light soils and a small holding, but may involve at least a fortnight of hard work for larger holdings

and heavy soils. Work lasts from dawn till dusk, from two to five hours work on an average field or eight hours for large ones. Yaks are never used for ploughing since they are too temperamental, only dzo or dzomo (female) are used, and may be guided by a willow wand and the voice of the ploughman. Sometimes one man leads the dzo and a second man controls the plough. The manure is ploughed into the fields each year and crop rotation is not practised, nor is the arable land allowed to lie fallow for a year, except in Hankar, which is at higher altitude. The plough is very basic, of wooden construction with a metal tip - indeed all agricultural techniques in Markha, and in most of Ladakh, are primitive, but successful in providing for the needs of the population.

Weeding is exclusively the work of women and children and commences several weeks after the sowing of the crop. The grass and weeds which are gathered are used as fodder for the animals. The young crop is watered regularly, about one day in four or five days.

By September the brilliant green barley fields of summer have ripened to pale gold and by the beginning of the eighth Tibetan month, around 10 September, the task of harvesting commences. The period is one of intense activity, for a considerable amount of work is required before the grain can finally be stored away for the winter. The crop is cut with sickles (zora) and left on the fields in sheaves before being stacked in a corner of the field and transported to the threshing floor. In other parts of Ladakh the crop may be pulled up by the roots, but in Markha, as in most villages, the crop is cut close to the ground and the stubble is grazed by the animals when they descend from the summer pastures. The crop is carried in deep basket structures made from thin willow branches and lashed together with bark and carried on the back. Cutting the crop is the work of both men and women and is accompanied by the singing of rhythmical songs and chants, as the line of harvesters, squatting on their haunches, methodically make their way across the field. In some parts of Ladakh and Zangskar, but not Skiu-Markha, the fields are re-ploughed after the harvest.

Threshing is done on patches of hard packed earth usually delineated by a low circle of stones, and positioned conveniently near the houses. In Markha, the main nucleus of houses have the threshing floors on top of the spur above, just below the monastery. The other houses scattered about the valley use threshing floors nearer each house. The threshing may be done by dzo, cattle, horses or donkeys or combinations of these. Four or five animals are used, the centre one being tied to a centre post, or with the head tied in to the tail at an angle to induce the beast to walk in a circle. A man or woman then drives the animals round and round trampling the crop, and children dash in to pick up the dung that falls from time to time. Not all the crop is threshed at once - some is threshed, then winnowed and sifted. In Markha, the crop is threshed in the mornings and evenings before and after the animals have gone to graze, for by October, only the goats and sheep and yak remain on the high pastures. The threshing, like most agricultural activities is accompanied by traditional singing and chanting.

The next job is winnowing which is done by two people and involves tossing the threshed crop in the air with wooden forks, the grain being separated by the wind from the chaff and straw. This work can be seen at any time of the day through October and is accompanied by whistling a tune in time with the work. Occasionally, a break is taken for butter tea or chang. The sight of dozens of people doing the various harvest jobs in different parts of the village, the continuous sounds of singing and whistling, the first snow of winter scattered on the high peaks and the deep blue sky characteristic of Central Asia make a most charming and picturesque scene, and despite the hard work, an atmosphere of good humour and cheerfulness always prevails.

The final stage of preparing the grain is sifting and washing. The barley is sifted in a shallow box with wooden sides and a bottom made from flattened tins riveted together and holes punched through to make a primitive but effective sieve. The sieve is shaken backwards and forwards rhythmically by two people, then the grain, now almost free from straw and grit is loaded into sacks (woven from yak hair) and later washed in the stream and dried in the sun. The barley is now ready for preparation either as chang (beer), or after roasting and grinding in water mills (rantak) as tsampa, the main staple. The grain is usually stored in the houses and then roasted and ground as necessary. In Markha the rantak can operate throughout the winter because of the springs which flow even in the depths of winter.

Fodder production.

Fodder is not actually cultivated, but the weeds gathered from the barley fields in summer are dried and stored to feed livestock during the winter. The main source of fodder is gathered in early September, the end of the seventh Tibetan month before the commencement of the harvest. Each village usually has an area of meadow land above the cultivated land, and the animals are prevented from grazing this, so that by the end of the summer, there is a substantial growth of various grasses which are then cut, dried and stored on the roofs of the houses along with the straw from the harvested barley. In Markha, these areas are quite extensive and are usually cordoned off with dense thorn hedges to keep animals out. The job of cutting the meadows lasts about ten to fourteen days, including two days for the cut grass to dry. When the herds return from the summer pastures they may also graze these meadows after the cutting. All these techniques and practises demonstrate how the Ladakhis maximise the use of their scanty resources, minimise waste and by developing a fine balance in arduous conditions, succeed in wresting a living from an otherwise inhospitable land.

Religion and the agricultural calendar.

Without detailing religious functions at this point, it is worth summarising the role of religion in farming activities including animal husbandry, the three main activities being prediction, sanction and propitiation. Cultivated land is protected by the

long stone prayer walls (mendang) and the water courses and irrigation channels have to be protected by offering to the divinities known as lu. The monks also fix the dates of certain agricultural tasks and the various stages of the agricultural cycle. Certain days of the week and dates of the month are good days or bad days.
No visitor to these Buddhist lands could fail to notice the evidence of religion on the landscape, the mendang, chorten, lhato, the monasteries and other structures of religious significance.
These are not erected without purpose, for Buddhism is not a religion that is superficial to everyday life: it permeates nearly every activity of the population.

.2 Animal Husbandry

The herds and grazing.

The inhabitants of Markha valley own yaks, cattle, sheep, goats, donkeys and horses. In Markha village, there are 75 yaks, 20 dzo, 1,000 sheep and goats, 60 donkeys, 21 horses, and 30 cows. Each household usually has at least one dog. The animals are valued as follows : yak - Rs. 2,000; dzo - Rs. 2,050; sheep - Rs. 350; goat - Rs. 300; donkey - Rs. 600; horse - Rs. 2,000; cow - Rs. 1,000.
From Spring until Autumn, particularly the four months from the beginning of June until the end of September, the herds are grazed at altitudes from 14,000 to 17,000 feet. During these months there is a shifting population from the villages who occupy small huts (pulu) made from dry stones and mud, with flat roofs of hard packed earth on willow branches laid across stout beams of poplar. There are eleven pulu belonging to the Markhapa and Nimaling. One group of six pulu is situated immediately below Gongmaru La, about 100 yards above the head-waters of Nimaling Chu (which later becomes the Markha Chu), at about 15,600 ft. This group is called Gunles, and on the other side of the river, slightly downstream is the second group of five pulu belonging to Markhapa, called Zabuk.
There are two further pulu at Gunles which belong to one family from Hankar (Lehlakpa) and one from Doltok (Changrachenpa).

The Hankarpa pulu (and in this case the Hankarpa include the villages of Doltok and Omlung) are situated on the flanks of Kang Yisay at about 15,500 feet, not far above a small lake on the broad spur immediately west of the deep ravine carved by the Nimaling Chu as it descends towards Tatchungtse from the plain of Nimaling. There are two groups, called Karutok (with six pulu) and Letselungpa (with four pulu). The Hankarpa, who rely on animal husbandry to a greater extent than the people of Markha (who live 1,000 feet lower on more productive land), occupy their pulu as early as March, whilst the Markhapa do not move to Nimaling until April. In the Lang Tang Chan valley, which joins the Nimaling Chu above Hankar to form the Markha Chu, the Hankarpa graze their herds in winter.
In October, the Markhapa graze their animals in Lang Tang Chan and stay in pulu owned by the Hankarpa, then all the animals are brought to Markha for the New Year (losar) celebrations which take place sometime in December (the Ladakhi New Year is not celebrated at the same time as the Tibetan New Year). Both before and after Losar,

the herds of the Markhapa are grazed at Chaluk, two or three hours walk below Markha on the way to Skiu. There is good grazing in Phorcheh lungpa (lungpa is a nullah or deep tributary valley) above Chaluk, on the lower flanks of Stok Kangri, and if there is heavy snow in Lang Tang Chan, the Hankarpa also graze their flocks here. When the Markhapa are in Lang Tang Chan, the Hankarpa graze the herds at Tatchungtse and Doltok lungpa. This tradition of co-operation ensures that all the available grazing is used fairly, according to the needs of the various villages. The people of Skiu and Kaya however, may under no circumstances graze these pastures and any attempt to do so would be strongly resisted. Their grazing lands are in the lower reaches of the Markha valley and on the pastures around the hamlet of Shingo, on the way to the Gunda La. Similarly, none of the Hankarpa or Markhapa may infringe the traditional grazing rights of the Skiu-Kayapa.

The yak.

The yak, Bos grunniens, is a highly valued animal in Ladakh. The term yak only applies to the male, the female being known as dimo (Tibetan 'bri or 'brimo), and it is quite incorrect to refer to a 'female yak'. The yak are indispensable to the Markhapa, for they are hardy enough to live at high altitudes, they are useful beasts of burden carrying 150 lbs or more, they provide milk and meat hides, hair and wool for weaving, and dung for fuel. A yak can live for about twenty years. Mating generally takes place on the summer pastures in the sixth month (July-August), and calving in the following third month (April-May). Some of the yaks may be castrated at about three years of age. Yaks usually have the nose pierced and a ring of willow is inserted attached to a length of rope for use when the yaks are carrying loads. They cannot acclimatise well below about 10,000 feet. The dimo has her first calf at about three or four years of age and may have others every two years although this is by no means regular. Up to seven years of age, the age can be determined by examining the teeth, and later by the grooves on the horns.

The basic colours of the coat are black, white or brown, or various combinations. Black is the main colour of the Markhapa yaks, and there are different names for different colour patterns. The hair or wool is cut in the sixth month.

In Ladakh, the yak is crossed with the type of cattle known in Europe as Bos taurus. These cattle are black in colour and have much shorter hair than the yak. The following cross-breeds are produced :

Bos grunniens (male) x Bos taurus (female), to give a male used as a beast of burden, or a female with mediocre milk yield ;

Bos taurus (male) x Bos grunniens (female), to give a hardy male used as a pack animal or a female with excellent milk.

The latter cross breed (male : dzo; female : dzomo) is the most useful and productive. The milk and dairy products contain a higher percentage of fat, and the male hybrid is docile by nature and indispensible for agricultural work, and for use as a baggage animal. The dzo in Markha are bred in Zangskar. The Markhapa only breed yak. Successive generations of cross breeds gradually assume an external appearance closer to cattle than to yak. The main characteristics of the two different hybrids are as follows :

Bos grunniens (m) x Bos taurus (f).	Bos taurus (m) x Bos grunniens (f)
Large stature, large horns, less hair than yak.	Small stature, small horns, less hair than yak.
Male : sterile, very hardy pack animal	Male : sterile, also used as pack animal
Female : poor milk	Female : excellent milk, richer and more productive than the dimo.

The practise of bleeding the yaks is unknown in Markha but is carried out twice a year in parts of the Nepal Himalaya.

Bos taurus.

Every household in Markha owns cattle which are more or less identical to the European species. The cows calve every couple of years, and the young bullocks are usually sold in Leh at two years of age. In the lactation period, the cows yield up to three litres of milk per day, a much richer yield than that of the dimo. They are grazed with the other herds on the summer pastures but are brought to lower altitudes in the autumn, somewhat earlier than the more hardy yak and dzo.

Other stock.

The herds of sheep are kept mainly for wool production rather than their mediocre dairy yield. The wool is a long, thick variety. Mating takes place in the autumn, and lambing in the first month (February). The lambs are weaned in June and lactation is finished by October. The milk is made into butter, each ewe producing 5 kg. annually on average. The sheep are sheared in the sixth and seventh months (July - September).

The sheep and goats of this area are derived from the type found on the Tibetan plateau. The reproductive cycle and butter production from goats is very similar to the sheep.

The horses in Markha are bred in Zangskar and are either traded, or purchased for between Rs. 1,300 and Rs. 2,000. They may be used for riding, but usually for load carrying. For riding, magnificent rugs are placed under the saddles, and it is a fine sight to see a well-to-do Ladakhi in full riding outfit cantering across the pastures accompanied by the sonorous notes of numerous brass bells hung round the horse's neck.

.3 Exchange

The inhabitants of the Markha valley, whilst largely self-sufficient, are lacking in certain commodities and have a surplus in others. Exchange with neighbouring communities appears to be a matter of convenience rather than of critical importance. The Markhapa produce enough for the needs of the village, and unlike many other Himalayan communities, do not rely on trade in order to survive. Exchange does not therefore take place on the scale and complexity of that of the Nepalese border lands where the exchange network is of great importance for the well-being of numerous communities between the Tibetan plateau and the central valleys of Nepal, leading quite different yet interdependent lifestyles.

The exchange network in Markha valley is confined to a relatively small area, for the district is some distance from the now disused Central Asia trade routes. The few goods that filter through from the outside world pass through Leh, but most trade in the valley is internal and does not extend beyond the neighbouring communities.

The most important single exchange link for the upper villages (Markha and Hankar) is with the Changpa nomads of Karnak. These villages produce about 2,000 kg of wool per year (including 200 kg of pashmina), but another 400 kg comes from the Karnak herds beyond the Zalung Kurpo La (17,040 ft). The 400 kg of wool supplied by the Changpa comprises only 3% of the total annual production at Karnak. In exchange, the Changpa receive some 2,000 kg of barley from Hankar/Markha when the harvest is good. In a bad year, the Markhapa have to rely more on their own production of wool since they would have no surplus grain for exchange. A serious crop failure would mean slaughtering some of the animals for meat and so that the winter fodder would be sufficient for the remainder. Some livestock may be sold in Leh for cash purchases of essential foodstuffs, therefore a series of bad harvests has severe economic repercussions and inflicts considerable hardship. Fortunately, the famines that occur in the more densely populated areas of Asia are very rare in Ladakh and although a bad harvest could mean a hungry winter, it would not be catastrophic enough to cause mass starvation and migration. Despite the difficult physiographic conditions, the dependence of agriculture on glacial fed sources of irrigation provides immunity from lack of rainfall, the most serious inhibiting factor to cultivation. Thus exchange mechanisms are a precise function of the prevailing climatic conditions and agricultural activities of the inhabitants and any fluctuation is derived from these factors rather than from external markets and competitors or other commercial considerations.
The Karnakpa also supply 200 kg of salt to Hankar and Markha.
The normal rate of exchange is as follows :

1 kg salt for 1 kg barley
1 kg wool for 10-11 kg barley.

Only on very rare occasions do the Markhapa travel to Zangskar. Every year, Zangskaris come to Ladakh on the Jhung Lam (middle road) over Charcha La and Ruberang La and thus pass through Markha valley where they sell dzo and horses. The Markhapa sell or exchange yaks

with the Zangskaris and also with Changpas. Some yaks are taken for sale in Leh, and about 30 per year in all from Hankar/Markha are sold. Usually they buy about half a dozen dzo.

Apart from Zangskar and Karnak, the only other outlet for the Markha valley is Leh. In addition to yaks, some 200 sheep and goats from Hankar/Markha are sold in Leh per year, though sometimes people come from Leh to Markha to buy them. There is also a demand for wood for fuel in Leh and the Indus valley. The Markhapa cross the pass to the densely wooded Khurna Chu (Chang Chu) in winter to cut wood which is then sold in Leh. In the autumn and winter, the old caravan serai in Leh is full of Ladakhis and Changpa and baggage animals bringing wood, charcoal, wool and grain for sale or exchange. Some of the Markhapa make the journey to Leh two or three times in the winter with ten dzo loads of wood. Wood is also traded with the Changpa who have to withstand very arduous conditions in their highland camps.

There was never a direct trade link between Markha and Tibet. The furthest that the Markhapa ventured on trading journeys was Lahul, in order to buy rice and tea at Kyelang. This three week journey was undertaken in the summer time, but with regular supplies now available in Leh, the trip to Lahul has not been made for about six years. Leh, once the entrepot for Central Asian trade, is now the entrepot for Ladakhi products, and for foodstuffs and manufactured goods from Kashmir or the Indian plains.

Wheat cannot be grown in the upper Markha valley, and there is an important exchange of wheat and barley between the villages of Skiu and Markha. The Markhapa obtain 600 kg of wheat per year from Skiu (Skiu grows 80% wheat, 20% barley), and a further 2000 kg is purchased in Leh. The exchange rate is 1 kg wheat for 1 kg barley. The Markhapa grow turnips and potatoes, and obtain onions, apricots and apples from Skiu-Kaya and Leh. There is also an important trade in charcoal, some 200 bags (10 kg each bag) being produced each year, the bulk of it in Skiu-Kaya. Wood and charcoal fuel is a scarce commodity in the arid Indus valley.

All commercial trade in Ladakh is focused on Leh, but every community, as in the Markha valley is part of traditional exchange mechanisms in which the needs of one community are met by the surplus of another, and duly reciprocated. The cordial atmosphere of exchange derives from years of mutual reliance and co-operation. There is almost a total absence of worldly ambition, and they seem to be satisfied with a life that is apparently harsh and unrewarding. As in so many facets of Ladakhi life, exchange mechanisms evolved over generations provide a means not of improving the lot of the individual, but of ensuring the mutual benefit of all, in a land where conviviality and goodwill count far more than material status. This attitude of amiability grows naturally in a vast environment of uninhabited mountains and sparsely populated valleys, where traditional self-sufficiency enables man to cope with comparative isolation.

.4 Diet

Barley.

Barley is the staple crop of Markha and indeed of Ladakh. The grain is roasted and ground to make a flour called tsampa in Tibetan (nganpeh or peh in Ladakhi). The native beer, chang, is also derived from barley.

The roasted flour can be prepared in different ways to produce various types and qualities of peh :-

Nganpeh	:	the grain is washed and dried for two days, to get rid of grit and dust. It is then soaked in warm water and dried again before being roasted on a flat dish. The roasted grain is then ready for grinding.
Skangmos	:	the grain is roasted without first being soaked.
Chuskus	:	the grain is soaked, sun dried and roasted; very similar to nganpeh.
Chubtsos	:	boiled, dried and roasted to produce a high quality flour for use at festivals and ceremonies.
Thuktal	:	flour of medium quality, used in the preparation of thukpa (soup).
Bangpeh	:	after chang has been prepared, the residue is dried and mixed with yos (roasted grain). It is of inferior quality.
Lamlong	:	only slightly roasted. Used for thukpa, but not for colac. Colac is high quality flour mixed with any liquid substance such as tea, yogurt, soup etc, to form a thick dough.
Yurchas	:	a flour of dried, ground peas and barley, used in the preparation of paba, a sort of steam pudding made by adding yurchas (or nganpeh on its own) to a quantity of boiling water.
Shanpeh	:	ground, dried peas, mixed with nganpeh and butter to make colac.

The barley grain, nas, is used as follows :

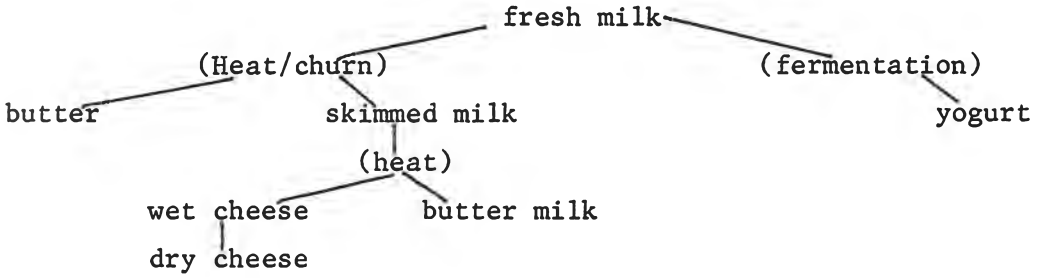
50% - tsampa; 20% - seeds; 15% - chang; 10% - miscellaneous; 5% - sold.

Chang is the other major derivative from barley. The grain is washed, soaked and then heated to a temperature of 60°C for three hours (crude starch is transformed and hydrolysis suddenly begins). Yeast is added, and fermentation then takes at least three days in a wooden tub placed in a warm room near the fire, until a sort of malt is formed which is then mixed with water. Chang is drunk frequently and in considerable quanitites, especially during the harvest when there is a glut of barley, and at ceremonies or festivities of any kind. It has an important role in the social life of the village, and some of the most elaborate domestic utensils are the chang vessels, chabskyem.

But the real intoxicant enjoyed by Ladakhis is the arak, (distilled chang). The fermented barley is placed in a large pot over a fire. The vapour condenses on the surface of a container of ice or cold water hung up above, and the condensed arak then drips onto a tray under the condensing vessel. As spirits go, arak is not particularly potent, but during the winter time, there is a considerable demand for alcohol and a happy time is had by all. It is interesting that alcoholism is almost unknown, even though chang is drunk with gusto from early childhood to old age.

Milk.

Milk is produced by the sheep, goats, cows, dimo and dzomo. The herds are generally milked twice a day, at dawn and dusk, and spend the day on the pastures. The milk from the various kinds of animals is often mixed together. Despite the abundance of milk, the Markhapa rarely drink it - whilst staying on Nimaling plain, they only sold us milk occasionally, though curd was available on most days. All the milk is used to make other dairy products, as follows :



Butter - the milk is heated for about four hours and then churned in a tub or a skin bag. The butter forms in small lumps which are scooped out and placed in a dish of water to prevent the butter going rancid due to exposure to the air. Finally the butter for storage is sewn up in pieces of goatskin.

Cheese -creamy milk is heated until it coagulates into cheese, with a residue of butter milk which provides a refreshing drink. The fresh cheese is dried and cut into small strips. It eventually has the hard, brittle consistency of uncooked macaroni. This is the usual form in Markha, but in other parts of the Himalaya it may be powdered.

Yogurt - milk is fermented overnight at a temperature of about 25° C by adding a small amount of yogurt or even fermenting barley to start off the process. Yogurt is eaten either on its own, or more commonly with tsampa.

Meat.

As a general rule, meat is not regularly eaten by the Buddhist communities of the Tibetan borderlands. In Tibet proper, it was legitimate to eat meat from animals that were either killed in an accident or by butchers-men of low status who lived outside the village and whose task was to provide meat for the community. Killing and

and eating livestock is also practised by nomads as a means of survival. Even though they know it is wrong to take any form of life, they believe they are destined to live by killing animals because of bad deeds in previous lives. But they accept their lot and are happy to have been born in knowledge of the Way. In Ladakh, the taboo against killing animals is somewhat less. The Moslem population in Leh and Kargil have no objection to killing animals and meat is on sale several days a week in the Leh bazaar. Amongst the Changpa meat forms an important part of their diet and is eaten in considerable quantities.

In Markha, meat is eaten occasionally as a treat or for special occasions but there appears to be no stigma attached whatever to those who slaughter animals. Certain men in the village, the experienced herdsmen, customarily carry out the slaughter, but their status remains the same. Indeed there are no social stratifications or low caste people in the entire Markha valley, unlike Ladakh as a whole (see p. 30). In general, animals are slaughtered at the end of the summer, which means less mouths to feed with the winter fodder. The meat is preserved by drying it in strips, and sausages and black pudding are made from the offal, somewhat unpalatable to western taste but eaten with relish at religious fetes and New Year celebrations.

Tea.

The staple drink in Ladakh is tea prepared from leaves slightly different to the tea usually drunk in India. At one time, brick tea from China was used. The concoction is boiled for a few minutes and salt and butter are added. It is then churned in a long wooden cylinder with a plunger, called a gur-gur. Hence the name gur-gur cha. When travelling, or preparing tea when working in the fields, the salt tea is poured into the cup and a lump of butter is simply dropped in and slowly melts and floats on the surface. Normally tsampa is used to clean out the cup. Apart from being a nourishing drink, particularly when taken with tsampa, tea drinking is part of a code of etiquette to honour guests and is the first stage in extending hospitality, and on occasion attains ceremonial status, especially in rich households in Leh. In Markha, the folk are more down-to-earth and whilst manners are generally observed even by the uncouth, tea is mostly drunk as a beverage for the hungry and thirsty rather than in a ceremonial context. Everyone carries his own cup in the folds of his gonche (coat). Meals are invariably prepared and served by women and the mistress of the house determines the ration allowed. The Markhapa eat well and no one goes hungry.

.5 Crafts

Skins.

Animal skins provide an essential material for the Markhapa and the preparation of these skins demands a certain amount of work before they are serviceable as leather. Goatskin and sheepskin is treated in the same way and is essentially man's work, taking place

during the seventh and eighth months (September) when slaughtering usually takes place. The skin is dried in the open air for a few days, woolly or hairy side up. It is then moistened slightly and dried again for several days then buried under a mixture of a thin layer of animal dung and damp earth and thoroughly trampled, then hung up. This tanning process preserves the skin from decomposition. The skin is now rather stiff and is rubbed with a stone to scrape off any flesh remaining and to stretch the fibres and make it more supple. The skin may be treated a second time and the final stage is to rub it vigorously by hand, a monotonous and strenuous task. The skin can then be used for winter clothing or for sleeping on or any other appropriate need.

To prepare goat or sheepskin minus the wool (this is rarely done), the damp skin is rolled up and left overnight and the loosened hair and wool is then scraped off quite easily. Yak skins are dried and used without needing this tanning process.

Wool, goat and yak hair.

Wool comes in several different qualities and is spun by hand by both men and women. This time consuming task is performed at any time of day or night whenever the spinner has his hands free and feels so inclined. The weaving is exclusively the work of women. The goat hair comes in two sorts : the long, rather coarse hair, and the shorter, woolly hair. The latter is used in weaving. There are nine weavers in Markha.

Raw material	Technique	Product
sheep (wool)	spinning, weaving	cloth (nimbu)
goat (long hair)	spinning, weaving	rope, sacks
(short hair)	spinning, weaving	cloth
yak (long hair)	spun, plaited	rope, slings, tent guys.
yak (short hair)	made into felt	saddle rugs
yak (short hair)	spun, woven	tent cloth, sacks.

Like the goat, the yak has both long hair and short, softer hair. The long, coarse hair is cut from the flanks and is about six to eight inches in length. The soft hair is pulled out.

Wool is carded by hand, by women and children. The wool is not washed, and the different colours are separated. It is then spun on a very simple spindle, carved in wood. The raw wool is held in one hand and with the other hand the spindle is twisted to spin the wool into a thread, several feet at a time. The thread is then spun onto the spindle, and another length of thread is spun from the raw wool, and so on. This apparently straightforward process requires considerable dexterity and skill.

4. SOCIAL ORGANISATION

Having seen how the family and the individual operate in the communal system of agricultural techniques, animal husbandry and exchange, we have to see how the individual relates to his family and how each family relates to the other families of the community and the world at large.

.1 The family

As already mentioned, the population is divided into households/landholdings (jhingkhang) which consist of khangchen (main family property) and khangu (secondary family property). The jhingkhang is owned by the tongchen (or tongpa) which simply means a family with a landholding, who own a house and farm (i.e. jhingkhang). The term tongchen applies to large families, tongpa to average ones. A landless family is not a tongchen/tongpa.

Khangchen : traditionally the land always remained intact and was inherited by the eldest son. Polyandrous marriages prevented the division of the landholding, if there were many sons, some would go to the monastery, and the daughters would marry. The parents have no rights to give land to a younger son, and without property, the younger son cannot therefore marry except in exceptional circumstances. He can work for other people as a tenant. This traditional pattern is rare now due to the rapid decline in polyandry and various land reforms.

Khangu : traditionally, when the eldest son married, he would inherit the family property and the parents moved into a smaller property known as the khangu. The khangchen/khangu system is still practised in Markha valley. Often, when people move into the khangu, it is purely a domestic, internal affair. If a family gets on very well, then they may all live together in the khangchen. The khangu has a social function more than an economic function, even in the traditional system of fraternal polyandry where several brothers shared one wife. Therefore the khangu serves as an ideal outlet for domestic and personality conflicts in the khangchen. Today land is not of such overriding importance in Ladakh, because it is now possible to make a living without owning land. Today, landholdings may be divided and younger sons may take a smaller landholding. Because of its geographical isolation, Markha is largely unchanged. Since polyandry is in decline, the pattern of inheritance will inevitably change, even though polyandry probably ran at only 20% in the past. Polyandry only performed a real function to prevent land division in a family of many sons. If there were only one or two sons, land was inherited intact, for the second son could join the monastery.

A roll of the families in Markha valley :

Markha

The village of Markha comprises twelve tongpa, in which there are twelve khangchen, ten khangu, a total of twenty-two khangpa (houses).

Lungpapa	khangchen	Merlingpa	khangu	
Parnangpa	"	Kolung-ghangpa	"	
Merlingpa	"	Nangkukpa	"	
Zurkhangpa	"	Kakerpa	"	
Kolung-ghangpa	"	Tongitgongmapa	"	
Nangkukpa	"	Tongotyogmapa	"	
Yokarpa	"	Telnespa	"	
Kakerpa	"	Abeelandulkelo	"	(part of Thiksepa, Doltok village)
Tetpa	"			
Tongitgongmapa	"	Abeeyudun	"	(part of Tongityogmapa
Tongityogmapa	"	Labrangnyingpa	"	(part of Lungpapa)
Telnespa	"			

Omlung three khangchen, no khangu.

Omlungyogmapa	khangchen	(no khangu)
Omlungkimtsespa	"	" "
Omlung-gongmapa	"	" "

Doltok five khangchen, four khangu (two of which are in Markha)

Changrachenpa	khangchen	(and khangu)
Thiksepa	"	(Abeelandulkelo khangu, Markha village)
Shahtangpa	"	(and khangu)
Tongyurpa	"	(no khangu)
Katmarpa	"	(no khangu)
		(no chehpa khangu, part of Lungpapa, Markha village)

Hankar

Lehlakpa	khangchen	(no khangu)
Yokpa	"	(and khangu)
Katokpa	"	(no khangu)
Parkarpa	"	(and khangu)
Tangmarpa	"	(and khangu)
Tamalungpa	"	(and khangu)

Paspun

Apart from his connections and obligations to the family, every Ladakhi is a member of a paspun (literally 'man brethren') which is a bond formed between otherwise unconnected families. The main function of the paspun is to carry out the appropriate tasks at a funeral. Only a paspun member may touch the corpse after death and prepare the body for cremation. No one except members of the

paspun may eat food in the house of the deceased, starting from the time when the ashes are brought to the house after the cremation. Some families have a restriction only at the time of death, or a birth, but not at both. Others follow the rule on both occasions. The restriction is not two way - the members of a family with a death or birth can eat from any house, paspun or not. For the seven to ten day period of the death ceremony, the paspun handle the body and build a kiln. The ashes are made into small chorten (tsutsan) which are placed in shrines, or they may be simply scattered in the river. The paspun can change, and a family may leave or join a different paspun if necessary, but this is rare. A spouse usually joins the paspun of a wife or husband if the marriage means moving to another village. Members of a paspun also have the same family deity (pho-lha). The following khangchen and khangu comprise the various paspun of Markha, Omlung, Doltok and Hankar, (M, O, D, H), who are thus interconnected by paspun.

1. Abeeyudun khangu (M)
   Labrangnyingpa khangu (M) (Lungpapa)
   Tongityogmapa khangchen and khangu (M)
   Telnespa khangchen and khangu (M) — four khangchen, five khangu
   Lungpapa khangchen (M) — Pho-lha : Nyongchen
   Tongyurpa khangchen (D) — (deity) Tanglha
   Nochehpa khangu (D) (Lungpapa)

2. Tongitgongmapa khangchen and khangu (M) — four khanchen, two khangu
   Tetpa khangchen (M) — Pho-lha : Kurgyal
   Tamalungpa khangchen and khangu (H)
   Omlung-gongmapa khangchen (O)

3. Parnangpa khangchen (M)
   Omlungkimtsespa khangchen (O) — three khangchen
   Yokarpa khangchen (M) — Pho-lha : Chamin Lhabsang

4. Kolung-ghangpa and khangu (M)
   Kakerpa and khangu (M) — two khangchen, two khangu
   Pho-lha : Dzolung-Nyampo

5. Merlingpa khangchen and — two khangu
   Tangmarpa khangchen and khangu (H)
   Lehlakpa khangchen (H) — five khangchen, four khangu
   Katmarpa khangchen (D)
   Parkarpa khangchen and khangu (H)

6. Abeelandulkelo khangu (M) — (part of Thiksepa, Doltok)
   Yokpa khangchen and khangu (H)
   Thiksepa khangchen (D) — three khangchen, three khangu
   Changrachenpa khangchen and khangu (D)

7. Nangkukpa khangchen and khangu — one khangchen, one khangu
   Pho-lha : Kangjhu

8. Katokpa khangchen — one khangchen

9. Shahtangpa khangchen and khangu
   Zurkhangpa (M) Omlunyogmapa khangchen (O) two khangchen, one khangu
   (N.B. Zurkhangpa and Omlungyogmapa are one and the same)

From the list, there is evidently no specific rule concerning the formation of paspun. Groups seven and eight are exceptional in having no connections with other families. The only consistent rule is that khangchen and khangu of one tongpa are invariably members of the same paspun.

.2 Land ownership and reforms

Himis gompa, apart from appointing monks to carry on religious duties for the inhabitants of the Markha valley, also owns a certain amount of land in the valley which is rented from the monastery. In Markha village, three tongpa are taxable : Tongitgongmapa rents eight fields and pays a tax of eight kyal (one kyal is twelve kg) or 96 kg of grain per annum; Tongityogmapa rents two fields, the rent for which is five kyal (60 kg of grain per annum); and Kolung-ghangpa has two fields at four kyal (48 kg per annum). The grain is taken to Himis in the ninth month (October-November).

In the hamlet of Doltok, twelve fields belong to Himis and the Doltokpa feed the lama at Dehcha. Fifty kyals per annum are paid in kind to Himis gompa. In Omlung, one field is owned by Himis, yielding a rent of six kg. Land is also owned in the lower part of the valley, as follows :

Skiu : Zerigpa, one field, rent three kyal.
Kanchigmo, one field, rent two kyal.

Kaya : Kayayogma, one field, rent four kyal.

Himis also has land in other villages such as Martselang (but not Ozang and Chogdo), Thikse, Matho and Chiling. Chiling is not taxed but provides a living for the resident lama.

Karnak comes under the jurisdiction of Himis and pays a tax in goats, sheep and yaks, and wool. There is no fixed amount and the yield fluctuates depending on the severity or fairness of the weather. Barley and salt are not paid to Himis from Karnak. One lama from Himis is appointed to Karnak, but the other monks are native Karnakpa.

The official unit of land in Ladakh is the kanal.

One karam is 5½ feet
Three x three karam equals one marla.
Twenty marla equals one kanal.
Eight kanal equals one acre.

The records in Leh are out of date and bear little relation to the land system as understood by the native population. Many years ago, Indian government officials conducted a survey of the Ladakhi villages for revenue purposes and in 1964-65 the revenue paid by the Markha valley is recorded as Rs. 305, 3 annas, 2 pais. In 1967 an act was passed exempting landowners from payment if their

annual revenue was less than Rs. 9. The best land was levied at Rs. 1 per kanal, and the poorest land at 4 annas per kanal (16 annas = Rs.1). The average landholding in Skiu-Markha is about 13 kanals per tongpa +but of course this varies considerably in different tongpa. The tahsildar (revenue officer) in Leh refers to all landholdings and other nomenclature in Urdu (Katah is Urdu for tongpa) which helps to confuse the issue. The total revenue from Skiu-Markha in 1976-77 was Rs. 198 (about £12), levied on 1,700 kanals. Obviously there were a lot of exemptions and tax evasion is a game not confined to the western world. No other taxes are levied on the population unlike other parts of Jammu and Kashmir state. Since land is being divided amongst sons, rather than remaining intact in the traditional manner, more and more holdings drop below the Rs. 9 mark and are thus exempted altogether. 'Development' in the valley is nil so those who pay tax are receiving nothing tangible in return. ϕ

.3 Village administration

The headman (goba) represents several villages. There is one goba for Rumbak and Kaya, one for Chiling and Sumdah, and one for Skiu, Markha and Hankar. At present, the gobas are resident in Sumdah, Rumbak and Skiu. The goba is in a sense the government representative. It is a judiciary position dating from the time when the goba collected revenue for the Dogra invaders. Most disputes are settled over chang, and fines are paid in chang, an amicable arrangement that suits everyone. The goba must be at least twenty years old and a member of a khangchen, rather than a khangu. The goba is elected but his assistant, the kodwal is appointed from different houses in turn. There is a kodwal in Markha, Kaya and Sumdah, appointed for one year. There is also a council (panchyat), consisting of three members from Hankar and Markha, one from Kaya and one from Chiling. They retain the position for three years, whilst the goba changes every one to three years depending on his popularity. The panchyat have control over communal village affairs but there is no serpanj (panchyat head) as in other villages. Indeed the entire administrative structure in Skiu-Markha is extremely parochial and they are left very much to themselves. Very few Ladakhis from villages in the Indus valley have been to Skiu-Markha which remains to this day a peaceful, self-contained valley, whose inhabitants have no particular desire to go elsewhere, and where the rapidly changing outside world (i.e. Leh) remains in their eyes a bewildering and overcrowded place, to be visited only occasionally, out of necessity. How long this situation will last must remain a matter for conjecture, but it seems unlikely that the Indian government will not put a road through the valley for many years. Any outside influences will trickle very slowly over the high passes, although a boom in the popularity of trekking by foreign tourists will soon stimulate the more enterprising of the Skiu-Markhapa to make easy money. The absence of roads, army, tourists and Indians in the Markha valley is one to be welcomed if an upheaval of a tolerably enjoyable way of life is to be avoided. A way of life moreover that in spite of illiteracy, ignorance, backward technology and stolid conservatism permits man to

+ i.e. something under two acres per average family.

ϕ e.g. Medical service is provided locally by Anchis (doctors) - two in Markha, one in Hankar and one in Ømlung.

display some of his finer qualities.

.4 Social status

The notion of caste does not exist in Ladakh as it does in Hindu society, but there are certain categories in Ladakh comprised of people of inferior social status. They are called Mon or Bedar, and are of uncertain origin, possibly from Himachal Pradesh or Nepal. The Tibetans use the word Mon to denote the tribes to the south of Tibet, in the middle valleys of Nepal. Mon are found in almost every Ladakhi village and are treated with little respect by the rest of the population. Most of the Mon are musicians or carpenters. For some reason there are no Mon whatever in the Markha valley nor in the villages in the Zangskar gorge below the confluence with the Markha Chu. The musicians originally entertained the kings but now serve the villages. Mon cannot become goba (headman), nor can they take any part in New Year celebrations other than play music. Most Mon are landless, and their low status is hereditary. In Skiu-Markha there are musicians, carpenters and blacksmiths but none are Mon and no one in Skiu-Markha is landless. Chiling, on the Zangskar Chu is famous for its goldsmiths (Sergar) and coppersmiths (Gara) who produce very fine articles. The village is unique in that every tongpa has a goldsmith and one tongpa also has a carpenter/blacksmith. None are Mon and none are landless. In Skiu, there is a blacksmith in each of the four tongpa, (Tsarikpa, Kangchikpa, Kukspa and Gistatpa, this last one having both khangchen and khangu). Kaya comprises five tongpa (Kimchespa, Polungpa, Kayagongmapa, Kayayogmapa and Dundungpa: the latter three also have khangu). There are two carpenters in Kaya (Dundungpa and Polungpa) who also do balcksmiths work. There are no carpenters in Skiu, nor in any of the neighbouring villages of Rumbak, Yurutse and Shingo. There are no blacksmiths whatever in Hankar and Markha, but there are two carpenters in Markha. None of these low status occupations seem to infer any inferiority at all in Skiu-Markha. Nor is inferiority attached to those who kill animals for meat, for meat is regarded as a necessary food when available, and the killing is therefore justified. (In Tibet, as previously mentioned, butchers are of low caste).

5. RELIGION

.1 Ladakh is part of the Tibetan Buddhist world. Buddhism was introduced to Tibet between the eighth and twelfth centuries from India and was strongly influenced by local pre-Buddhist beliefs and practices. Over the centuries several monastic orders evolved. Principally these are the reformed and unreformed sects (Nyingmapa and Gelugpa) but there are numerous sub-sects as well. The history and development of Buddhism is not discussed here as there is no shortage of scholarly works that may be consulted (see bibliography). The purpose of this section is to put the daily life of the Markhapa into a religious perspective, making the point that Markha is traditionally a rather holy place. All aspects of material life and social life of the community are prodoundly involved with religion.

The environment consists of the inhabited land used and exploited by man, the wilderness of gorges and mountains, and places of religious significance. Very often the three overlap, for man exploits the wild country outside the village by grazing the herds and collecting wood and scrub, and both the inhabited and the uninhabited land has holy places occupied by local divinities, and religious monuments erected by the local population.

.2 Monasteries

There are four small gompas in Markha valley, at Kaya, Skiu, Markha and Dehcha. The latter is a solitary gompa on top of a buttress 300 feet above the valley, located between Markha and Omlung. The three village monasteries each serve their respective village whilst Dehcha serves Omlung, Doltok and Hankar. Each gompa is occupied by one monk from Himis gompa, who is posted for a three year period before returning to Himis. There is a small temple in Hankar but this is not occupied and is only used when the Dehcha lama makes a visit. The hamlets of Markha valley are therefore religious backwaters where all activity takes place on a very local level. The gompas simply fulfill the religious needs of the community, unlike the great monasteries of the Indus valley which although now in decline, were at one time centres of learning and high artistic accomplishment.

.3 Local divinities

The land in and around the valley is inhabited by numerous local deities who protect the valley and its inhabitants from malevolent divinities, provided that suitable propitiatory gifts and prayers are offered.

The lha : The most venerated are the pho-lha (family divinities) and the yul-lha (protector of the valley). The name of the yul-lha for Hankar, Skiu and Kaya is Kurgyal; for Markha, Omlung and Doltok it is Tsering Chenga, the goddess of five sisters who live on top of Kangchentsenga (the great glacier of five peaks). They are also the Flying Goddesses (Kandoma) of which there are numerous tales and legends in Ladakh. Their names are Tashi Tseringma, Tingi Jhalzangma, Myola Zangma, Chodpen Dinzangma and Tarkar Donzangma. Other lha connected with Markha are Kurgyal, Chokun-nyangpa, Chamen and Labtsan. The lha inhabit high places, and shrines (lha-tho) may be seen on conspicuous pinnacles and ledges above houses and villages.

The tsan : These divinities are associated with the inhabited spots. They may be either malevolent or benevolent, and their sanctuaries are on the roof terraces of the houses. These are small red-painted shrines, a few feet high with prayer flags and the horns of yaks and wild sheep placed on them. Offerings are made for the protection of the house, for marriages and for long journeys. The appropriate offerings must be made to ensure that unfortunate deaths are prevented in which the cycle of rebirth could be broken. If a man dies in an accident, such as drowning or falling down a cliff, then if the proper

ritual is omitted, his spirit can lose the Way and become a tsan.

The lu : These divinities occupy the streams and sources of springs below the surface. Propitiatory ceremonies are performed to pacify them so that the water supply is sustained to bring a good harvest and so that the houses are not washed away by floods and the irrigation channels destroyed.

.4 Votive constructions

Chorten. The literal meaning is 'support for worship' and it is derived from the Indian stupa. Chorten are to be seen all over Ladakh at inhabited sites and scattered in the countryside. The prime purpose is a shrine to enclose relics but it came to symbolize universal buddhahood. The outward form of the chorten is identified with the five elements, representing the sum total of phenomenal existence. The square base is identified with earth, the dome with water, the upper section with fire, the lunar crescent with air and the sun with space. The chortens vary somewhat in different Buddhist regions but the significance remains the same. They vary in height from a few feet to as much as fifty feet, and are as much a part of the landscape as the villages and monasteries. There is no shortage of literature dealing with the complexities of Buddhist art and iconography so it is pointless to reiterate it here in brief form. Suffice to say that the Markhapa, like other Buddhist communities in the Himalayas, live in a landscape dominated by Buddhism which in its outlook and conduct infiltrates the very fibre of their lives. But the general ethos of Ladakhi society can not be entirely attributed to the effect of Buddhist ideology. Environment and external influences have also played an important part.

Mantang (prayer walls). The paths and villages of the valley are the location of long walls about three to five feet high, ten or fifteen feet in width, covered in flat stones usually carved with the invocation 'Om Mani Padme Hum', or other suitable formulae. They are built near fields, temples, summer pastures. The path always goes to the left hand side of a mantang.

.5 The Lamas of Markha

Long ago a lama died at Himis monastery and when the body was taken to be cremated, two monks were appointed to carry out the task. The forehead of the body was preserved unburnt, as usually happens with very holy men. Both the monks were Markhapa and one of them suggested that they should take the sacred forehead to Markha to provide a source of blessing for the valley, but they could not think of a suitable excuse for running away and not returning to Himis. One suggested that they should break one of the musical instruments made from conch shells that they had with them. So they broke one of the conches and ran away with the holy relic to Markha where they built a chorten to enshrine it. After many days they were recalled to Himis and asked why they had fled to Markha, so they explained how they had dropped the conch and it had broken and they had fled in fear of being found out.

In the past, Markha produced many outstanding lamas, the reason being, it is said, because of the blessing of the forehead of the old lama. To this day, this is believed to be the reason that Markha has produced such holy men. Amongst the most famous are the following :

An incarnation of the head lama of Stakna. His name was Tashi Tampel and he lived at the time of Gulab Singh who invaded Ladakh in 1834. He was mainly responsible for obtaining a sanction from the Dogra ruler to keep all monasteries exempt from revenue taxes and providing all the privileges which they enjoyed under Ladakh kings. According to Ladakhis, the lama obtained this concession because he discovered the sapphire mines at Padur, a village near Kishtwar, and showed the mines to Gulab Singh.

In more recent times, Markha produced another outstanding lama, Noston Phuntzog. He became a monk at Himis and through his ability he won the appreciation of the head lama of Himis, Chimet Padma Dodul. The head lama met the old rajah of Ladakh who was also a monk at the time, and the rajah suggested that Phuntzog should be the Chogzot (manager) of Himis. Phuntzog heard about this and was so terrified at the prospect of executive work that he ran away to Tibet. There he went to Kham in east Tibet and contacted one of the leading yogis of the time, Shakya Shiri. In time, he became a great yogi himself and when the new incarnation of the head lama of Himis was discovered and brought to Ladakh from Tibet as a child of eight or nine years, Phuntzog returned to be his tutor. He lived with the head lama for several years and finally passed away at Hanle, about 1950.

Another disciple of Shakya Shiri was a Markhapa called Chosom. His elder brother had no children so the parents were discussing a possible marriage for Chosom so that they would have grandchildren. This discussion took place whilst on the way to Nimaling with livestock, and hearing it Chosom was so overwhelmed by the idea that one night he fled. By morning he had reached a relative's house at Chushot on the Indus, and spent the whole day hiding in a stable, fearing the pursuit of his family. At nightfall he went to Gotsang, a meditation centre above Himis, where Chimet Padma Dodul was then residing. He became a monk and was given the name Chosom, meaning 'one who thinks of religion'. He went to Tibet and after receiving religious teaching from Shakya Shiri, he returned to Ladakh with three other Ladakhi monks all of whom became outstanding yogis.

6. CONCLUSION

The plateaus of Tibet and the high valleys of the Himalayas on the rim of Tibet have been inhabited for generations, despite a harsh climate and difficult conditions of subsistence. Throughout this cultural area - the high valleys of Ladakh, Garwhal, Nepal, Sikkim and Bhutam - many questions arise as to the future. Will this way of life be maintained, or will the acceleration of material progress and the reduction of distances due to improved communications threaten the stability of society and economic life ?

At some stage in the future, the modern world will encroach upon the Markha valley but this is not the place to discuss at length the justification and long term effects of such changes. Suffice to say that Markha is still a harmonious place where man has hitherto led a peaceful and contented life, albeit arduous. One suspects that this remote valley would be sensitive and vulnerable to the detrimental effects of modernisation, as well as its so called benefits. The disruption of a way of life that has existed for centuries is a high price to pay; it is also futile and pointless if the old traditions are not replaced by something qualitatively better. Life in Markha valley is happy and very civilised; let us hope it remains so.

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7. GAZETTEER OF SKIU-MARKHA REGION PLACE NAMES: Settlements (seasonal and permanent), Peaks and Passes.

Survey of India		Local Name	Altitude (Survey of India)	Altitude (Altimeter)
Kaya		Kaya	-	ϕ - (10900')?
Skiu (or Skio)		Skiu (or 'Kiu)	-	3350 m (10990')
Shingo		Shingo	-	4100 m (13450')
Chaluk	1 *	Chaluk	-	- (11600')
Tunespa	2	Telnespa	-	- (11800')?
Markha		Markha	12510'	3650 m (11975')
-	3	Dehcha Gompa	-	3850 m (12630')
Omlung		Omlung	-	3790 m (12435')
Doltal		Doltok	-	- (12900')
Hankar		Hankar	-	3950 m (12960')
Letchungse	*	Tatchungtse	-	- (13750')
Nimaling Plain	*	Nimaling	-	4750 m (15585')
Nimaling Chu		Nimaling Chu	-	
Markha Chu		Markha Chu	-	
Khurna Chu		Chang Chu	-	
-		Chuskormo	-	- (13050')?
Chogdo		Chogdo	-	3910 m (12830')
Oza		Ozang	-	- (12200')?
Sumdo		Shang Sumdo	-	- (12000')?
Martselang		Martselang	-	- (11300')?
Chiling		Chiling	-	- -
Rumbak		Rumbak	-	3910 m (12830')
-		Yurutse	-	4050 m (13290')
Kurio	4 *	Tsogra	-	4060 m (13125')
Karnak	*	Karnak (or Ldat)	-	4240 m (13910')
Lang Tang Chan		Lang Tang Chan :	-	
-	*	Tamachan	-	- (13300')?
-	*	Ma' Les	-	4170 m (13680')
-	*	Taktok	-	4350 m (14270')
-	*	Pura	-	4400 m (14430')
Kunda La		Gunda La	16310'	4910 m (16110')
-		Stok La	-	4790 m (15720')
Gongmaru La	+	Layokma La	-	5200 m (17060')
Chikorma La		Gongmaru La	-	5180 m (16995')
Zalung Kurpo La		Zalung Karpo La	17040'	5060 ± 20m (16600' ± 65')

Survey of India		Local Name	Altitude (Survey of India)	Altitude (Altimeter)
Ruberung La	5	Ruberang La (or Langru La)	-	-
Shapodak La		Shapodok La (or Lapurba La)	18530'	- -
Lalung La		Chaksang La	-	- (17000')?
-		Konka Ngonpa La (between Lang Tang Chan & Nimaling)	-	5165 m (16945')
-	6	Teri La (between Karnak and Gya)	-	- ?
-	7	Kang Yisay	21000'	6200 m (20342')
-	8	Stok Kangri (or Kang Lacha)	20085'	6000 m (19685')

Notes :

* Seasonal settlements.
1 Part of Markha.
2 Part of Markha.
3 Monastery 350' above valley floor.
4 Tributary valley "Kurik Lungpa" situated close by, no settlement of that name. Ruined Fort, marked "Kar" on map, on high spur above Tsogra.
5 Valley leading to the pass from Markha known locally as Shekyem.
6 Height unknown. An important pass used by Karnak nomads, not marked at all on Survey of India maps. Probably over 16500 ft.
7 Pt. 6160 (20210') climbed by expedition, marked on some Survey of India maps as 20560'. Situated S.E. of Kang Yisay.
8 Climbed by 1976 expedition.

ϕ A dash in the metre column, and a feet height with question mark means no altimeter reading was recorded, but an estimate has been given in feet.

/ The Survey of India 'Gongmara La' and the actual 'Gongmaru La' are two different passes. The name 'Chikorma La', does not exist.

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IV ORNITHOLOGY

1. INTRODUCTION AND OUTLINE OF FIELDWORK

The ornithological fieldwork we undertook as part of the 1977 University of Southampton Himalayan Expedition was an extension of the study completed by Clive Denby and Andrew Phillips during the University's expedition to Ladakh in 1976. Clive and Andrews' work was done in the Upper Indus Valley near Leh during July and August and their suggestions, arising out of this study, were invaluable to us in planning the fieldwork for 1977.

We went to Ladakh with the aim of splitting our fieldwork into three parts :

1. A survey of the birds of the Suru Valley in western Ladakh during July.

2. One or two weeks high-altitude work in early August centred around the top of the Stok Gorge, a part of the 1976 study area.

3. An autumn migration study including a mist-netting and ringing programme based somewhere on the Indus floodplain near Leh which would occupy us until we left Ladakh in October.

In the event the high altitude bird-watching up the Stok gorge was abandoned, largely because on our arrival at Leh on 2 August we both contracted rather violent and debilitating stomach trouble which drove all thoughts of bird-watching from our minds for several days. By the time we felt fit enough to recommence fieldwork we had realised that either the ringing project had to be left until the end of August or the visit to the Stok gorge had to be given up. We chose to give an early start to the migration study priority as a number of previous ornithologists, working mainly in the first half of this century, have made extensive summer tours of Ladakh taking in some of the highest and most remote parts. Consequently we felt we were unlikely to discover anything particularly novel about the avifauna of the high "alpine zone" in the limited time available. So our time in Ladakh was split between the Suru Valley survey - lasting from 6 July to 1 August, and the migration study, commencing on 7 August and carrying on until we started the return journey to Delhi on 13 October. Before describing these two projects a short description of Ladakh's physiography and habitats is worthwhile.

Lying as it does north of the Main Himalayan Range Ladakh is in the Palearctic rather than the Oriental Biogeographic Region and though politically part of India the region is clearly Tibetan in its flora and fauna. Tibet, in its wider geographical sense, as defined by Charles Vaurie in 'Tibet and its Birds' (1972), is divided into three natural regions, the Northern, Outer and Southeastern Plateaus. The Northern Plateau forms the heart of Tibet and

1. The Suru Valley – a view downriver from a few kilometres south of Kochak.

2. Upper Indus Valley at Tikse in early October – a view south from Tikse monastery with beyond it the Forestry Department plantation to the banks of the Indus. The hut used for the study is just visible behind the western end of the monastery garden.

3. Netting site, N.W. part of the Forestry plantation at Tikse. A small patch of low *phragmites* in the foreground with a bank of *hippophae* and young poplars and willows behind. The mist-net pole visible is 3 metres high.

4. Brahminy Mynah ringed at Tikse, one of several species ringed which have not been previously recorded in Ladakh.

consists largely of the Chang Tang, an arid and desolate waste with a mean elevation around 5,000 m. and one of the harshest climates in the world. Not surprisingly the Chang Tang is very poor in plant and animal life, but the Outer Plateau, forming a relatively narrow 3,500 km. long rim round its southern edge, has a more temperate climate and is more diverse geographically and biologically.

Ladakh lies near the western limit of the Outer Plateau. Its geographical layout is neatly summarised by Vaurie (1972) as follows : "The extreme northeast is a very bleak plateau which lies north of the Karakoram, but, with this exception, Ladak is best compared to a very high mountainous corridor inclined from the northwest to the southeast through which the Indus flows. The corridor is bounded by the Main Range of the Himalayas in the south and by the Karakoram in the north and is crossed by two internal ranges, the Ladak Range north of the Indus and the Zaskar south of it, all the ranges and the river being roughly parallel." In its most narrow sense Ladakh comprises only a small part of the Indus Valley around Leh but as considered by most previous writers and described by Vaurie above it includes a larger area and takes in the Dras and Suru Valley systems in the west, Rupshu in the southeast and Zaskar in the southwest. This wider definition is more practical as the boundaries between "Ladakh proper" and the areas listed above are not firmly established, there being no sharp political or physiographic dividing lines. Using this definition Ladakh has an area of about 100,000 square kilometres, about three-quarters that of England.

Nearly all of Ladakh is drained by the Indus which flows through the region for some 500 kms at a mean elevation of around 3,700 m. Osmaston (1925) estimated Ladakh's mean altitude as about 4,600 m. The highest peaks vary from 5,800 to 7,600 m. while the lowest altitude in the region is around 2,700 m. The snowline lies at about 5,300 m.

Ladakh's climate is characterised by extreme temperature variations on both a seasonal and a daily basis. The summer sun glares fiercely out of a clear sky giving an intense, dry heat, while the winter is prolonged and bitterly cold with heavy snowfalls. Because of Ladakh's extremely inhospitable winter climate very few of the regions breeding birds are residents, most moving into the Himalayan foothills and the plains of northern India in the autumn. Vaurie (1972) quotes extreme temperatures for Ladakh of $-35^{o}C$ and $+37^{o}C$. Due to the monsoon rarely penetrating over the Main Range of the Himalayas the region receives very little rain. Annual rainfall apparently rarely exceeds 250 mm. and is generally much lower than this, particularly in the Indus Valley. Consequently, despite the numerous streams and rivers draining from the melting snow and glaciers on the high peaks, the great bulk of Ladakh is an arid wilderness of rock and sand.

Ladakh's inhabitants have provided themselves with agricultural land by diverting water from rivers and streams into intricate networks of irrigation channels. Most of the irrigated land is given over to cereals, chiefly barley, with scattered willows (*Salix sp.*) and poplars (*Populus sp.*) and patches of pasture and scrub between the fields. Villages and their associated agricultural land are found along the bottoms of the wider valleys up to about 4,000 m. and

occasionally higher. The verdant cultivated land contrasts strongly with the natural vegetation - a mixture of sparse grass, low xerophytic herbaceous plants and occasional patches of low thorny scrub - which takes over immediately beyond the limits of irrigation. On the lower mountain slopes the vegetation is very discontinuous and often completely absent from large areas, but higher up, near the snowline, herbaceous plants are often more widespread and diverse. This is sometimes referred to as the "Alpine Zone", however the plant cover is still xerophytic, usually only a few centimetres high and often patchy. Practically the only shrub which grows above 4,000 m. is the Tibetan Furze, (Caragana sp.) usually growing from 50 cm. to 1 m. high. Below 4,000 m. other shrubs occur, the most abundant probably being Sea Buckthorn (Hippophae rhamnoides) which can grow up to 4 m. but is usually under 2 m. in height. It is particularly evident around cultivation and along rivers but is not found in the mountains. Away from irrigated land the only place one is likely to find lush grass is along some mountain streams. Even here it is short and usually confined to a narrow strip a few metres or less wide along the banks. Wild roses (Rosa sp.) also occur near some streams and occasionally rivers well away from cultivation may be bordered by small willows but away from the main valleys and irrigated land anything more than small isolated patches of trees or high scrub is very unusual.

Vaurie's 'Tibet and its Birds' (1972) provides the most complete survey of the region's avifauna available and we have used it as our basic background reference on Ladakh's birds. The bulk of the book is a 'Systematic List' which gives brief details of all the specimens of each species collected in Tibet, the records of each species being listed according to region. Vaurie has made an exhaustive search of the literature as well as of skin collections but only includes sight records for a region if no specimens of the species in question have been collected there. As Ladakh has been visited by more ornithologists than any other part of Tibet a good species list for the region can be extracted from Vaurie's book. But because the list is based on collected specimens the number of records of a species cannot be taken as anything more than a very rough indication of abundance as there is bias in favour of rarer species and those which, by nature of their accessible habitat or confiding nature, provide the easiest targets ! Another important bias is introduced by Tibet's extreme winter climate, which results in nearly all ornithologists just spending summer in the region. Consequently passage migrants have been severely under-recorded. It is worth mentioning here a point about Vaurie's book which might confuse, this is that though Zaskar and Rupshu are treated as part of Ladakh in the introductory chapters specimens from these areas are listed separately under each species heading.

Our background reading on Ladakh's birds has not been exhaustive and we have relied on Vaurie's book to provide information from the earliest and more obscure reports. As the early work was principally a matter of building up a representative skin collection from a practically unknown region Vaurie's Systematic List does contain a good, brief summary of the early ornithology.

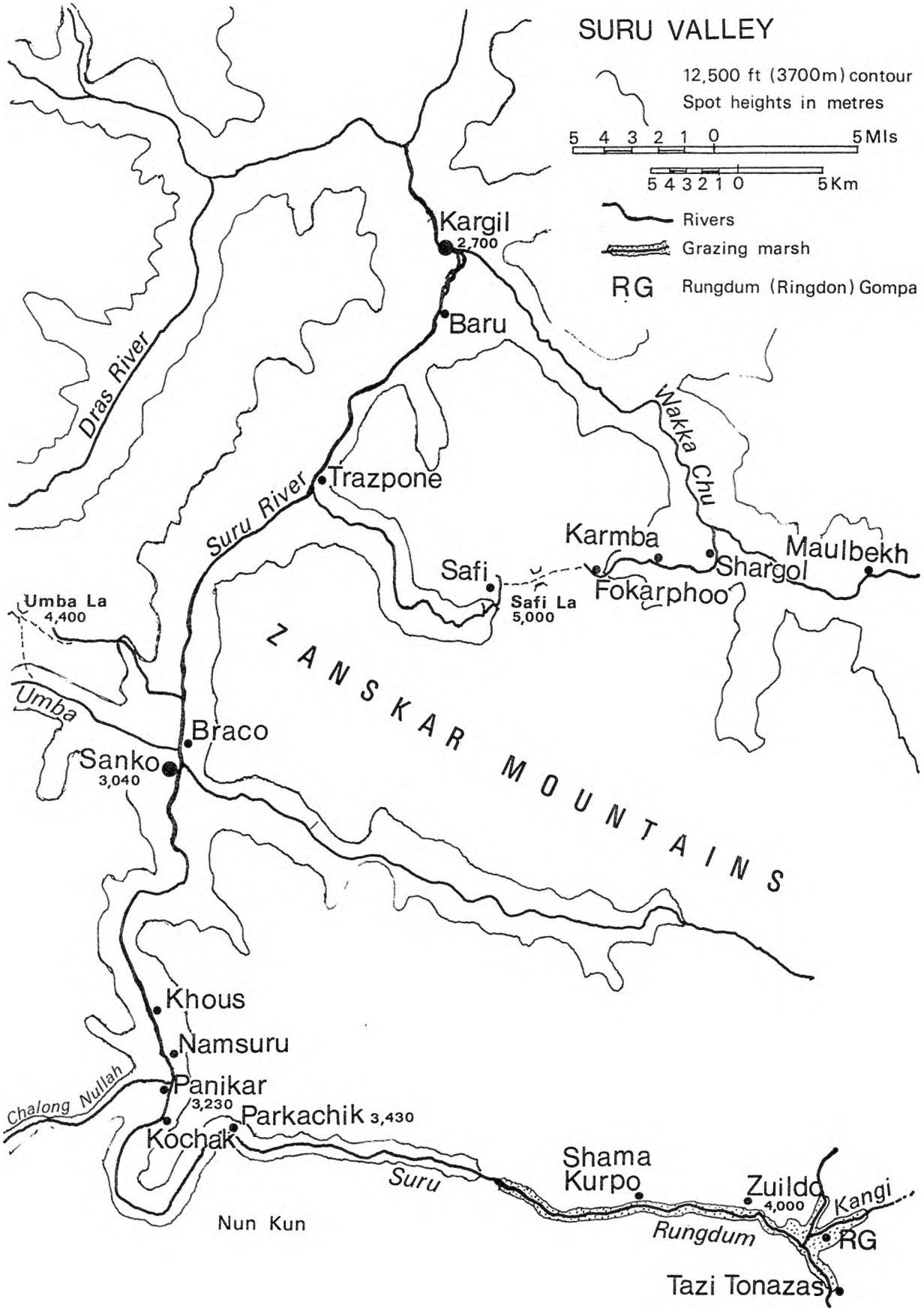
We have read the bulk of the papers published since 1915 on the birds of Ladakh and the adjacent regions of Baltistan, Western Tibet proper and Spiti. We have also looked at papers on the birds of Lahul, a region immediately west of Spiti which though it lies south of the Main Range of the Himalayas and is thus not part of Tibet as defined by Vaurie is arid and mountainous with a lowest altitude of 2,750 m. and an avifauna essentially similar to that of Spiti and Ladakh.

We did not take the standard reference work on India's avifauna, Ali and Ripley's ten volume 'Handbook of the Birds of India and Pakistan' (1968 - 74), with us to Ladakh. This was mainly because its cost was beyond our limited means but financial considerations apart it was probably a good thing we did not have the Handbook with us, heaving the ten thick volumes around the Himalayas must be a test of strength which all but the most athletic bird-watcher would fail. The bulk of our preparation for the Ladakh expedition consisted of copious note-taking from the Handbook, concentrating on species previously recorded in Ladakh and not covered in European field guides. As well as these notes we took the following identification guides with us : Ali (1941); Fitter, Heinzel and Parslow (1974); Peterson, Mountfort and Hollom (1965); Porter, Willis, Christensen and Nielsen (1976); Svensson (1975); Williamson (1968, 1967, 1968). We also had Fleming, Fleming and Bangdel's "Birds of Nepal" (1976) with us in the Upper Indus Valley thanks to John Lord, another migrant ornithologist, who lent us his copy of the book when we met in Kargil.

In the field,notes were taken on all the rarer and more difficult species and photographs were obtained wherever possible. Detailed 'in-the-hand' descriptions and close-up photos of the birds we ringed in the Upper Indus Valley were taken if they were uncommon or their identity was at all in doubt. On our return to England we checked our notes and photographs with descriptions in the larger reference works (chiefly Ali and Ripley (1968 - 74) and Witherby et al (1938 - 41)) and with skins in the British Museum's collection at Tring.

2. THE SUMMER SURVEY OF BIRDS IN THE SURU VALLEY

Because of its position in the extreme west of Ladakh close to the peaks of the Main Himalayan Range, which divides the Oriental and Palearctic biogeographic regions, the Suru Valley is a particularly interesting area zoogeographically. It also receives more rainfall than other parts of Ladakh and consequently has a slightly less sparse natural vegetation, particularly at its southern end. These distinctive characteristics produce interesting peculiarities in the local avifauna which, as Clive Denby and Andrew Phillips had already completed a study of a representative range of habitats in central Ladakh, made the Suru Valley the most favoured locality for our mid-summer fieldwork. In addition the valley is one of the few areas of Ladakh - apart from those along the main road from the Zoji La to Leh - which is accessible to travellers without pack animals as a motorable road now runs from Kargil to Rungdum and on over the Pensi La. All in all the area seemed ideal for our July survey which as well as being interesting in its own right would ensure we were familiar with most of Ladakh's breeding birds before we moved on to the migration study.


SURU VALLEY
12,500 ft (3700m) contour
Spot heights in metres
5 4 3 2 1 0 5 Mls
5 4 3 2 1 0 5 Km
Rivers
Grazing marsh
RG Rungdum (Ringdon) Gompa
Kargil
2,700
Baru
Dras River
Wakka Chu
Suru River
Trazpone
Karmba
Maulbekh
Shargol
Safi
Fokarphoo
Safi La
5,000
Umba La
4,400
Umba
Braco
Sanko
3,040
ZANSKAR MOUNTAINS
Khous
Namsuru
Panikar
3,230
Parkachik 3,430
Kochak
Chalong Nullah
Nun Kun
Suru
Shama
Kurpo
Zuildo
4,000
Kangi
Rungdum
RG
Tazi Tonazas

Kargil lies on the usual route between Kashmir and Leh via the Zoji La and has been visited by most previous bird-watchers but few of these have travelled elsewhere in the valley. Frank Ludlow made his way up the Suru on his way out of Ladakh in the first half of July 1919 (Ludlow 1920) and may also have visited the valley during trips to Ladakh in 1928, 1929 and 1931 but did not publish anything on these expeditions. The fullest accounts of the area's birds are given in three papers by B.B. Osmaston (1926, 1927 and 1930) which include the results of two visits - during most of July 1925 and the end of June and first half of July 1928. In total Osmaston spent over six weeks in the Suru Valley covering it from Rungdum Gompa to Kargil, paying particular attention to the Rungdum area which has several unusual breeding species. He seems to have been primarily an egg collector and includes a lot of detail on the position and construction of nests, clutch sizes, breeding seasons and the dimensions of eggs in his papers. Walter Koelz made a three-day visit to Rungdum in mid-September 1931 and travelled from Rungdum to Kargil in the last week of July 1933 (Koelz 1940). His paper is the most recent on the Suru Valley's birds. All three of these collectors concentrated on valley floor habitats though Osmaston did make a number of trips into the adjacent mountains.

The Suru River is formed by confluents which come together between Rungdum Gompa and Zuildo at just over 4,000 m. From here it flows west for some 40 kms. and then turns sharply north between Parkachik and Panikar, running for a few kilometres through a narrow gorge below the massive double peak of Nun Kun. The river then runs north for about 65 kms to Kargil where it is joined by a large tributary - the Wukka Chu - before meeting the Shingo River, a tributary of the Indus, 5 kms. further north. In attempting a survey of an area this size in only one month it was obvious we would have to be selective so we decided to spend most of our time bird-watching from four or five bases scattered along the valley, staying at each for a few days and covering as wide a variety of habitats as possible in each area. A description of our movements and the habitats covered is given below. Some of the more interesting birds seen are mentioned in passing but full details of when and where each species was seen are given in the Systematic List (Appendix A).

We arrived in Kashmir by bus from Jammu on 29 June and before departing for Ladakh spent five days in Srinagar buying various utensils and provisions. We left by bus early on 5 July loaded down with an ungainly assortment of luggage, the most unmanageable items being nine three-metre-long bamboo poles, bought at a distinctly inflated price in a Srinagar bazaar as we had been told by our wily house-boat owner that Ladakh was not only utterly devoid of bird-life and inhabited by a collection of avaricious tourist-fleecers but also lacked anything remotely resembling a mist-net pole.

The day-long journey from Srinagar to Kargil is an impressive introduction to Ladakh. After entering the mountains the route winds steadily upwards through a very alpine landscape to Sonamarg, with impressive peaks towering above pine-clad slopes and lush open pasture. Beyond Sonamarg the road rises more steeply towards the

Zoji La, the 3,600 m. high pass into Ladakh. The last, unsurfaced, stretch before the pass is an amazing series of murderous hairpins, the road contouring round a precipitous mountain side. The casual ease with which the local buses spin along these tortuous Himalayan roads we at first ascribed to suicidal recklessness or divine guidance on the part of their drivers but it is probably the result of impeccable judgement and an extreme familiarity with the route. As soon as the Zoji La is passed pine-forests and meadows disappear and are replaced by the arid mountain wastes of Ladakh. The road wanders down to the Dras River and on to Kargil, (2,700 m.) a large village which, being the overnight stopping place for buses shuttling between Srinagar and Leh, has become something of a boom town since Ladakh was opened up to tourists in 1974. A dozen or so inexpensive but 'basic' hotels have sprung up around the main bazaar and in the evenings a sudden influx of tired and usually disgruntled tourists rush from newly arrived buses to all available accommodation. But, though tourism is definitely having marked and rapid effects on the local economy, local people at Kargil, as elsewhere in the Suru Valley, seem as yet uncorrupted by affluent sight-seers, their response to foreigners varying from disinterested neutrality to extreme hospitality.

After our arrival in Kargil we left our mist-net poles with the local police for safe keeping and then collapsed for the night on the roof of the Argali Hotel, awaking the next morning to a short but beautiful dawn chorus of Golden Orioles (Oriolus oriolus). Our time during the next two days spent in Kargil was divided between bird-watching and buying dried apricots, barley flour (tsampa) and other provisions which together with rice and lentils brought up from Kashmir formed the basis of our diet in Ladakh. Between the Suru River and the main road through Kargil the cultivation consists of small barley fields with many willows and poplars and some small patches of scrub, chiefly Hippophae. Immediately west of the village the ground rises as steep terraced slopes with tiny fields, apricot orchards and numerous tall poplars and willows. Only a few hundred metres from the road this gives way to uncultivated mountainside - largely a vegetationless jumble of boulders and steep scree. Visits to these habitats provided us with our first good views of the common breeding species around cultivation. Many of these common birds such as the Kashmir Black Redstart (Phoenicurus ochruros phoenicuroides) and Hodgson's Pied Wagtail (Motacilla alba alboides) are distinctive races of familiar European species and most of the rest are members of familiar genera. Consequently a European bird-watcher rarely comes across a species in Ladakh which is not immediately recognisable at least to family - a sharp contrast to the situation in lowland India. As well as the common species our first two days bird-watching around Kargil produced Ibis-bill (Ibidorhyncha struthersii), possible Common Whitethroats (Sylvia communis) and, on the dry slope west of the village, a family of Eastern Pied Wheatears (Oenanthe picata).

We had been warned in England that we might have to walk up the Suru Valley from Kargil but it turned out that though buses only travelled to Sanko, "Public Carrier" trucks ran as far south as the small hamlet of Panikar and so on 8 July we took this cheap, rugged form of public transport. The open back of a lorry provides excellent opportunities for staring at spectacular scenery and is definitely

more comfortable than a bus when travelling on unsurfaced roads but when one shares it with forty or so local villagers, their luggage, several large pieces of timber and a diarrhoetic calf the novelty of the experience soon wears off. Arriving at Panikar (3,250 m.) tired and covered in dust in the early afternoon we seemed to have finally reached somewhere respectably remote - an impression heightened by the sight of our first Bearded Vulture (Gypaetus barbatus) and Himalayan Griffon (Gyps himalayensis) soaring out over the village. But we were brought back to earth when several of the politely inquisitive local children started speaking excellent English.

We stayed at Panikar for four days camping in a willow grove on the banks of the Challong Nullah near the village. The cultivation here is more typical of the rest of the valley than that around Kargil, consisting of fairly large open fields - chiefly barley and some lucerne - with only occasional small willows and Hippophae bushes between, though patches of scrub and willow groves occur at the edge of cultivation and along the Suru, which is narrow here and flows between steep stony banks. Scattered between the crops are patches of lush grass which in July were carpeted with a great variety of beautiful but quite unfamiliar alpine flowers. We covered the valley floor on both sides of the river, and the mountain slopes immediately beyond for two days, exploring a stretch from Kochak to a little beyond Khous. In the other two days we wandered over the mountain ridge immediately south of Panikar between the Challong Nullah and the Suru Valley, climbing to a little over 4,000 m. Though the mountains visible from Kargil are as dry and barren as any in central Ladakh many slopes around Panikar, including this ridge, are covered in a thin, discontinuous plant cover usually only a few centimetres tall and dominated by tough, often aromatic dicotyledonous herbs like Artemisia absinthium and Polygonum affine, plants well adapted to survive a combination of xerophytic conditions and heavy grazing pressure from local livestock and wild herbivores.

The more open nature of the valley floor habitats produced several common species we had missed at Kargil and a number of more local species were found such as Wrynecks (Jynx torquilla), Cuckoos (Cuculus canorus) and our first Bluethroats (Erithacus svecicus). In addition a good variety of mountain species were seen, often surprisingly low and close to cultivation. These included four species of raptor, two species of Mountain Finch (Leucosticte sp.) and both Choughs (Pyrrhocorax sp.) as well as Horned Lark (Eremophila alpestris) and Himalayan Snowcock (Tetraogallus himalayensis).

Osmaston, during his visits to the Suru Valley in the 1920's spent a large proportion of his time covering the highest sections of the valley around Zuildo and Rungdum Gompa. Most of the wide valley floor here is covered with marshy grassland, which results in the area being given the evocative title of "the Great Rungdum Swamp" in Osmaston's papers. His eulogies on Rungdum's spectacular scenery and unusual breeding birds made us anxious to push on from Panikar after our four day stop. Though "Public Carrier" trucks went no further than Panikar we were able to take a ride on a Work's Department lorry ferrying road-building materials to the Pensi La. The journey to Rungdum is, if anything, more jarring than that between Kargil and Panikar but to compensate the scenery is even more wild and spectacular. The road climbs quite steeply away from the village and after crossing the Suru

loses sight of it and winds tortuously up to Parkachik (3,450 m.) a village perched several hundred metres above the valley bottom. Beyond Parkachik - where we stopped for lunch and saw, among other things, our first Snow Pigeons (Columba leuconota) - the valley levels out and the road rejoins the river. Trees and cultivation and many of the birds associated with irrigated agricultural land are left behind and the road travels through wild rocky country. The valley then widens out and becomes covered by a continuous sward of surprisingly lush grass, finally flattening out into the "Rungdum Swamp" about 10 kms. from Zuildo (4,000 m.). Here the nearly flat valley floor is wide, between one and two kilometres across, with the river meandering through lush often boggy grassland with a dazzling variety of alpine flowers and some sedges (Carex sp.) and rushes (Juncus sp.) on the wetter ground. This marshy pasture is intersected by muddy creeks with still pools in the wettest areas. An extensive low growth of dwarf willow (Salix sp.) - nearly all half to one metre high or less - covers drier parts of the valley floor.

The best area of open marshland lies just east of Zuildo, comprising several square kilometres of short grass and sedges, sometimes submerged and quaking in places. Further east the ground becomes drier with short grass and dwarf Salix giving way to a stony, almost vegetationless desert. This desert, intersected by shallow fast-flowing streams extends eastwards to Rungdum Gompa, a Buddhist Monastery at the head of the valley. The river runs round the southern edge of the desert, the belt of land along its banks being a short green sward with patches of dwarf Salix divided up by creeks with shingle and mud banks, the whole looking superficially quite like an English salt marsh. Apart from a few stunted willows between two and three metres high scattered across the desert area the whole of Rungdum is completely lacking in trees, while the only agricultural land is a few tiny, dry barley fields behind Zuildo. We arrived at this village on the evening of 13 July and camped nearby before walking the last 5 kms. to Rungdum Gompa the next day assisted by a novice monk who hired us his horse.

The monastery is perched on the top of a small grassy hill and commands a good view of the surrounding desert. We camped at the foot of this and during the next three days covered the desert, the grassland and scrub along the river between Tazi Tonasas and the eastern end of the swamp and an area of mountainside about two kilometres northeast of the monastery on one side of the valley running towards the Kungi La. At Rungdum, as elsewhere in Ladakh, adjacent mountain slopes vary a lot in their vegetation. The driest near Rungdum Gompa are completely bare, the multi-coloured strata producing fantastic patterns. However the slope we covered and several others in the area have, as well as some grass and other herbaceous cover, quite large patches of dwarf Salix up to 1.5 m. tall where we found Tickell's Leaf Warbler (Phylloscopus affinis) with the similar Sulphur-bellied Warbler (Phylloscopus griseolus).

On 18 July we returned to Zuildo, camping a few hundred metres from the village. From here we covered the marshy grassland and scrub from its eastern end west to about 3 kms. or so beyond the ruins

of Shama Kurpo during the next three days. Zuildo itself, the first Buddhist village we had come across (the rest of the Suru Valley being Muslim) is a small haphazard group of mud huts - some colourfully painted in the Tibetan style - lying on a stony waste a little north of the marshes, its only water supply a tiny stream which irrigates a meagre patch of barley only a few square metres in extent. At Panikar we had been advised to pack up our tent and belongings each day and leave them for safe-keeping with a local villager to keep them out of the way of envious children but at Zuildo we did not bother. Though our tent was entered once the only items we found missing were a fork and a spoon, trivia compared to the other things lying around. However this loss did cause us some inconvenience as apart from one spoon the only other implement we could find to eat with was a spanner !

The birds of the open areas at Rungdum seem very much the same as in Osmaston's day, with the Tibetan race of the Common Tern (Sterna hirundo) and families of Lesser Sand Plover (Charadrius mongolus) along the river and breeding Redshanks (Tringa totanus). However though the Salix scrub around the marshes had good numbers of Mountain Chiffchaffs (Phylloscopus sindianus), Robin Accentors (Prunella rubeculoides) and Horned Larks (Eremophila alpestris) we failed to find several scrub-dwelling species which Osmaston had found reasonably common. Comparing Osmaston and Koelz's descriptions of this willow scrub with our own there is a suggestion that it has been reduced in recent decades - a point taken up in the discussion section. To compensate for the species we missed several previously unrecorded from Rungdum were seen. These included five species of migrant wader and breeding Rose-breasted Pipits (Anthus roseatus), as well as Ruddy Shelduck (Tadorna ferruginea) and Little Owl (Athene noctua) probably breeding.

We would advise anyone else visiting Rungdum not to leave behind too much of their warm clothing in disgust after unbroken weeks of burning sunshine further down the valley. Low cloud and persistent drizzle are quite commonplace here and in clear weather Rungdum is as intensely cold at night as it is beautiful during the day. We left Zuildo on 21 July taking a taxi jeep on its way back to Leh as far as Sanko, (3,050 m.), our next base. At Sanko, where the Kartse and Umba rivers join the Suru, the valley broadens out so that the village is surrounded by extensive flat agricultural land. The cultivation is basically similar to that at Panikar but there is a greater abundance of willows and more extensive Hippophae thickets which, unlike those at Panikar, are often nearly two metres high. The tall Hippophae bushes, especially when on wet ground near the river - where they are mixed with scrubby willows - provide excellent Bluethroat (Erithacus svecicus) habitat.

After Rungdum, Sanko, with its tea shop and several small general purpose stores, seemed full of home comforts. In addition we were allowed the luxury of real beds owing to the kindness of the local hospital's laboratory technician and dentist who allowed us to sleep in its two bed dormitory. We stayed in the village from 21 to 26 July doing most of our bird-watching in the surrounding scrub and cultivation, covering a stretch five kms, or so long north of the village.

We also explored the east bank of the river - which includes some good thick Salix and Hippophae scrub - and on one day went on a 30 kms round trip to the Umba La (4,400 m.) a pass between the Dras and Suru Valleys. This walk took us up a tributary stream which enters the main valley five kilometres north of Sanko. We followed it through a willow grove and out of the valley up a steep gorge to about 3,700 m. Above this the climb becomes less strenuous, the few scattered rose bushes flanking the stream disappear and at around 4,100 m. the ground flattens into gently sloping "alpine pasture" between the peaks. The vegetation here, like that on the slopes behind Panikar, is xerophytic and heavily grazed but, though only a few centimetres high, it is fairly continuous. The same kind of habitat continues to the top of the Umba La and after admiring the view we climbed down to the Umba River, stopping for high altitude tea with a family of nomads from Jammu who were camping just below the pass. The final rush back to Sanko, following the Umba River, was done partly in darkness. The Umba Valley is narrow with a thin strip of cultivation and a few houses above the river, which rushes between precipitous banks of loose rock for much of the way. This day trip produced a good variety of mountain birds including our first Whistling Thrushes (Myiophonus caeruleus) and Brown Dippers (Cinclus pallasii) and two Little Forktails (Enicurus scouleri), a new species for Ladakh. The valley floor around Sanko revealed a basically similar avifauna to that around Panikar with the addition of Large-billed Bush Warbler (Bradypterus major), Stonechat (Saxicola torquata), Pleschanka's Wheatear (Oenanthe pleschanka) and a Rufous-backed Shrike (Lanius schach).

We returned to Kargil by bus on 26 July and on the 27th covered the terraced slope immediately west of the bazaar looking for woodpeckers, which Mohammed, our hotel proprietor's brother, had told us lived in the tall poplars there. A young Scaly-bellied Green Woodpecker (Picus squamatus) was seen, a first record for Ladakh. We also reconnoitred a narrow cultivated valley with apricot orchards a few kilometres to the north which added several species to our Kargil list. The following day we left to start a three day round trip covering mountains between the northern end of the Suru Valley and the Wukka Chu to the east.

We took a 'Public Carrier' to Trazpone and then headed out of the main valley towards Safi. A navigational error found us following a mountain torrent running through a deep gorge rather than contouring along the ridge above. This gorge, though scenic, with spectacular crags and some wild rose growing amoung the screes, was so narrow in places that we were forced to cross the stream several times, leaping from boulder to boulder as it was too deep and fast-flowing to wade. We camped at the top of the gorge a kilometre or two below Safi (3,950 m.) and continued up through the village and over the Safi La (c.5,000 m.) the next day. Safi is a small Buddhist village lying in an unexpected oasis of rich grassland with a few willows and some small barley fields. Beyond it the mountains get steadily drier towards the pass, the last 600 m. or so being almost completely devoid of vegetation.

Over the pass the slope down to the head of the valley which reaches the Wukka Chu at Shargol is slightly less arid with scattered clumps of Polygonum sp. and other herbaceous plants. After reaching cultivation we walked on a few kilometres to a campsite near the stream. This small tributary is flanked by a fairly typical narrow belt of cultivation but is unusual in having a dense strip of willows about 5 m. high along its banks, in which, between Karmba and Sersing, we found Greenish Warblers (Phylloscopus trochiloides) common and breeding. These and a pair of Red-rumped Swallows (Hirundo daurica) near Karmba were the high points of the trek, which had already produced a good variety of mountain species in its first two days. We continued on down the valley to Shargol and started down the main road to Kargil seeing Common Sandpipers (Tringa hypoleucos)on the banks of the Wukka Chu before hitching a lift with a passing lorry.

The next two days in Kargil were mainly spent relaxing, over-eating and resorting luggage for the trip to Leh but a second, this time unsuccessful, woodpecker hunt did produce two Fire-capped Tits (Cephalopyrus flammiceps) in a stand of poplars west of the main road. We left the Suru Valley by bus to Leh at the ungodly hour of 4.30 a.m. on 2 August but did manage a last day's bird-watching around Kargil on 14 October during a day's stop-over before leaving Ladakh. This was in fact one of our most lucrative days ever and a fitting note to leave on. We covered a large riverside Forestry Department plantation, mainly a mixture of scrubby willows and Hippophae, between Kargil and Baru which contained Guldenstadt's Redstarts (Phoenicurus erythrogaster), Black-throated Thrushes (Turdus ruficollis) a Sparrowhawk (Accipiter nisus) and a pair of Stoliczka's Tit-Warblers (Leptopoecile sophiae), most of these doubtless migrating through. Excluding this last day's birding our species total for the Suru Valley and adjacent mountains was eighty including nine species not previously recorded in the Dras and Suru Valleys or surrounding mountains. Of these two, Little Forktail (Enicurus scouleri) and Scaly-bellied Green Woodpecker (Picus squamatus) are new for Ladakh.

3. THE AUTUMN MIGRATION STUDY IN THE UPPER INDUS VALLEY

Though Ladakh has been visited fairly regularly by amateur ornithologists since the latter half of the nineteenth century the severity of the region's winter climate, when all routes in and out are snow-bound and impassable, has ensured that bird migration through the area is very poorly documented. A few previous visitors have been in the Ladakh during parts of the spring and autumn passage periods but they have been on the move continually so that changes in the abundance of different species with time are nearly completely masked by differences between localities. In addition these early ornithologists spent the bulk of their time travelling through arid mountain habitats unlikely to attract migrants.

Clive Denby and Andrew Phillips started to fill this large gap in the knowledge of Ladakh's avifauna in 1976 but were called back to England by inescapable commitments in late August and thus saw only the start of the autumn migration. But in 1977 we were able to stay as late as money and the weather allowed and, having the advantage over

earlier bird-watchers of rapid road transport out of Ladakh, could remain till mid-October. By staying in one place and bird-watching and ringing in the vicinity daily from early August onwards we were able to build up a reasonable picture of the movements of local breeding birds and longer distance migrants through the Upper Indus Valley near Leh during the autumn. No previous systematic monitoring of migration for this length of time has been done in the western half of the Tibetan region as far as we know though one or two more lengthy but less intensive studies have been done in the south and east, in particular Frank Ludlow's at Lhasa and Gyangtse which spanned several years (Ludlow 1927, 1928, 1950). To the best of our knowledge no one has tried ringing birds anywhere in Tibet before.

As already mentioned our first few days in the Upper Indus Valley were marred by violent stomach trouble which confined us to Leh and held up the fieldwork between 2 and 6 August. On the 6th we were fit enough to start prospecting for a suitable ringing site. We were directed to the Divisional Forest Officer for advice and having described our basic requirements - an area of scrub somewhere along the Indus within easy reach of Leh in which to set up our mist-nets - were shown round three possible sites. When we expressed a preference for the large Forestry Department plantation along the north bank of the Indus near the village of Tikse not only was our request immediately granted but we were invited to live in a small Forestry Department hut on the edge of the plantation free of charge for as long as required. We had originally intended running our ringing operation from a tent but having completed the project it is obvious this would have been very inconvenient. In fact the helpfulness of the Divisional Forest Officer and his staff was largely responsible for the success of our autumn fieldwork.

Around Leh the Indus Valley is at its broadest in Ladakh - about 6 km. wide at Tikse. The Indus runs through a flat cultivated floodplain as much as 2 km. wide either side of which lies a stony desert zone, itself often several kilometres across, rising gradually to the arid mountains beyond. The cultivation in this part of the Indus Valley, particularly around Tikse, differs from that in the Suru Valley in that the fields - mainly wheat and barley - are substantially larger and not as broken up by trees, which grow mainly around the villages and in some young plantations along the river. Similarly scrub, mainly Hippophae, is largely confined to patches in fenced plantations and, in particular, islands in the Indus normally beyond the reach of cattle and goats. The banks of the river are generally low and stony and though they sometimes give directly onto fields or plantations, as at our Tikse ringing site, they are often flanked by a belt of grazing land, varying from a few metres to about a kilometre in width.

The Forestry Department's plantation at Tikse is approximately four square kilometres in area. The southern boundary is formed by the Indus and the plantation is traversed by a number of irrigation channels diverted from the river, the largest of these several metres across and over a metre deep. To the north the plantation gives on to fields at its western and eastern ends but most of the northern edge abutts on a plantation of close-growing willows and poplars with

grass and some patches of Hippophae beneath. This informal garden, owned by Tikse monastery, is a little under half the size of the Forestry Department plantation and the only large group of tall trees for miles around. The hut we lived in lies at the edge of cultivation just outside the forestry plantation's boundary fence near the west end of the monastery garden.

The whole forestry plantation has been planted with willow saplings in the last decade or two but, because of differences in soil and associated plants, shows a large degree of variation between different parts. The bulk of it is quite open with the trees well spaced and usually little over head-height. The area immediately west of our hut in the northwest part of the plantation is the most diverse, and contains several pools varying from tiny, temporary boggy patches to a shallow pond about 100 m. long by 10 m. wide. Around these are some small patches of Phragmites, mostly under 50 cms. high. Between the largest pool and our hut lies a mixture of small lawns of short, often wet grass between banks of tall, dense Hippophae up to 3 m. high and some small willows and poplars. Immediately south of the hut is a patch of open stony ground with low scattered clumps of Hippophae and Tamarix and beyond this, sandwiched between two creeks, a good area with mixed banks of Salix and Hippophae and a close grove of willows 1.5 to 5 m. high. Further towards the river the ground is drier, more stony and largely bare between the planted willow saplings. Scattered dry grass and Tamarix bushes up to 1 m. high occur but Hippophae is relatively short (up to about 1.3 m.) and largely confined to banks along some irrigation channels. Breaks in banks of Hippophae and low Salix provided ideal sites for the mist-nets most of which were thus concentrated in the less open areas near our hut. During our stay at Tikse the water-level in the Indus and the creeks running across our netting area dropped steadily as the flow of melt water from the mountains diminished so that though in early August reaching the furthest nets meant wading in icy water up to your waist (not pleasant at 6 a.m.), by October we were rarely getting our knees wet.

The Tikse forestry plantation and adjacent monastery garden constitute one of the largest and certainly the most diverse area of scrub and trees between Himis and Nimu and an ideal place to monitor migration of most terrestrial birds. However, though pools in the plantation provide some wader habitat the Indus immediately to the south is rather uninteresting, its banks being low but fairly steep and stony and the only nearby islands just low shingle bars. Consequently we extended our bird-watching to include an area attractive to waterside birds. We chose an area of wet grassland on the south bank of the river near Choglamsur which had been discovered by Clive Denby and Andrew Phillips in 1976 and was the best wader habitat for miles around. The area we covered here was in fact rather smaller than that watched by Clive and Andrew. It consists of short grass with some bare stony patches immediately west of a bridge across the Indus which, rightly or wrongly, we called Choglamsur Bridge. The area has several shallow grassy pools and is crossed by a few small water-filled ditches. The adjacent riverbank is low and grassy. Flat grass and shingle covered islands in the river were gradually exposed as the level of the Indus fell during the autumn. To the south the grazing land is bordered by a narrow belt of barley fields and scattered houses beyond which stony desert

stretches up to the village of Stok. The riverbank and adjacent wet grass were covered on the following days :

August : 11, 13, 15, 18, 20, 24, 26.
September : 1, 4, 7, 11, 14, 18, 22, 25, 26, 29.
October : 3, 8.

Though only about one square kilometre in extent this area produced sixteen species of wader and several other interesting migrants.

Bird-watching at the Forestry Department's plantation at Tikse was almost continuous from dawn to dusk throughout our stay and particularly intensive in the areas covered while patrolling the mist-nets. The surrounding cultivation was also watched regularly, coverage becoming less frequent towards and beyond She though the entire stretch between Tikse and Choglamsur was covered quite regularly on walks to and from Choglamsur Bridge. The only nearby habitat not regularly watched was the desert zone north of the road to Leh, mainly because it was practically birdless - though it was frequented by Desert Wheatears (Oenanthe deserti) towards the end of our stay. Williams made a four-day trip to Stok and up the gorge to the south, between 26 and 30 August. This area, part of Denby and Phillips' 1976 study area is described in their report (Denby and Phillips 1977). Apart from this short hike we were both resident at Tikse, with occasional day-trips to Leh to stock up with provisions.

The ringing site was thus manned for a total of sixty-three days, between 9 August and 11 October, and birds were caught and ringed on all but three of these days. Altogether 964 birds of twenty-nine species were trapped, and of these 240 were subsequently retrapped on one or more occasions.

By ringing and recording weight, measurements and other details of as many birds as we could, we hoped to find out as much as possible about the biometrics of birds using the area. From changes in the biometrics both of individual retraps and of each species catch as a whole with time we hoped to be able to make generalisations about the post-breeding and post-fledging portion of the life cycle of the local breeders, and about their preparation for migration. By maintaining a constant catching effort we hoped to obtain an index of the volume of migration through the area, since the number of birds caught should be approximately proportional to the number present in the netting area. Trapping also allowed many species to be identified down to race when this would not have been possible in the field, and several species with inconspicuous behaviour were caught, which might have been overlooked had they not flown into our nets. It is unlikely out of a total of just under a thousand birds ringed, nearly all of them small passerines, that any will be recovered. A recovery would be extremely exciting, but recoveries were not an important motive behind our ringing programme, and at the time of writing it is sobering to think that the majority of the birds we ringed will already have died.

Almost all the birds were caught in five mist-nets, four of them nine metres long by three metres tall, and one six metres long by four metres tall. The nets were set in scrub on flat ground between the braided channels of the Indus and, when open, were patrolled half-hourly to extract birds which had flown into them.

Walks around the nets involved wading thigh deep through fast-flowing streams and negotiating five foot barbed wire fences - part of the Forestry Department management scheme for the area - and we were sustained on our patrols by quantities of peanut brittle, and cold tsampa porridge with sugar.

Our attempts to maintain a constant catching effort with the nets were hampered by livestock damage and by soldiers billeted in Tikse who stole a net to use for fishing. A comical encounter with Leh police proved fruitless and in the end our Forest Guard friend Mohammed Ali found the net plastered with slime and weed, but not beyond repair. Another net was stolen later in the season and was never recovered. Damage by livestock - horses, goats and dzhos, (a hybrid of yak and cow), all of which leapt over or through the forestry plantations boundary fences with consummate ease - was a constant bugbear. A dzho in a mist-net is a horrifying sight, and many hours were spent repairing damage caused by such encounters. Nets were moved regularly in attempts to find the safest sites, and our Hume's Short-toed Lark (Calandrella acutirostris) site was reluctantly abandoned permanently in early September because it was an open area favoured by livestock.

Detailed records were kept of the footage and positions of nets in use, and from these, calculations of total net-foot-hours were made for each five-day period of our stay. By adjusting the total number of each species caught per five-day period according to the number of net-foot-hours worked in that period, we obtained, we hope, a reasonable index of the number of birds using the site in each period. Graphs showing mean numbers of birds caught per ten net-foot-hours in successive five-day periods, for the five species of which more than thirty-five were ringed, are shown in the ringing report, together with a brief interpretation of each graph.

Birds were also caught in two walk-in rail traps, made from chicken-mesh. These traps, (comprising a simple small chamber with a funnel entrance, with two long baffles leading to the entrance in a shallow Vee) caught two Baillon's Crakes (Porzana pusilla) in their first day of operation, and thereafter caught about a dozen Bluethroats (Erithacus svecicus) and a Tree Pipit (Anthus trivialis), making them well worth the punctured finger-ends suffered in their manufacture.

Once trapped, birds were placed in cotton bird-bags and taken back to the Forestry Department hut (dubbed "The Palace") for processing. Birds were ringed with Bombay Natural History Society rings of Swedish manufacture, and aged and sexed using Svensson (1975), the three Williamson Warbler Guides (Revised editions 1967 and 1968) and notes from Ali and Ripley (1968 - 1974) as well as plumage details such as wear and moult characteristics. One plumage characteristic we found particularly useful for ageing birds in the Himalayas was the development of parallel "fault bars" on the rectrices, and even the remiges of young birds. Fault bars occur when fledgelings in the nest are deprived of food for a period long enough to cause the development of a zone of weakness in each growing feather. Since all the rectrices and remiges of nestlings (unlike those of adults) are growing simultaneously, the zones of weakness in each feather line up to form 'bars' of feather tissue of a slightly different colour to the rest of the feathers.

Certainly, fault bar development was more widespread than we have seen in autumn in Southern England, and this may be something to do with the harsher environment of the Himalayas.

Winglength and weight were recorded on all birds caught, and many also had bill, tarsus and tail measured, and wing formula taken. Measurements were taken with a stopped metal ruler and with dividers and weights with Pesola spring balances, the birds being placed in a polythene cone for weighing. The time of each weighing was also recorded, and birds followed the well-known pattern of increasing steadily in weight as the day progressed and losing weight overnight. On our return from India, the changes in weight of all retraps were plotted, and for the five species of which more than thirty-five individuals were trapped, mean weight changes over successive five-day periods were analysed on the Southampton University computer using one-way analysis of variance. This analysis was carried out for each age and sex category where large enough samples were caught, and significant results are plotted and interpreted in the ringing report. One-way analysis of variance was also carried out on the computer for winglength of different age and sex categories of these five species, and for mean catching times of those species which showed significant variation in weight with time, and again, results are shown in the ringing report. Frequency distribution of winglengths of these five species was also plotted for the separable age and sex categories, and some interesting results were obtained. In the ringing report we also present weights and measurements of species of which fewer than thirty-five were caught, and details of wing formulae where these are important to identification.

Many of the birds trapped at Tikse were moulting, and details of the moult of 141 new birds and 43 retraps, involving eight species were taken for submission to the British Trust for Ornithology moult enquiry and for our own analysis. We obtained a particularly clear picture of the post-nuptial moult of the Mountain Chiffchaff (Phylloscopus sindianus) and got enough information from four other species - Hume's Lesser Whitethroat (Sylvia curruca althaea), Citrine Wagtail (Motacilla citreola), Bluethroat (Erithacus svecicus) and Hume's Short-toed Lark (Calandrella acutirostris), to make detailed analysis worthwhile. In our work we confined ourselves to the study of wing and tail moult, and looked into such questions as the timing of onset and duration of moult, the relative rates of moult of the three main flight feather tracts (Primaries, Secondaries and Tail). Numerous graphs of moult and brief interpretations are to be found in the main ringing section.

Our species total for the Upper Indus Valley between Leh and Tikse reached 108 definitely identified and one or two additional "possibles". The total includes at least eighteen species new for Ladakh four of which - Night Heron (Nycticorax nycticorax), Gull-billed Tern (Gelochelidon nilotica), Brahminy Mynah (Sturnus pagodarum) and a species of Spine-tail Swift (Chaetura sp.) - have not been recorded previously in the Tibetan Region as far as we know.

Finally it is worth stressing that our time in Ladakh - whether in the wilds of Rungdum or the centre of Leh - was made particularly relaxing and enjoyable by the friendliness of local people. At Tikse we were frequently visited by hospitable locals, from local children to Forest Guards' and monks from Tikse Gompa. The only two exceptions to this barrage of affability were unfortunately our immediate neighbours' children who became our only enemies in Ladakh when they stole our copy of Svensson and cut the pictures out.

4. DISCUSSION

.1 The Suru Valley Survey

It is obvious from the combined results of our visits and those of Osmaston (1926, 1930), Koelz (1940) and Ludlow (1920) that the avifauna of the Suru Valley, though basically similar to that of the rest of Ladakh, has a strong component of species characteristic of the alpine grassland on the southern slopes of the Himalayas above the tree line - an area which forms a transition zone between the avifauna of the forested lower slopes with their great diversity of Oriental species and Ladakh with its essentially Palearctic and Tibetan birdlife (Meinertzhagen 1928). As mentioned in the introduction this is to be expected given the Suru Valley's position and slightly less arid climate.

Defining exactly which birds occurring in the Suru Valley and elsewhere in Ladakh are members of this transition zone avifauna is difficult and in looking at the distribution of species in Ladakh it is probably best to think of the region's birds as comprising "western" and "eastern" elements. The bulk of species commonest in western Ladakh are Himalayan ones adapted to relatively non-arid habitats, many are characteristic of Meinertzhagen's alpine pasture "transition zone" though a number are also found at low altitudes in the foothills. Extreme examples of this Himalayan element - birds rare in Ladakh and restricted to the extreme west of the region as breeding species - are West Himalayan Rubythroat (Erithacus pectoralis pectoralis) and Red-breasted Rosefinch (Carpodacus puniceus) (two species more or less restricted to the southern end of the Suru Valley both of which we failed to find). If the two species we added to the Ladakh list during our Suru Valley survey - Scaly-bellied Green Woodpecker (Picus squamatus) and Little Forktail (Enicurus scouleri) - breed in the area they would also qualify.
A few other species which one could not call Himalayan extend into western Ladakh from Baltistan. These are species at the extreme eastern limits of their range such as the Eastern Pied Wheatear (Oenanthe picata) and Hume's Wheatear (Oenanthe alboniger).

Extremes of the 'eastern element' are species like the Tibetan Sandgrouse (Syrrhaptes tibetanus) and Tibetan Partridge (Perdix hodgsoniae). The great majority of the birds breeding in Ladakh have distributions between the two extremes and thus occur in central Ladakh but one can still classify most as members of either the eastern component - more adapted to the dry, open Tibetan Plateau and commonest in Rupshu and northeastern Ladakh - or the western one - usually adapted to less arid mountain habitats and thus commonest in areas of Ladakh adjacent to the Main Himalayan Range. Examples of the western component which extend into central Ladakh but are particularly characteristic of the Suru and Dras Valley area are Himalayan Griffon (Gyps himalayensis), Snow Pigeon (Columba leuconota), Alpine Chough (Pyrrhocorax graculus), Whistling Thrush (Myiophonus caeruleus) and Plain-coloured Mountain Finch (Leucosticte nemoricola).

Some of the more adaptable and ubiquitous species, such as the Black Redstart (Phoenicurus ochruros) as well as some restricted to agricultural land with trees - like Magpies (Pica pica) and Hoopoes (Upupa epops) - or more specialised natural habitats - like Lesser Sandplovers (Charadrius mongolus) and Redshanks (Tringa totanus) - tend to be found wherever these habitats occur in Ladakh and do not show a steady increase or decrease in abundance as one moves away from the Main Himalayan Range. However, viewing Ladakh's breeding birds as essentially a mixture of a mainly 'Himalayan' element whose members have a western bias to their distribution in the region and a 'Tibetan' one most dominant to the north and east seems to fit the facts quite well.

Though the avifauna of the whole of the Suru Valley between Kargil and Parkachik forms a natural unit that of Rungdum is clearly different. This is largely due to the lack of trees and agricultural land which eliminates species like Hobbies (Falco subbuteo), Magpies (Pica pica) and Hoopoes (Upupa epops). The pools, creeks and marshy ground in the valley bottom attracts wetland species characteristic of the Deosai Plain in Baltistan and the Rupshu Lakes. These include Redshank (Tringa totanus), Common Tern (Sterna hirundo) and one or two Ruddy Shelducks (Tadorna ferruginea). Stony desert around and east of Zuildo provides ideal nesting habitat for Lesser Sand Plover (Charadrius mongolus) while drier parts of the "swamp" with grass and dwarf Salix scrub hold several mountain species usually found breeding in the high "alpine zone" such as Horned Lark (Eremophila alpestris) and Robin Accentor (Prunella rubeculoides) and along the valley sides Plain-coloured Mountain Finch (Leucosticte nemoricola), Brandt's Mountain Finch (Leucosticte brandti) and Adam's Snowfinch (Montifringilla adamsi).

It is natural to assume that the avifauna of an area as remote as Rungdum would remain unchanged for centuries but our failure to find Tickell's Leaf Warblers (Phylloscopus affinis) and Himalayan Rubythroats (Erithacus pectoralis) breeding in the dwarf Salix scrub on the valley floor suggests that these species have declined at Rungdum. Osmaston includes both in a list of birds "common in and near the swamp" in the paper describing his first visit (Osmaston 1926). The other species on this list - Mountain Chiffchaff (Phylloscopus sindianus), Citrine Wagtail (Motacilla citreola) and Robin Accentor (Prunella rubeculoides) are still very abundant. In the paper on his second visit (Osmaston 1930) Tickell's Leaf Warbler is described as "fairly common and breeding in the low willow scrub in the swamp" and the Rubythroat as "occasionally seen near the edge of the swamp and on the hillsides above it". Koelz also describes the Rubythroat as "rather common from below Pensi La to Shakkar below Ringdom" and collected six males during his brief visit in 1933 (Koelz 1940). Neither Koelz nor Osmaston state the extent or height of dwarf Salix at Rungdum but both describe it as forming "thickets" around the swamp which suggests that at least in places it was a lot higher than it is now, so it seems possible that Tickell's Leaf Warbler and the Himalayan Rubythroat have become rarer as the result of a reduction in the height of this scrub. The most likely explanation for such a change is an intensification of

of grazing pressure. Though we have no direct evidence of this there are certainly large numbers of livestock grazing the Rungdum Swamp, not only ponies owned by the locals but large herds of goats brought up from Jammu for the summer by nomadic herdsmen. Political and technological changes in the northwest Himalayas since the 1920s could well have increased the use of Rungdum as a grazing place. Another possible explanation for a reduction in scrub cover around Rungdum could be some natural change in drainage patterns and soil moisture conditions.

North of Parkachik we also found some evidence for a reduction in the numbers of two other scrub-dwellers, Large-billed Bush Warbler (Bradypterus major) and Bluethroat (Erithacus svecicus) and again a reduction in suitable habitat may have been the cause. We might have had greater success finding Himalayan Rubythroats and more of the other three species if we had covered the stretch from Gulma Tongas to just below Parkachik which according to Osmaston (1926, 1930) has good patches of Salix, Rosa and Hippophae scrub in which he found all four species quite common.

On the "plus" side there is good evidence for an increase in the numbers of Golden Eagles (Aquila chrysaetos) and Himalayan Griffons (Gyps himalayensis) in Ladakh since the first half of this century and the suggestion of a local increase in Bearded Vultures (Gypaetus barbatus), (see the sections on these species in the Systematic List). All three are carrion-feeders - the two vultures all year round and the eagle during periods when live food is scarce - so a possible explanation for the apparent increase in these raptors is that carrion has become more easily available, most likely due to an increase in domestic livestock grazing the "alpine zone" rather than a greater abundance of wild herbivores. This explanation does have the bonus of neatly fitting in with the apparent decrease in scrub cover at Rungdum and possibly elsewhere.

Though the July fieldwork in the Suru Valley was intended as a survey of breeding birds we did see some early migrants, notably five species of wader at Rungdum, Fire-capped Tits (Cephalopyrus flammiceps) at Kargil, and Red-Rumped Swallows (Hirundo daurica) near Shargol, none of which have ever been recorded breeding in Ladakh. Combining the results of our visit with those of Osmaston and other previous ornithologists a fairly complete though superficial picture of the breeding birds in the area has been built up. We attempted to improve on Osmaston's reports by including more detail on habitats and being more quantitative but for a really thorough survey analysing the relationships between the bird communities and the habitats they occupy a botanist familiar with the local flora is essential, as well as a lot more time !

.2 The Migration Study

The traditional view of the migration of birds breeding north of the Tibetan Region and wintering in the Indian subcontinent is that they avoid the 2,500 km long barrier formed by the Himalaya and Tibetan Plateau by skirting it to east and west, the western half of

this pincer movement crossing into northwest Pakistan through passes across the eastern end of the Hindu Kush, where the mountains are at their narrowest. However evidence has gradually accumulated which shows that a much larger number of birds than was originally thought cross the Himalaya directly in their journeys to and from their wintering areas. Indeed, the high altitude observations of mountaineers have revealed that some, particularly wildfowl and waders, tackle even the highest sections. Our migration study at Tikse adds some more evidence to support the view that the high Himalaya are not such an impassable barrier to migrants as was previously supposed.

Though we did not see the kind of large scale migratory movements one can expect at coastal observation points in western Europe under suitable meteorological conditions our migration study revealed a surprising variety of non-local migrants passing through the Upper Indus Valley near Leh despite the area being over 100 kms northwest of the peaks of the Main Range of the Himalayas at their nearest point and about 250 kms from the lowlands of southern Sinkiang to the north - from which the Indus Valley is separated by the formidable barrier of the Karakoram. Of those birds we saw in the Upper Indus Valley which do not breed in Ladakh the majority, in terms of both the number of species and the number of individuals seen, were non-passerines. According to the list of species which Vaurie (1972) believes breed in 'western Tibet' twenty-six of the sixty-three non-passerines we definitely identified in the Indus Valley do not breed anywhere in Baltistan, Ladakh, Spiti or western Tibet proper. This compares with only ten of the forty-four passerines we saw during the migration study.

The predominance of non-passerines among the species we saw which apparently do not breed in western Tibet is accentuated if one starts looking for concrete evidence of breeding such as records of territory-holding pairs, nests or recently fledged young. This is because Vaurie includes in his lists of birds breeding in the different regions of Tibet a few species for which no such evidence exists and which in fact seem unlikely given present knowledge of their breeding range and required nesting habitat. For example Baillon's Crake (Porzana pusilla) and Moorhen (Gallinula chloropus) are included in the list for western Tibet on the basis of a handful of specimens (two and four respectively) collected by Koelz in Spiti during the middle of the autumn passage period, mostly in open agricultural land which sounds quite unsuitable nesting habitat. Similarly some species of duck, such as Pintail (Anas acuta), Wigeon (Anas penelope) and Shoveler (Anas clypeata), are included because they have been collected or seen in the region despite the fact that nearly all the records are spring and autumn ones and no one has reported any signs of breeding on the extremely limited areas of wetland available. Having looked for more conclusive evidence of nesting we think that of the sixty-three non-passerines we saw in the Indus Valley at least thirty-six and possible as many as forty do not breed anywhere in Ladakh, Baltistan, Spiti or western Tibet proper though the list of passerines not breeding in the region remains the same.

Among the non-passerine birds we saw which appear to be passage migrants or vagrants only in western Tibet Charadriiformes predominate with at least thirteen species of wader, one gull and two tern species. Then come raptors (Falconiformes) with eight species, and wildfowl (Anseriformes) with seven. Fourth come Gruiformes with, most surprisingly considering their weak power of flight, three species of crake. A list of all these species is given below. Names accompanied by an asterisk indicate species which are included in Vaurie's list of west Tibetan breeding birds but which we consider are unlikely to nest in the area on present evidence.

	Night Heron	(Nycticorax nycticorax)
*	Pintail	(Anas acuta)
*	Common Teal	(Anas crecca)
*	Mallard	(Anas platyrhynchos)
*	Wigeon	(Anas penelope)
	Garganey	(Anas querquedula)
*	Shoveler	(Anas clypeata)
	Common Pochard	(Aythya ferina)
	Northern Goshawk	(Accipiter gentilis)
	Long-legged Buzzard	(Buteo rufinus)
*	Booted Eagle	(Hieraaetus pennatus)
	Hen Harrier	(Circus cyaneus)
	Pallid Harrier	(Circus macrourus)
	Montagu's Harrier	(Circus pygargus)
*	Marsh Harrier	(Circus aeruginosus)
	Peregrine	(Falco peregrinus)
*	Baillon's Crake	(Porzana pusilla)
	Spotted Crake	(Porzana porzana)
*	Moorhen	(Gallinula chloropus)
	Eastern Golden Plover	(Pluvialis dominica)
	Curlew	(Numenius arquata)
	Spotted Redshank	(Tringa erythropus)
	Marsh Sandpiper	(Tringa stagnatilis)
	Green shank	(Tringa nebularia)
	Green Sandpiper	(Tringa ochropus)
	Wood Sandpiper	(Tringa glareola)
*	Terek Sandpiper	(Tringa terek)
	Little Stint	(Calidris minuta)
	Temminck's Stint	(Calidris temminckii)
	Curlew Sandpiper	(Calidris testaceus)
	Ruff	(Philomachus pugnax)
	Black-winged Stilt	(Himantopus himantopus)
	Great Black-headed Gull	(Larus ichthyaetus)
	Whiskered Tern	(Chlidonias hybrida)
	Gull-billed Tern	(Gelochelidon nilotica)
	Spine-tail Swift sp.	(Chaetura sp)

The ten passeriformes we saw in the Indus Valley which appear to be exclusively migrants or vagrants in western Tibet are scattered through six different families. They are :

Swallow	(Hirundo rustica)
Brahminy Mynah	(Sturnus pagodarum)
Rosy Starling	(Sturnus roseus)
Jackdaw	(Corvus monedula)
Great Reed Warbler	(Acrocephalus arundinaceus)
Paddyfield Warbler	(Acrocephalus agricola)
Siberian Chiffchaff	(Phylloscopus collybita tristis)
Isabelline Wheatear	(Oenanthe isabellina)
Black-throated Thrush	(Turdus ruficollis)
Black-throated Accentor	(Prunella atrogularis)

In addition distinctive subspecies of two warblers were ringed which have not been collected in Ladakh before and are unlikely to breed here given present knowledge of their distributions. These were Sylvia curruca blythi/margelanica and Phylloscopus trochiloides viridanus. Ludlow (1927, 1928) during his three years bird-watching around Gyangtse in southern Tibet recorded a similar predominance of non-passerines in his list of migrants which did not breed locally (thirty-four species as compared to seventeen passerines) with waders, wildfowl and raptors again forming the great majority. The predominance of these groups among the non-breeding migrants recorded in Tibet must be largely due to their being mainly relatively large birds with excellent powers of flight for which the Himalayas and Tibetan Plateau are a less formidable barrier than they are for smaller, weaker fliers. Many of the waders and ducks and a few of the other migrants listed above were also seen by Denby and Phillips during the 1976 Southampton University expedition to Ladakh. In addition they saw the following species which have not been recorded breeding in western Tibet and which we did not see in the Upper Indus Valley in 1977 :

Gadwall	(Anas strepera)
Egyptian Vulture	(Neophron percnopterus)
Whimbrel	(Numenius phaeopus)
Alpine Swift	(Apus melba)
Red-rumped Swallow	(Hirundo rustica)
Himalayan Greenfinch	(Carduelis spinoides)

Birds breeding in southern Sinkiang would appear to be by far the most likely to cross the northwest Himalayas on their way to and from their nesting areas because they are boxed in to the north by the Tien Shans and to the west by the Pamirs and Alai mountain systems so that a detour round the western end of the Himalayas would appear to be more arduous than a direct route across the Karakoram and Himalayas. But problems arise in trying to hypothesise about the breeding areas of migrants recorded in Tibet because not only is the status of birds in the region itself often uncertain but the avifauna of regions to the north is also hazy. This is certainly true of Sinkiang and the problem of ascertaining what is known of its avifauna is made more difficult if one knows no Russian or Chinese. Though they must be essential reading for anyone attempting a review of trans-Himalayan migration we have not read the few Russian and Chinese papers on the region's birds and most of what information we have comes

from Sharpe's ornithological report on the second 'Yarkand Mission' (Sharpe 1891) and notes on distribution in various reference works, particularly Dementiev et al (1966 - 70). Southern Sinkiang, like Ladakh, is extremely arid and consists largely of a central desert, the Takla Makan, and cultivation is basically similar to that in Ladakh. Consequently many of the regions species also breed in the northwest Himalayas. However, the region does contain grassy steppe around the edge of the Takla Makan, forested slopes in the Tien Shan Mountains and some patches of marshland, all habitats not found in Ladakh.

Coniferous woodland in the Tien Shans is likely to have been the breeding area of the Goshawks (Accipiter gentilis) we saw at Tikse while the harriers we recorded on passage probably came from grassland and reedbeds in southern Sinkiang, as all four species have been seen or collected in the region and three have been found nesting there (Sharpe 1891, Dementiev et al 1966 - 70). The crakes which appeared at Tikse in September may also have come from Sinkiang as their breeding distribution is little known but it is obvious that the large majority of the migrant waders and wildfowl we saw passing through the Upper Indus Valley must have come from Siberia.
Of the ten passerines we recorded in the Upper Indus Valley for which there is no evidence of breeding in western Tibet Swallow (Hirundo rustica), Great Reed Warbler (Acrocephalus arundinaceus), Paddyfield Warbler (Acrocephalus agricola), Isabelline Wheatear (Oenanthe isabellina) and Black-throated Accentor (Prunella atrogularis) are all likely to have bred in Sinkiang in or south of Tien Shans, as is Sylvia curruca blythi/margelanica but the occurrence of Siberian Chiffchaff (Phylloscopus collybita tristis) suggests that even some of the smallest passerines breeding north of the Tien Shans take a direct trans-Himalayan route into India.

The similarity between the avifauna of Ladakh and southern Sinkiang complicates the interpretation of changes in the abundance of common local breeding species in Ladakh during the migration period. A number of the common passerines we found around Tikse - such as Mountain Chiffchaffs (Phylloscopus sindianus), and Common Rosefinches (Carpodacus erythrinus) - showed autumn peaks in abundance before becoming scarce. These may well have just been pre-migratory gatherings of the local breeding population as changes with time in the weight and measurements of the common species we were catching, which might have signalled the replacement of local birds by members of a different population of non-local migrants, did not in fact occur. However the arrival of a few individuals of non-local species or subspecies, in particular the occurrence of Phylloscopus collybita tristis and Sylvia curruca blythi/margelanica suggests these peaks in the abundance of the local breeding birds may have included some migrants from north of the Karakoram. Tree Pipits (Anthus trivialis) have rarely been recorded in Ladakh in mid-summer, the great majority of previous records being September ones. Consequently though the species probably does breed occasionally in Ladakh we are sure the substantial passage we recorded at Tikse was of birds from north of the Himalayas. A similar argument can be made for regarding the Grey Herons (Ardea cinerea) we saw as trans-Himalayan migrants.

Changes in the weights of adult Bluethroats (Erithacus svecicus), Mountain Chiffchaffs (Phylloscopus sindianus) and Hume's Lesser Whitethroats (Sylvia curruca althaea) during the time we ringed at Tikse were probably related to post-nuptial moult and the end of the nesting season rather than any preparation for migration. The only other significant weight changes we recorded in our mist-netting catch was a small increase in the weights of adult Common Rosefinches (Carpodacus erythrinus) in the last week or two before the last disappeared (see the Ringing Report). The lack of evidence for pre-migratory fattening which at first surprised us probably reflects two things about the migration of birds out of central Ladakh. Firstly the distance between our ringing site and the plains of northern India is not large in terms of the distances many small passerines habitually fly non-stop on migration. Secondly birds which breed in Ladakh are adapted to exploit local food resources and thus do not need to rush out of Ladakh in a single non-stop flight but can drift out in a fairly leisurely fashion, feeding as they go.

Walton (1906), discussing migration in southern Tibet, proposed that most birds migrating through the area follow the Tsangpo Valley and pass through Assam to avoid crossing the Himalayas to the south which would otherwise provide a much more direct route to and from the Indian lowlands. However, the observations of mountaineers as well as more recent evidence provided by radar studies have supported the view that many migrants can and do fly at extreme altitudes and have no great need to follow valleys through the Himalayas. Ludlow (1927, 1928) put forward a good case against migrants following the Tsangpo into and out of southern Tibet. As he pointed out the migrants he saw in the Gyangtse area would have had to cross country north of the Tsangpo quite as difficult as the Himalayas separating them from the lowlands. Discussing the thousands of wildfowl which congregate on lakes near Gyangtse in spring and autumn he argues "I find it difficult to imagine that these birds are going to branch off east and follow the Tsangpo when a four hour flight or so alone separates them from the Indian Plain."

This commonsense argument against the slavish following of low ground through the mountains would appear just as strong when applied to birds migrating through the northwest Himalayas as the main river through the area, the Indus, runs parallel to the four main ranges. There is no easy route between the northern slopes of the Karakoram and the Indus Valley near Tikse and having arrived there a migrant following the valley would, if it travelled southeast, find itself running out of river and still deep in Tibet while if it headed downriver would have to travel northwest through the mountains for 300 kms before reaching Gilgit where the Indus turns south. This is not to say that birds migrating through the northwest Himalayas fly in exactly straight lines completely oblivious to the positions of passes, tributary valleys and other local physiographic features. It was noticeable that the bulk of the birds we saw flying over the ringing site at Tikse were following the Indus rather than flying straight across it and it is doubtful whether any of these left the valley exactly south of where they entered it. But we think it unlikely that any migrants follow the course of the Indus for hundreds of kilometres in a region where it runs parallel to, rather than through, the mountain ranges they must cross to reach their

wintering grounds. Though we noted down flight directions to see if particular species were consistently flying up or down river no predominant flight direction emerged for the great majority of species. The exceptions were Grey Heron (Ardea cinerea) and hort-toed arks (Calandrella acutirostris/cinerea) which were usually heading southeast and Guldenstadt's Redstarts (Phoenicurus erythrogaster) nearly all of which were going northwest.

From late September onwards a large proportion of the birds seen around the Tikse forestry plantation were of species usually regarded as 'altitudinal migrants' - the most conspicuous being Guldenstadt's Redstarts and Eastern Great Rosefinches (Carpodacus rubicilloides). Dubbing a species an altitudinal migrant usually implies that it undergoes small scale movements between altitudinal zones without much horizontal shift in range, but we suspect that many of the "altitudinal migrants" arriving at Tikse were not from mountains in the immediate vicinity. Even though one must expect populations of altitudinal migrants to become concentrated once they move into the valleys it is difficult to believe that all the Guldenstadt's Redstarts around Tikse in late September and October had bred in central Ladakh, as reports of summer sightings and nests for the area are very scanty. The predominantly northwesterly flight direction suggests the species was moving out of eastern Ladakh and adjacent areas of Tibet proper. Similarly the abundance of Brown Accentors (Prunella fulvescens) relative to Robin Accentors (Prunella rubeculoides) at Tikse in October is at odds with the rarity of the former as a breeding species in Ladakh and the arrival of one or two Black-throated Accentors (Prunella atrogularis) with these birds adds weight to the view that they came from further afield.

In interpreting our records from the Upper Indus Valley several qualifying points must be borne in mind. Firstly, we left in mid-October and though we believe we had seen the large bulk of the passage of most species we may have missed a significant proportion of the wildfowl migration. Secondly, one must remember that at Tikse the floor of the Indus Valley is at about 3,300 m. while mountain ranges immediately to the north and south are over 5,000 m. high at their lowest points. Thus if trans-Himalayan migrants were crossing these ranges they would be likely to cross the valley over 1,500 m. above the river unless they were coming down to feed or rest or were forced down by adverse weather conditions. The notion that in good weather a significant proportion of migrants were missed as they flew high overhead is borne out by the fact that the most diverse wader "fall" so far recorded in Ladakh, that seen by Denby and Phillips near Choglamsur Bridge in August 1976, was found immediately after an atypical three-day period of rain and low cloud. In 1977 we had a rather average dry autumn and it was noticeable that though the banks of the Indus produced a good variety of waders during the autumn there were surprisingly few of any one species present at a particular time, the largest number being eleven Greenshanks (Tringa nebularia) on 7 September. This contrasts with wader sightings at higher altitudes during the expedition such as the twenty-five Wood Sandpipers (Tringa glareola) and thirty-three Ruffs (Philomachus pugnax) we found at Rungdum (3,800 m.) on 18 July and the thirty Black-winged Stilts (Himantopus himantopus) seen beside a tarn at 5,200 m. by Fraser, Dravers and Ritchie on 31 August. Considering that Ludlow's observations of migration at Gyangtse in southern Tibet spanned three years (Ludlow 1927, 1928) compared to our three-and-a-half months

in Ladakh it would appear that migration across the narrow western end of Tibet is a bit more diverse than at points south of the Chang Tang. However there is little in the geography of the Tibetan Region to funnel trans-Himalayan migrants into concentrated 'narrow fronts' at particular points. At the western end of the region migrants do not have to fly for over a thousand kilometres over the high wastes of the Chang Tang but they must cross the Karakoram - the most formidably solid mountain block in the region - as well as three parallel ranges to the south.

The view that the Tibetan Plateau and Himalayas are too formidable a barrier for any migrant has already been disproved but the question of the relative importance of direct trans-Himalayan migration as compared to relatively 'narrow front' routes skirting Tibet to east and west still remains very largely unanswered. The relative importance of these two migration strategies will obviously vary from species to species depending on their powers of flight, breeding and wintering areas, food requirements en route and other aspects of their biology. A reasonably complete picture can only be built up by the systematic, quantitative monitoring of migration at several other places inside the Tibetan Region and at strategic points to east and west.

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APPENDIX C Systematic List and Ringing Report

V - MOUNTAINEERING SUMMARY

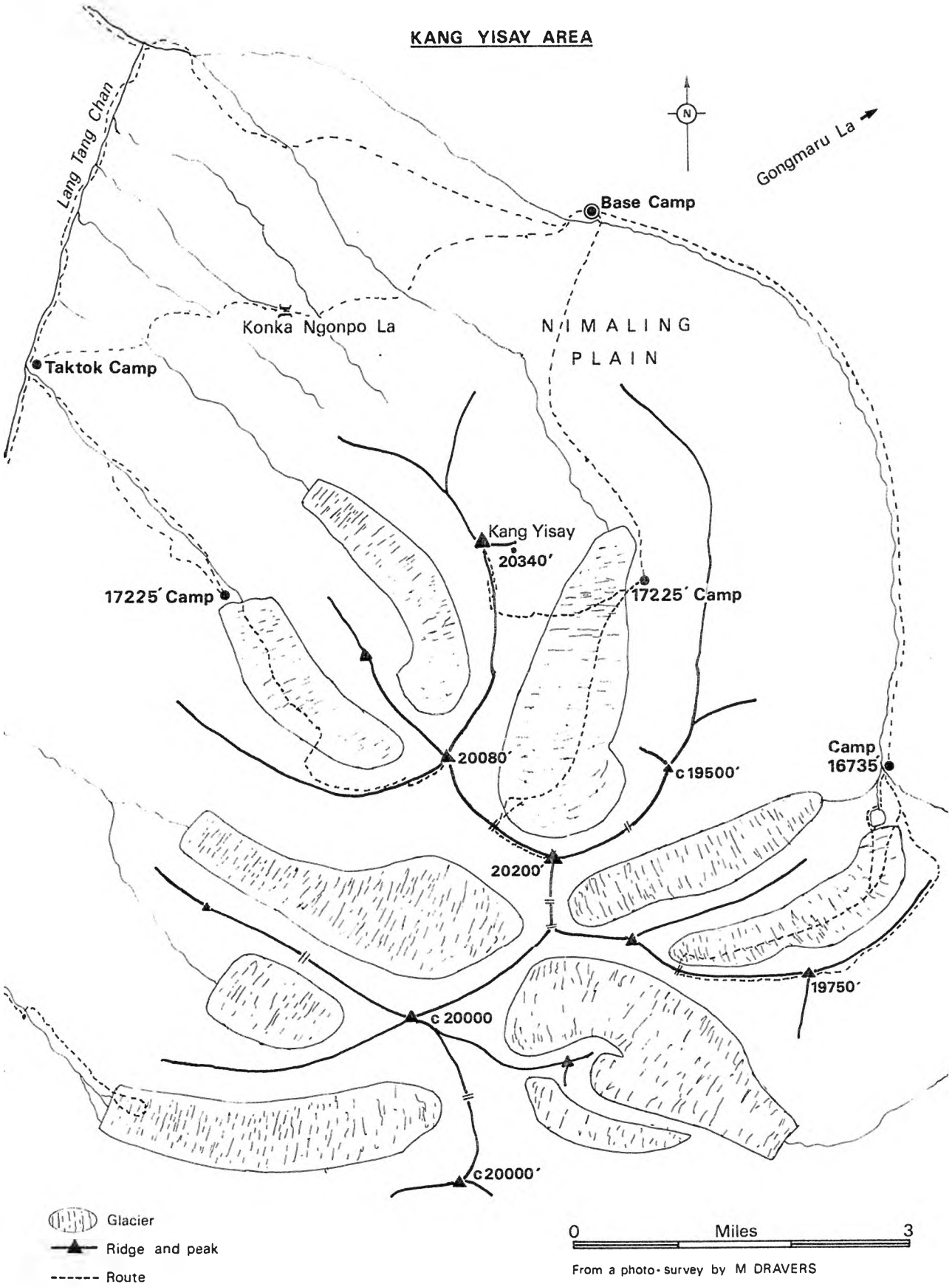
Ladakh has been a neglected region as regards mountaineering. Other parts of the Karakoram-Himalaya have more challenging mountaineering objectives and the highest peaks in the accessible parts of Ladakh do not usually exceed 21,000 feet. However, there is a wealth of modest peaks of 19,000 - 21,000 feet which make excellent objectives for small, light parties. Some peaks were climbed by survey teams in the early years of the century, but most of the high peaks are unclimbed.

Our experience on the 1976 Ladakh expedition showed that travel and mountaineering in Zangskar and in the remoter parts of Ladakh would be impractical without pack animals to carry food and equipment. In 1977 the hire of four pack animals and two Lahuli horse wallahs for three months enabled us to travel for extensive periods in uninhabited or sparsely inhabited country where self-sufficiency is essential and thereby extended our range and flexibility.

An attempt on the conspicuous 19,400 ft rock peak west of Singi La (c.20m. south of Khalsi on the Indus, see route map p.2) was abandoned on 1 August after four days on the mountain. Very loose and steep rock was encountered, and progress above the high-point of about 19,000 feet was deemed unsafe without more equipment, especially rope, pitons and crash helmets. This mountain and its satellite peaks, almost Patagonian in appearance, remain a worthy objective for future expeditions. The peak is three days journey from Lamayuru monastery on the Kashmir-Ladakh road, and we refer to it as Singi Kangri.

The principal mountain objective, Kang Yisay (21,000 ft) at the head of the Markha Valley, was climbed by the east face and south-east ridge on 23 August. The ascent provided an enjoyable and technically varied climb which took twelve hours from a camp at 17,225 ft. Three other major peaks around 20,000 ft were climbed in the same group, and one other attempted. All these mountains were at the northern end of a range which stretches away to the south for over thirty miles and is poorly represented on the best maps available. In particular, the 1:250,000 Survey of India maps (and the later American series) show none of the extensive system of glaciers - many over three miles long - and few of the peaks, which in many cases rise to an estimated 20,000 ft. The sketch map (overleaf) was made from photographs and compass bearings taken from each summit we climbed but there is much scope here for further exploration.

The peaks of the Zangskar range afford fine mountaineering in magnificent surroundings. More serious climbing can be expected on the main Himalayan range, for example the impressive peaks near Padam, only a few of which have been attempted. The opportunities for rambling and exploratory mountaineering are boundless.



Note: Heights given were measured in metres by Thommen altimeter. If Kang Yisay is actually 21,000' (as on Survey of India maps), then all other heights should be raised accordingly by some 600'. The altimeter behaved consistently and was set at known heights in the Indus valley. During four crossings of Zaling Kurpo La, the altimeter recorded a height of 5,060 m ± 20 m (16,600' ± 65'), somewhat lower than the Survey of India 17,040 ft. However, in most other cases throughout Zangskar and Ladakh, the map heights and the altimeter heights coincided reasonably closely. We suspect that the Survey of India measurements of peaks and passes in the Kang Yisay area are too high by as much as 500 feet.

APPENDIX A

TRAVEL AND MOUNTAINEERING

PART I : FIRST ZANGSKAR JOURNEY (JUNE - SEPTEMBER)

Preparations

In the words of the sage 'Whoso looketh on Himachal (the Himalaya) his sin shall be cleansed from him.' The mountaineer, more than most sinners, yearns with longing for the first view of the snows as he journeys up into the foothills. And sinners and mountaineers alike might have to wait some time to enjoy even a glimpse of the great peaks during the monsoon months. However the overcast weather did little to dampen our enthusiasm as the bus travelled up the Kulu valley towards Manali, on 30 June.
Mike Ritchie had already been there a week, but the other four members of the expedition had arrived in Delhi on 27 June.
The ornithologists, Charlie Williams and Simon Delany went off promptly to Kargil via Jammu and Srinagar, eager to get to grips with Himalayan avifauna and the like, whilst Mark Dravers and I were delayed in Delhi for a couple of days. Travel in the Indian plains in the month of June is hot work, and Mark and I found it hotter than usual, carrying around 140 lbs of baggage between us.
We went to the extravagance of hiring a porter in Delhi railway station for one rupee, but having been paid his fee, the porter told us he was a poor man. This we knew already. One rupee is the official 'fixed rate', but one can't help feeling a little uncomfortable at the glaring rift between rich and poor, although station porters are not as badly off as many of their fellow Indians. Yet most Westerners are prepared to get quite heated if a man tries to swindle them out of half a rupee or less, so ingrained is our idea of principle.
So we installed ourselves in a second class sleeper, checked our bulging moneybelts, and lay back under the fans as the train trundled across the plains to a fly-ridden dawn in Chandigarh. The bus journey from here to Manali takes twelve hours, and the stretch from Mandi to Kulu is cliff hanging in the true sense of the word. Here at 6000 feet, it was comparatively cool after the mild hell of Delhi, and the weather was cloudy and wet. Mike had made contact with Mr J. W. Banon, the secretary of the Himalayan Club, who was a great help in recommending a reliable horse wallah, Angyal, a native of Darcha in Lahul on the other side of the Rohtang pass. We met Angyal in Manali on 1 July and arranged to hire him and four pack animals for a provisional period of two months at a total cost of Rs 50 per day. This negotiation was so easy that we congratulated ourselves and celebrated with a lot of beer and several large meals. Next morning we awoke to hangovers and heavy rain. I felt particularly sore after an encounter with a barbed wire fence during last nights revelry. In the bazaar, Mr Banon helped us to buy all our supplies and the following day I set off for Lahul, ostensibly to see the Deputy Commissioner in Kyelang with regard to crossing the passes to Zangskar, whilst Mike and Mark remained in Manali to complete our purchases. It was quite a job getting the heavy baggage hauled onto the roof of the bus and since it turned out to be the wrong bus, it took more carrying and heaving before I was established on the back seat of the bus to Kyelang and

Darcha. Indian buses have the baggage piled on the roof and when there are twenty people clambering about on it at the same time, it's not difficult to be inadvertently shoved off head first into the gutter, or as Mike demonstrated last year in Leh, to fall off under your own steam.

Crossing the Himalaya

Manali is the starting point for many expeditions in the surrounding ranges and mountaineering is very popular in this region. Until recently, comparatively few people have bothered to travel over the passes to Zangskar and Ladakh, and still fewer to Spiti which at present is completely closed to foreigners. We chose to start from Manali for the simple reason that pack animals are less than half the cost of those from Kargil on the northern side of the ranges. Moreover the long approach to our peaks would provide plenty of time to attain fitness and acclimatisation, as well as taking us through some interesting country.

The road to the Rohtang pass climbs up steeply through lovely pine-clad hillsides amongst great rock outcrops and waterfalls. Wonderful cloud formations obscured the peaks and near the top of the pass there had been a landslide which had blocked the road with tons of mud and boulders. Everything had to be carried half a mile to a bus on the other side and since I could not carry all the baggage on my own, I squandered three rupees on a coolie. Meanwhile I took some photographs of a bulldozer shoving the rubble into the gorge below. It would have made for more spectacular photography had the bulldozer gone with it but the driver seemed to know what he was about. An hour later and we were over the 13050 ft pass, abruptly leaving the monsoon behind as we emerged into brilliant sunshine and an arid, rugged landscape reminiscent of Ladakh. The road zig-zags steeply for a couple of thousand feet down to Khoksar where there is a police checkpost, and then follows the Chandra valley with small villages set beneath huge cliffs and snow peaks. Despite the choking dust, there can be few more pleasant ways of spending a day than travelling on a crowded native bus in some far corner of Asia. It was very late when the bus finally stopped at Darcha (10840 ft) in the Bhaga valley some two hours above Kyelang. There is a small hut near the bridge at Sumdo, the actual village of Darcha lying a mile away. The hut is a tea shop owned by Punchok Tashi, the brother of our horse wallah Angyal, and there is also a police post with several bored officials living in a tent. According to Tashi, the Bara Lacha La was open provided one had permission from the senior police officer here, who was at present on a visit to Kyelang. The arrangement smelt strongly of baksheesh. The other officials said it was necessary to see the D.C. anyway.

The bus spends the night at Sumdo and leaves about 6 o'clock in the morning for Manali. Having missed it without much difficulty, I opted to see the sights of the Bhaga valley and so walked about 10 miles to Gemur where there was a festival in the monastery above the village. This involved dancing and plays in the monastery courtyard and plenty of refreshments in the form of chang, the native beer made from barley. The monastery is on a steep hillside above the valley with a fine view of the peaks. The women of Lahul still wear the traditional costume

but most of the men wear gaudy western style clothes. Their Tibetan faces contrast strongly with the rather Persian features of the shepherds from Kangra, a region to the west, who spend the summer roaming around Lahul. They wear short, white woollen coats with a long brown belt of goatwool wrapped round the waist and bare sinewy legs, rather like Greek hillmen in appearance, but very dour.

That evening I met Angyal at Sumdo and the following day we went to Kyelang. Angyal was issued with an official permit to cross Bara Lacha La, but all I could glean from the D.C. was that a permit for foreigners could only come from the Ministry of Foreign Affairs in Delhi. This came as no great surprise. The D.C. could issue a permit to go as far as Bara Lacha La and no further. The only other alternative, the Shingo La, was completely restricted. The D.C. was remarkable only for his ignorance and nobody in his office seemed to have the slightest idea of what lay beyond the Himalaya, nor were they remotely interested. One of the assistants spent some time showing me lots of 'lakes' on the map, although they were actually glaciers. Then the Personal Assistant to the D.C. wanted to copy something from our 1976 expedition report which I had with me, so I told him that regretfully I was unauthorised to let him see it without special permission from the Vice-Chancellor of the University of Southampton, which he thought was a huge joke.

Fruitless, polite discussion against the brick wall of Indian bureaucracy produced nothing more than a cup of tea. All the local people insisted that the pass was open and since the Jammu and Kashmir Government permit foreigners to cross from Zangskar to Himachal Pradesh by way of Bara Lacha La, it seemed that no one would be offended if we crossed the pass as well, so it all depended on the official at Sumdo. By the time the bus arrived, I was feeling a little peevish. Mike and Mark were on the bus looking a little the worse for wear, having had to stand most of the way from Manali. A further day was spent at Sumdo, sorting the paraphernalia into suitable horse loads, bathing in the icy torrent of the Bhaga river and enjoying that pleasant feeling of excitement and anticipation that is felt on the eve of a long sojourn in wild country.

On 7 July we rose early and packed the loads although there was no sign of Angyal and the horses. He showed up at 8.30 and we gave the policeman a wristwatch as baksheesh, rather like one gives a bottle of Scotch to a generous host. We were accompanied by a German couple who were en route for Kargil and had hired another man, Namgyal (from Darcha), with two mules. Mike, Mark and I were carrying about 40 lbs each, and the spring in our stride had pretty well petered out by the time we reached a beautiful tarn at about 12000 feet. The unaccustomed exertion and the ferocious sun prompted us to stop for a brew of tea. Indeed, as the result of several months inactivity, Mark had become a little gross and was trailing the field with a wet towel wrapped round his head and unable to speak. Mike and I enjoyed what H. W. Tilman would have rated as a 'memorable bathe' in the clear blue water until the cold rendered us speechless also. Shortly after that we reached Patseo (12400 ft), a camping ground with a deserted rest house on sparse grassy meadows. It was only 2.30 but apparently there was a large stream to ford

further on, and no one questioned the veracity of this. Two Zangskari women who now lived in Manali were also in our little caravan. They were going to visit their mother at Pibcha near Padam. The younger one had a two year old girl whom she carried on her back and whom we treated for sore eyes with the result that the child screamed whenever we went near her. The Zangskaris were a cheerful pair, continually engaged in jokes and ribaldry with the horse wallahs and often rolling around helpless with laughter. I think we were probably the biggest source of amusement.

A fine starry night was followed by an overcast morning and though we were ready to leave by 8 o'clock, Angyal dallied and insisted it would rain. For lack of anything better to say, we told him that it wouldn't rain, and at this time of the morning our meagre knowledge of Lahuli couldn't cope with more advanced comments. The wallahs' mother tongue is a Tibetan dialect similar to Ladakhi and Zangskari, and they also knew Urdu. Our combined knowledge of English, Swahili and French was more or less redundant, and none of us spoke a word of Urdu. So for the first few days we just grinned at each other and used sign language as we struggled to master elementary Ladakhi. By the time we set off it was raining steadily and it felt more like walking up a miners track in the Lake District than to a pass across the Himalaya. The dirt road is suitable for jeeps and goes over several high passes in the military zone to Leh. The road is forbidden to foreigners from the Indus at Upshi to Bara Lacha La. In several places it was cut by landslides or had been washed away. It was a wet and dismal walk to Zingzingbar, an old caravanserai where we stopped at midday since there was no grazing further up. The altitude was 14000 ft, though the map said 13000 ft. We fixed some plastic bivvi bags across the walls of the hovel to keep the rain out and spent the rest of the day cooking and eating. It rained all day. Predictably the wallahs did not want to cross the pass the next morning and the weather looked very unpromising. Since we were investing Rs 50 per day in this venture and wereso to speak on the board of directors, we felt that what we said should go. We therefore informed Angyal, Namgyal and the rest of the crew that it was not company policy to knock off when it rained, nor to walk only three hours a day. Since the monsoon lasts for three months, we could in theory have sat in Zingzingbar until the end of September if Angyal had his way. We suggested that we would not pay them if they didn't go, but since we had already advanced Rs 500, Angyal did not seem too bothered. So then we said we would give them warm clothes and waterproofs, an arrangement which seemed to suit all parties although we were now the ones who would get wet when it rained. Some four hours later we reached the Bara Lacha La at 16047 ft, the crest of the Himalaya. I felt the journey had really begun at last, for ahead lay Zangskar and Rupshu.

> 'Zaskar to the west, though bare enough in all conscience, is wild, broken, and savage to a degree; a more inhospitable country it would be hard to find .... I should much like to travel there. Its intense savageness attracted me; there seemed to be nothing dull in its outlook nor tame in its desolation'

So wrote the Hon. C. G. Bruce over sixty five years ago, and his comments are just as applicable today.

Zangskar

The cairn and prayer flags were the only things that stood out in this broad, bleak landscape. On the way down the other side we had to cut steps down the old winter snowpack in order to get the horses down. The landscape was inhospitable except for a few patches of grazing and some lovely alpine flowers. We passed Yunan Tso, a flooded gravel plain with magnificant gaunt hillsides and snow peaks. A few miles further on with the sun now burning the back of our necks we reached Kilang (15120 ft) where there are a couple of roofed buildings and good grazing. Everyone had headaches and felt exhausted by sun and altitude but we revived after tea. The next day we crossed the Lingti plains which were deserted except for a few Kangra shepherds. We camped at Kamirap at about 14500 feet, which was the only suitable grazing for some way. The spot is merely a patch of ground with a name, a few fire-blackened stones and nothing else. The country is uninhabited, windswept and exposed to a fierce sun. The Lingti Chu flows in a defile below the windswept camping ground, and joins the Tsarap Chu lower down and later the Kurgiakh Chu at Pune after describing a long arc to the north. Thereafter it is known as Tsarap Lingti Chu. The following day we had to cross a couple of fast flowing tributaries during the walk to Chumik Marpo at 4600m. We were chased by monsoon clouds all day and we had just got the tents up when there was a very violent hailstorm. It was a wet and dreary glen and the horse wallahs had a damp night in their makeshift tent. This was merely a length of material hung on one pole, the sides pulled out and tied to rocks, with the pack saddles and baggages arranged as a windbreak, and the side held up by the pole remaining open to the elements. However it was possible to have an open fire to cook on and enough room for several people to sit round. The design is very practical for the usually dry conditions of Ladakh. We usually slept outside in good weather but on this occasion gave the small tent to Chorton, Norbu and the baby; the Germans were in their own tent and the three of us in the large mountain tent we had with us. The next day, (as Keats wrote on Skiddaw with 'much fag') we crossed the Phirtse La, where the altimeter read 5350m (17550 ft) a figure which I can well believe. It snowed on the way up and rained on the way down. There was still a huge snowfield on the north side, but the horses descended the wet mud and gravel beside it where the old snow had recently melted. The upper reaches of this pass seem utterly lifeless although I saw a couple of spiders that somehow contrived to live there. Lower down there were a few patches of green and we saw our first yaks. We camped in a grassy hollow at 4400m (14440 ft) called Jhingsheng and feasted on chappaties and jam. They were so greasy that nobody ever ate more than six at one sitting. On the 13 July, we saw the Kurgiakh valley for the first time, and came across some Zangskari shepherds in a summer camp high above the main valley. They were very shy and just peeped out from their yak wool tents. That day we camped at Tanze after a steep descent down a gorge that from below seemed to be an inconspicuous cleft in the valley wall. It was hot and sunny when we arrived but in the afternoon there was a thunderstorm and we were almost flooded out by the rain. The whole meadow was

running with water and we had to dig ditches round the tents to prevent all the supplies getting soaked.

The next day we marched to Katge Latho but I managed to miss the bridge at Tanze and walked on the north bank. The path became indistinct and I ended up traversing atrocious scree. I could see the rest of the caravan on the other side of the gorge, almost invisible on the enormous sweep of mountainside. Because of the rocky bluffs below, I kept high and eventually scrambled down to Pune, the confluence of the Kurgiakh and Tsarap rivers. In the house there, I lunched on salt tea and tsampa whilst the others had disappeared round the bend in the gorge. There was a bridge across the Kurgiakh Chu here and I soon caught up the others who were camped not far away at Katge Latho, a poor camping ground with a tiny spring of water. The German couple and I went to Phuktal gompa (monastery) that evening, a couple of hours walk up an impressive gorge, the Tsarap Chu (also known as Niri Chu) grey and swollen by the melting snows swirling down between great orange cliffs. The monastery is set in a cave high up on a precipice and is reached by crossing a rope bridge, and is one of the most beautiful settings in Ladakh. We spent the night there and the monks were very friendly. In the morning we walked to Char, climbing hundreds of feet above the gorge before descending to the village. Our arrival caused quite a stir and every one came out to see us although the women and young children were very shy. One old boy brought out a stuffed snow leopard to show us, and a woman gave us a big pot of yogurt and some tsampa and butter milk for three rupees. Then we rejoined the main path by crossing a rope bridge over the main river and set off for Itchar, which despite the spectacular gorge scenery was a rather monotonous and tiring walk. The others had camped below Itchar which was above us on the other side of the river, and there was a salt caravan camping nearby. There was no spring here, only the murky, silt-laden river water. About a dozen children spent the evening in and around our camp and one particularly boisterous one stood out from the ruck since he seemed intent on stealing the plastic waterbottles.

On the walk the next day Mike and I were invited into a house in Reru where there was a party going on. By the time we left we were full of chang which induces a very agreeable feeling but saps one's desire for walking long distances. However we made it to the camp that evening which was on the hillside above the gorge, with the village of Pibcha on the other side. Norbu and Chorton invited us to their relatives' house where there was much festivity. It is the custom in Ladakh and Tibet to refill the cup of a guest even after only a couple of sips. Consequently the guest's cup is always full to the brim, and he never knows how much he has drunk. The chang and arak (distilled chang) were flowing in abundance and dozens of people, adults and children alike, were crowded round, faces alert with curiosity and laughter. We had to get back over the precarious rope bridge before dark and so dragged ourselves away at dusk. Namgyal could hardly stand up by this time, but fortunately wasn't planning to cross the bridge that evening. Angyal also stayed and they returned to the camp in the morning. By this time we knew them quite well. Angyal was always polite, efficient and amiable with a quiet sense of humour. We came to like him immensely

over the months. Namgyal was not so bright, and was the scapegoat of the party. Angyal was definitely the boss, and Namgyal did most of the chores. His slight figure, bandy legs and huge grin were a great source of amusement, but when roused, his face would darken with anger and there were one or two brusqueries during the expedition. 'His thoughts, few that they were, lay silent in the privacy of his head', and yet he could be quite cunning, with a habit of pilfering cigarettes and beedies which he smoked continuously. Whenever we were 'in town' he would get hopelessly drunk and his eyes seemed on these occasions to rotate independently of each other, and his big grin would sit there indefinitely.

Padam was another two or three hours walk the following morning but was a great disappointment. Scenically there is little to commend it, the population which is largely Moslem was sombre and dreary after the Buddhist villages and there were no eggs, curd or vegetables or chang to be had. Namgyal used to go off to find chang and would come back hours later having drunk half of it. At the Kangri tea house, a new establishment to cater for the influx of trekkers from Kargil, there was good tea and chappaties but atrocious rice and unmentionable meat. We hired a room for a few days and the German couple went on to Kargil. Now that Namgyal was out of a job, Angyal said that he would not go on without him as an extra man to help manage the pack animals on the difficult ground ahead. There was quite an argument over this because we were unwilling to pay an extra Rs 10 per day which Angyal wanted. The original agreement was Rs 50 per day plus food. We finally agreed to pay Rs 60 per day but as it turned out the extra expense was well worth it and having two men was an immense advantage. After a lot of enquiries, we ascertained that the direct route to Leh over the Shapodok La was impassable due to the size of the rivers at this time of year. We had originally planned to go to Leh this way and return to Zangskar from Lamayuru but we decided to go to Lamayuru first. Even this route was in some doubt since a bridge was down on one of the rivers but we decided to risk it. One of our main purposes in coming to Zangskar had been to make a study of the region, following up a more general survey we had made in the Upper Indus the year before. However, a young Englishman, one J. P. Crowden, had just spent the entire winter living in Zangskar, and had apparently made a detailed study to which we could add nothing in the time available. So we switched our plan to the Markha valley which we had visited last year and which is the only inhabited valley in the rugged mountains stretching from Zangskar to Ladakh proper.

We quitted Padam on 22 July. Two horses and a foal had been sent back to Darcha and we now had two mules and two horses. They set off early via the Tungring bridge which crosses the Doda River whilst we sahibs took the short cut by crossing the river below Kursha in an inflatable orange raft that a local spiv bought from a German who came boating here last year. This means that one can reach Kursha in less than two hours, albeit five rupees out of pocket. We had arranged to meet the lads* at Kursha but were told they had gone through earlier and were now camped a couple of miles away. The spiv had gone to Padam on business and so we had to wait until five o'clock to cross. We eventually found the lads camped at Rinam, a good two hours away. That evening I managed to drop into

* The Anglo-Indian term 'wallah' is still used 30 years after the end of the British Raj. We always referred to our two horse wallahs as 'the lads'.

the stream a little valve, an essential component of the pressure cooker; this caused a bit of a flap, but Mike found it in the morning. From Rinam to Pidmu was a very hot walk and there is hardly any water except in the river which is usually far below the path, and full of silt. We met some shepherds on the way, so drank an excessive amount of yogurt. At Pidmu, the lads were reshoeing the horses. They tied their tails to the back legs to prevent them kicking and twisted a loop of rope with a stick round one nostril rather like a tourniquet to try and make the animals behave themselves. Even so they received one or two kicks before the job was done.

The next day was another hot walk along the valley then up over a spur overlooking the confluence of the Zangskar Chu and the Oma Chu which from this height looked like a trivial stream. Ahead of us was a crumpled landscape of red, grey and brown mountains. Tilman wrote of Mustangbhot in northern Nepal 'It is fascinatingly ugly country, the more fascinating for being so little known', a suitable description of the Zangskar mountains. There is nothing gentle in this land to relieve the eye, yet it exerts an extraordinary pull over the traveller, to see over the next pass, or round the next bend in the gorge, and the contrast between the oppressive gorges and the sweeping views from high up, between waterless desert and vivid alpine flowers, between neat fields of barley clustered round little Tibetan style houses and the wasteland before the next village or valley, is ample reward for the unrelenting harshness of the mountains. The settlements are merely tiny pockets in an immense and lonely landscape.

After crossing the Purfi La (about 13000 ft), I had drawn ahead of the others and dropped rapidly down to the river, some 1500 ft below, on an obvious path. At the bottom there was a precarious bridge composed of two flimsy saplings across a bottleneck where the whole of this sizeable torrent, the Oma Chu, thundered through. I took tea with a couple of lamas on their way to Linshet over the Haluma La. After two hours there was still no sign of the others and I scanned the hillside with binoculars then climbed halfway back to the pass. Rain had washed away the tracks in the dust so I eventually concluded that they had gone by a very unlikely looking path that traversed the hillside. I saw the occasional footprint which proved against all my doubts that the lads had got the mules and horses across this difficult terrain, (an achievement comparable to getting a mule up Jack's Rake in the Lakes). The path led down to a fine camping place opposite the village of Jhingsheng. Mike and Mark expressed some curiosity as to where I had been and explained how they had got the horses across the bad stretch, with sparks flying from the hooves, in fear of imminent disaster, for there was a sheer cliff below to the Oma Chu. What was not quite so entertaining was the fact that they had attempted to ford the river and had found it impossible. The only possibility was to build a bridge across the bottleneck; with this simple idea in our minds we went to sleep. In the morning we found some logs that just happened to be lying nearby and so we carried these up the spur above the impassable section of the gorge and then took them to the riverside by the simple expedient of throwing them over the cliff. To avoid the rocky section of the path we gave the horses an introduction to scree running down a gully.

Angyal and Namgyal were very sceptical about getting the horses over, especially because of the polished rock slabs leading down to the bridge. But a hard days work with liberal use of pitons and rope and we built a staircase down the slabs and a fine bridge of wood and flat stones. We got all the baggage and pack animals safely across, which put us in an exceedingly good mood as failure to cross the river would have necessitated a detour of at least a fortnight to reach the Singi La and the peaks we were to investigate.

The next day was a long climb to the Haluma La (15453 ft) and we camped at about 13000 feet, above Linshet. Another climb of 500 ft brought us to the Chupken La, then through Linshet village where there is quite a large monastery, and over the Mordum La where I met a rather infuriating lama who tried to sell me his hat. Just after this pass was the Nietukse La which is really a continuation of the Mordum La on the same mountain shoulder, followed by a steep descent to the little village of Kian Butur. Mike and I were here invited into the gompa and plied with chang and tsampa with seats of honour next to the lamas and all the villagers crowded into the small courtyard. It was obviously a special occasion and everybody was very friendly. One old man was a keen snuff taker, taking large doses and blowing it out through his mouth. Mike tried a sample but 'paused and swallowed convulsively like a pekingese taking a pill'. I thought he was ill because he went bright red and started spluttering, which the Ladakhis considered extremely funny. It was rather like inhaling ammonia. When the head lama finally fell asleep over his chang, we decided it was time to go as well. We staggered off and climbed over the Kuba La, a stiff climb of over 1000 ft straight above the village. Some distance beyond we found the others camped by a small spring.

Singi Kangri

On 28 July we had our first view of the peak. The lead up to it was a whole series of huge rock towers that did not look at all easy. Singi Kangri (19400 ft) finally revealed itself as an inaccessible monolith, which the Andean expert - Mark - pronounced as Patagonian in appearance. Mike and I nodded in agreement. We camped on the Singi La (16600 ft) and the horses dropped down the north side to the nearest grazing. One member of the party also misjudged the heights of various features on the peak by a factor of three - what appeared to be little more than one rope length turned out on closer acquaintance to be about 500 feet. That afternoon I made a quick reconnaissance and climbed up several hundred feet above the pass to obtain a better view of the approach to the east ridge, and the hanging glaciers of the north face, whilst Mike and Mark sorted out the camp . The peak consists of a summit block, about 1000 feet high, with an approximately triangular base, and three faces - the north face, the south face, and the south-west face. The faces are just about vertical, and the whole thing is surrounded at its base by several hundred feet of steep ice on the north side and screes on the other side. Below this is another lower rock band which surrounds the whole peak in a practically unbroken line. Below this rock band is ice on the north side and scree on the other side. At the far end of the peak from us, the south-west and north faces joined to form a vertical buttress and an arete joined the main peak to

another rock tower which we called Singi Ngama (the Lion's tail), and we referred to the main peak as Singi Go (the Lion's head). Directly above us between the north and south faces, lay the east ridge, quite steep in its lower section, leading to Singi So (the Lion's tooth), a conspicuous pinnacle with a gap beyond after which the ridge eased off towards the summit. We could not see the west face from this side and the east ridge seemed to be the obvious route to the summit, from this side at any rate.

The next day we set off early to look at the east ridge. We quickly climbed to 17500 and were beginning to think the peak might be in the bag when to our dismay we came across a 100 ft vertical drop to a col below. Gullies dropped steeply from either side of the col and above was the first rock band, several hundred feet of rather unfriendly looking rock. We cramponed down some steep snow-ice and clambered down a little rock wall to get into the north facing gully. Mark was inconvenienced at this point when one of his crampons dropped off and bounced merrily down the gully, coming to rest on some scree, more or less invisible. Fortunately it was found without too much difficulty. Mike cut some steps up some 50 degree water ice and we found ourselves on the col. The rock band presented the choice of a vile chimney lined with ice and with a small waterfall coming down it, or a ramp leading diagonally left. I led up, as Mark put it 'like a granny', for 150 ft on loose rock to a sloping ledge and belayed on a bad peg. Mark led 180 ft up a gully and then up shattered slabs, sending down frequent showers of rock that was very unnerving. The pitch was virtually unprotected but he found a good piton belay. I joined Mark and traversed on reasonable rock across a wall to the top of the buttress. Beyond the buttress, two gullies plunged down on either side of a short arete made of gravel, the right hand gully being the chimney leading up from the col. Above the arete, a rock wall led to steep icefields. At this point we decided that because of the bad rock, the climbing would inevitably be slow and quite dangerous and a retreat from above the rock band in bad weather or in an emergency would be very serious. We carefully climbed down to the col, dropped down steep scree on the south side and finally traversed back to Singi La. Obviously the peak would require a little more thought. The climbing was not difficult but the rock was so loose that the leader inevitably dislodged rocks even with a gentle flick on the rope, so there was a very real danger of someone getting cracked on the head.

I was sick in the night and felt too ill to accompany the others on another reconnaissance the next morning to the col to the right of the Lion's Tail. My job was to pack up the camp, then descend to fetch the mules up to collect the baggage. Whilst doing this, to my surprise a lone foreigner appeared. Although French, he was a cheerful and amiable little man who went haring off towards Lamayuru. Down in the valley, Angyal had moved his camp to a rather more sheltered spot by a spur at 4600m (15100 ft). In the evening, Mike and Mark arrived rather hot and bothered having been unable to see the new campsite from above and therefore had had to make a bigger reconnaissance than they had bargained for. As a consequence the conversation ventured into what Swinburne considered as 'Language of the strictest reserve' when he called Emerson a 'hoary-headed and toothless baboon'. I felt a bit sheepish for not having set up some orange bivvi bags to catch their eye as they

came off the hill. A big mug of curd from the nearby shepherd camp and a brew of tea restored equanimity. They had reached a height of about 18500 ft by reaching the col and traversing along the foot of the west wall. It was proposed that we put a camp on the ledge and then traverse right round to the east ridge above the hanging glaciers and snowfields.

The following day we took Namgyal and one of the mules and managed to get up to about 17000 ft on a scree slope with the loads. The mule couldn't climb any further so we plodded on carrying about 40 lbs each. At this point the lower rock band peters out into a scramble and we easily reached the col and then traversed past a small pinnacle and up to a broad ridge at the foot of the Lion's Tail at c5500m (18045 ft). As a token gesture to protect against falling stones, we solemnly put on our hats. Mike was sporting a cap from Locks of St. James's Street (S.W.1.) I had a Kurdish balaclava, and Mark wore his towel held together with safety pins. He had considered wearing a cooking pot but his head wasn't the right shape. We then set off to traverse the foot of the great wall. Below us a steep scree slope stopped abruptly at the edge of the lower rock band. The Lion's Tail was a slender blade of rock that looked as if it might collapse at any minute but fortunately nothing of significance came down. We reached an ice gully, and Mike and Mark had left some gear under an overhang on the other side the day before. Yesterday Mark had spent almost an hour cutting big steps in the ice to speed up subsequent traverses, and had been hit by one stone. By now every step had stones embedded in it and the entire slope was peppered with debris. It was obviously no place to pass the time of day. We crossed safely, picked up the rest of the gear and finally found a suitable place to camp on top of a buttress of the lower rock band at the apex of the south and south-west faces. We called this Kusini* Buttress. We had problems with the supper as I had lost the spreader for the primus stove; Mike fashioned a new one from the lid of a milk tin, but we still had trouble getting the stove to work, possibly because of the thin air at 5680m (18636 ft). We had pre-cooked a meal and packed it in a tupperware box which had split and most of the contents were spread around Mike's rucksack and sleeping bag. Whilst we waited for the stove to deliver the goods we enjoyed tremendous views of the Himalaya, the evening was still and fine and the sunset was magnificent. For once we were all in agreement that it was one of the finest camps we had ever had. As far as the eye could see were rock towers, small glaciers, ice faces and distant unknown ranges. Nothing unusual for the Himalaya, but thrilling for us newcomers to the game. At this height we seemed to be perched above or level with everything else with a great void beneath us (the tent was surrounded by cliffs on three sides), detached from the rest of the world, for there was not a living thing in view. We ate well : 'This was a good dinner enough, to be sure; but it was not a dinner to ask a man to' (Samuel Johnson). Sitting outside the tent drinking a large mug of coffee, one could hardly wish to be anywhere else. Shortly after sunset, the full moon rose 'like a dying lady lean and pale'.

Just after dawn on 1 August we set off and traversed the 1000 ft south wall. The layman would have labelled it as vertical but to be precise it can't have been more than 85 degrees. We turned

* Kusini is Swahili for 'Southerly Breeze'

the corner to the east ridge and set off up a steep snowfield beside the rock. The snow was deeply fluted and already soft and after two pitches we reached the top and moved onto the rocks. I belayed on a loose peg and Mark set off carefully. However he nearly wiped out the rest of the team when he dislodged some rocks. Mike was still on the snow and was hit on the head by a small one, and a heavy one just missed the back of my head and landed on top of my rucksack. Mark had run out of rope and had nowhere to belay so I joined him and then belayed in a little cave a bit higher up. The rock was absolutely appalling, but the actual climbing was only about Grade III. Mike led the next pitch and belayed on a disintegrating ledge below an impressive vertical wall with a crack going up it. It looked like what climbing guide books like to describe as 'a magnificent pitch, strenuous and exposed' and looked a lot harder than anything we had climbed already. Following the maxim of the traditional mountaineer we decided that we would have to 'climb it free or perish in the attempt'. Since we had already dropped one of our five pegs, and the remaining ones were essential as belays, there was no option but to climb it free, and on rock like this, at nigh on 19000 ft, no one was desperately keen to try it. The last few hundred feet had taken a very long time and to justify our lack of guts we calculated that there was not enough time to reach the summit and return without a bivouac. Apart from Angyal and Namgyal, whose camp we could just make out 4000 feet below, we were on our own and did not want to stick our necks out any further. So we started back down to the ice field, gingerly tiptoeing down the rubble. The snow was very soft by this time, with hard ice underneath so care was required as we front-pointed back down to the scree, where we arrived in a tangle of ropes, slings and pegs. Mike and I sorted the gear while Mark went on ahead to make the soup. We packed up the tent and traversed back to safe ground below the Lion's Tail then raced down the screes to the camp in another forty five minutes. That evening we sat in the moonlight and watched the peak above with the carefree detachment of those who have no further intention of climbing it. As a reconnaissance, it had been fairly successful, for we found the most feasible route to the summit, but it was a great disappointment not to have reached the top. With a camp on the ledge above the first rock band, near the snow field on the east ridge, with several days food, crash helmets and plenty of pitons, the ridge would probably be straightforward. Looking through binoculars from the valley camp, it appeared that we had nearly reached the notch by the Lion's Tooth and beyond the notch the angle of the ridge eases off. I thought of G. K. Chesterton's 'If there be any value in scaling the mountains, it is only that from them one can behold the plains', but time was pressing, so we left this aggravating mountain behind and set off again for our main objective, the snow and ice peaks above the Nimaling plain in Ladakh.

Ladakh

The following evening we were encamped at Photaksar, a very picturesque village, perched on the edge of strange erosions in the conglomerate above a gorge at 13900 ft. Namgyal and I went up to the village to replenish our supplies. Namgyal was acting like a half-wit today as were most of the inhabitants of the village but we managed to get hold of some rice and flour and chang. Some turnip leaves, our first vegetables since Padam, went down well but we ran out of sugar that night.

The next day saw us over the Sirsir La (16300 ft) where we met some yaks and two Ladakhis. The scenery beyond was rather surreal, strange orange rock pinnacles, purple hillsides and the green sheen of copper ores. We had to look for a safe place to ford the river which was thigh deep with a powerful current. The usual route to Lamayuru via Hanupatta and Wanlah was apparently impossible for horses at this time so we set off up the valley with the orange rock pinnacles, in threatening weather and crossed a very high pass which the altimeter gave as 5340m (17520 ft), unnamed on the map but called either Sniutse La or Nyuche La depending upon whether one prefers the Ladakhi or Lahuli interpretation of the word. We camped on the other side at c.4800m (15750 ft) and it rained heavily.

The final day to Lamayuru took us down the Shilla Khong gorge through dense scrub, with colossal rock walls above. The river had to be waded about twenty times. We emerged from the gorge at Shilla Khong village at about 11000 ft and then crossed the Prinkiti La, about 13000 ft, the route following a very barren, dried up nullah where the only thing of interest was the shrivelled corpse of a goat. Then to Lamayuru, the oldest monastery in Ladakh, yet setting the trend with a hotel to cater for the new surge of tourism in Ladakh. After a couple of days there, we arrived in Leh on 6 August on the bus. Leh had visibly changed in just a year with lots of new buildings on the outskirts. The place was crawling with groups of rich tourists, mostly German and French, who see Leh as a jumping off point for visits to the monasteries of the Indus valley. Tourism brings with it many changes, some good and some bad. Modern developments can damage the traditional way of life with its stable and balanced society and usually creates moreproblems than it solves. The notorious Aleister Crowley expressed this point forcefully when he wrote nearly fifty years ago 'Where the white man sets his foot, the grass of freedom and the flower of good faith are trampled into the mire of vice and commercialism'.

We replenished supplies in Leh and the days slipped by quickly. On 15 August we ferried all the baggage down to the bus station having already sent the pack animals unladen to Karu. The bus usually leaves at 10.45 but by a stroke of luck it had had a puncture and was delayed so we caught it with seconds to spare. That evening we camped at Martselang. The weather was very poor and we camped for two nights just below the hamlet of Chuskormo, since the lads, being fair weather wallahs, were unwilling to cross the pass in dense mist and rain. 18 August was very fine and sunny at first and Mark and I reached the Layokba La (5200m, 17060 ft) in three hours and sat in a hailstorm for an hour waiting for the others. It was quite cold so we dropped to a little col on a spur below the pass and caught glimpses of Kang Yisay peeping out through storm clouds, the ice on the north face catching the sun as it tried to break through. It looked superbly remote and mysterious for 'the clouds that are the almost inseparable companions of mountains lend even the best known the mysterious power of attraction of the unknown'. (Tilman) After some time we assumed that the others must have crossed the Gongmaru La (5180m, 16995 ft) so we made our way down to the Nimaling plain where we could see scattered herds of goats and yaks grazing. We disturbed some Tibetan Snowcock

on the hillside at about 16000 ft, an elusive species of which we obtained several sightings this year. Eventually we found the others camped on a pleasant spot on the edge of the plain at c.4750m (15585 ft). Above us the squat mass of Kang Yisay was clear of clouds and b asked serenely in the late afternoon sun. We had reached the base of the peak in 1976 but the weather was bad and we had had insufficient food to make a closer look. We had therefore hoped to return another year, and believed it to be an 'unclimbed, unnamed peak at 21,000 feet' as we described it in our application to the Mount Everest Foundation and other sponsors. As it turned out we were wrong on at least two counts, since the peak has a local name, has been climbed before and if our altimeter is to be believed the summit is only 6200m (20342 ft). The shepherds told us the local name by which it is known by the inhabitants of Hankar and Markha who graze their herds on the fertile pastures of Nimaling during the summer. A previous ascent is evidenced by a cairn near the summit on the rocky arete above the north-west spur, but we never knew of this until we reached the summit ourselves via the east face and south ridge. We assume it was built by a Survey of India team who first made maps of the region many years ago, since we found a number of survey cairns in the region but there are no records of mountaineering in the region. The map marks a spot height of 21000 feet but only vaguely traces the ranges to the south.

Kang Yisay

The next day we made a leisurely start and packed up enough food for several days then set off with Namgyal and the two mules towards the glacier basin to the west of the main peak. Ominous clouds were closing in over the range :

'Then Alpheus bold
On his glacier cold
With his trident the mountains shook' (Shelley),

He also filled the air with a lot of static, for our hair stood on end and heads and hands buzzed like a roaring primus stove. We traversed the screes until they got so steep that we dropped into the ablation valley beside the moraine. The ablation valley petered out and we pitched two tents on the gravel at 5250m (17225 ft) during a heavy hailstorm. There were now four of us since we were accompanied at this stage by Colin Wilks, an English friend who we met by chance in Leh. The following day Mike, Mark and I made a reconnaissance of the glacier and walked for one and a quarter hours, firstly over huge moraine boulders and then ice. The diffused light made the glare very painful and we stopped on a large boulder at the foot of the face at the head of the glacier to wait for the weather to clear so as to obtain a view of the south ridge leading to the summit of Kang Yisay. Unfortunately the weather deteriorated into a hailstorm with minimal visibility, so for lack of anything better to do, Mike started to make a snowhole, later joined by Mark who also succumbed to the temptation. Meanwhile, I simply sat on the rock, for as Dr Johnson put it 'Every man is, or hopes to be, an idler'. After three and a half hours the weather showed no sign of improving so we set off back to camp. Mark went down a little earlier to pick up some of his personal gear which he had forgotten at Nimaling. On the way down the glacier the weather very suddenly cleared and gave us a superb view of all the peaks.

We decided to try and reach the col to the right of the peak at the head of the glacier, and possibly to reach the summit. This excursion would provide a good view of the neighbouring peaks and also a view of the country to the south. Mike had a pain in his chest having gone to work with a will on his snow cave. We were not sure whether his floating rib had merely come adrfit from its moorings, or whether it was a chest infection, but the next morning he opted for a rest day. Mark couldn't face ginger bread and custard for breakfast even though he was the instigater of this delicacy. I ate mine with as much relish as can be mustered at the barbaric hour of 5 a.m. It weighed heavily on the stomach but not quite heavily enough to provide an excuse for not getting up. By 7.30 we reached the rock at the head of the glacier at 5540m (18175 ft) and set off up the snowfields to the col. From bitter cold to excessive heat was an instantaneous transition as we emerged into the sunshine. Above us was a hanging glacier glued precariously on to the face. We crossed several small crevasses and climbed a steep snow slope to the col with snow continuously balling up under the crampons. We rested on the col at 5890m (19325 ft) and despite clouds coming in, we had a fantastic view across Zangskar and a whole new vista of ice peaks to the south. The summit ridge looked straightforward and consisted of loose rocks and steep snowfields. There was a rock tower which we turned by traversing a narrow ledge of rotten rock and near the top we climbed some firm rock slabs and then traversed an arete of snow in poor condition to the summit. The altimeter was fooling about, for it read 6135m (20130 ft) on arrival and 6160m (20210 ft) when we left. It probably felt a bit sluggish in the thin air but on the whole the altimeter was reasonably consistent and never met the usual fate of such instruments. We enjoyed the most wonderful view of the surrounding peaks and to our surprise realised that our mountain was one of the highest in the range. We spent well over an hour on top, basking in the sun, then carefully descended to the col, having decided against a traverse of the peak, for the ground beyond looked quite difficult. There was some debate as to whether or not the slope below the col would avalanche. Fortunately it stayed put although we took a slightly different route during the descent so as to be out of the way of anything coming down the precipitous north face. We reached the camp at 4 p.m. just as a hailstorm broke.

Snow fell in the night and the weather looked very unsettled so a rest day was unanimously voted. Fortunately we had plenty of food and reading material. Aleister Crowley attributed 'the almost universal mental and moral instability of Europeans engaged in exploring to their lack of proper intellectual relaxation far more than to any irritations and hardships inseparable from physical conditions. Perfectly good friends became ready to kill each other over a lump of sugar'. Affairs never got as bad as that, for we were variously engaged in The Rise and Fall of the Third Reich, Ulysses, Moby Dick and the Complete Works of William Shakespeare. Mark was suffering from fleas at this stage and whilst he took the drastic step of washing his hair in a glacier pool (no mean feat), I pestered the others with a Hindustani phrase book : 'Bahut Angrez Hindustani sikhna pasand karte hain' (Many Englishmen like to learn Hindustani) and 'Ham ap ko itla dete hain ki ek hafte se rui ki farokht ho rahi hai (We beg to inform you that the cotton sales

have been in progress for a week)', or more appropriately 'Yeh pahari mulk hai' (this is a hilly country).

On 23 August the weather was set fair as we commenced breakfast at 3.45 a.m. Today we were to attempt Kang Yisay whose bulky mass towered over us on the other side of the glacier. The face below the summit was draped with hanging glaciers, bergschrunds and all the rest, which looked good through binoculars but were not for the likes of us. We planned to climb a gully that led without interruption from the glacier, up the east face to the south ridge, so we set off across the glacier at 5 a.m. and started cramponning up the frozen snow of the couloir. Soon we found ourselves wading around in avalanche debris so climbed up some massive rocky slabs and snow fields to the crest of a spur on the left, which we followed for some way, clambering over enormous boulders piled on top of one another. The spur petered out into steep snow which led to the col at 5990m (19650 ft) which we reached at 9 o'clock. The morning was perfect with vivid blue skies, great cloud formations boiling up in the east and a wonderful mountain panorama. Above us at an estimated 23000 feet, we watched a formation of geese flying south. The summit was visible above us along the ridge and from here it appeared to be an elegant cone of snow on top of a rock tower, the whole set up being reminiscent of winter conditions on the Aonach Eagach in Glen Coe. We traversed the narrow ridge, sometimes on shattered rock, sometimes in deep powder snow until we reached the foot of the impasse. Mike suggested climbing the rock on the right hand (east) side, and I suggested a steep corner to the left. Mark was leading the pitch and decided to traverse further to the left on steep soft snow overlying ice, in order to turn the tower and regain the crest of the ridge by a gully, if one existed. Mark belayed on rock, and Mike then hacked up and across an ice field to belay on a ledge above. Here the cliff was split by a narrow gulley of steep water ice with a foot of unconsolidated powder snow on top. After climbing the gully, another pitch on mixed ground brought us to the crest and quite shortly we found ourselves on the broad undulating summit. We waded through deep powder snow to just below what appeared to be the highest point of the long corniced summit. Beyond the cornices, on the arete leading to the north-west spur, we were surprised to see a surveyor's cairn, from which we assumed that a Survey of India team climbed the peak from that side many years ago. As the Chinese proverb says 'There are many paths to the top of the mountain, but the view is always the same'. It was one o'clock when we reached the summit, and we lunched uncommonly well on fudge, mars bars, mint cake, glucose biscuits, orange juice and a small bottle of brandy which with considerable restraint had been saved for the summit of Kang Yisay. Stormy weather appeared to be coming in from the north-east but there was a fine view to the south. On the descent Mike found a direct route down the eastern side of the rock tower which was easier than the ice gully. By the time we reached the col, the snow was very soft, and after making rapid progress glissading, a couple of ominous cracks prompted me to move on to the rock spur. Mark was some way above and managed to avalanche the whole slope which slid gracefully to the foot of the gully. Clambering over the huge boulders on the spur was very tedious but quite safe.

Angyal and Colin were waiting at the tents with the mules and after a big brew of tea we struck camp and descended to base at sunset. It was a marvellous, sunny evening and life felt good as we tramped to Nimaling amidst the sounds of flowing water and grunting yaks. After fourteen hours of exertion, 'thoughts of dinner begin to obtrude', so it was disappointing that no curd was to be had from the shepherds.

The next day the clouds were right down and it rained most of the time. On 25 August, Mark set off for Leh to collect mail and to buy some supplies and we arranged to send Angyal with the mules to meet him at Karu a few days later. Meanwhile Colin and Mike and I went to Hankar and Markha for several days where at 13000 feet it felt almost sultry in comparison to Nimaling. It was wonderful to be back in the valley again after our short visit in 1976. We set off from Markha on 29 August, intending to reach Nimaling that evening. At Hankar we bathed in the river and cooked some chappatties, flavoured with garlic. Chappatties made by amateurs are not outstanding at the best of times but these ones had a remarkable affect, for within an hour of leaving Hankar I was stricken with a mysterious ailment that put me in such a state of decrepitude that it was long after dark that I finally flopped down at the Nimaling camp. The others were unaffected although Colin wandered off up the wrong valley and went on a sort of grand tour of the pastures until he finally reached the camp shortly before me, just in time for supper. Luckily there was bright moonlight which prevented one from stepping into the numerous marmot holes on the plain. Mark arrived back the same evening with a few letters and lots of goodies. The following day we set up a camp at the foot of an attractive peak Mark and I had seen from the top of the first one we had climbed. After three hours walk up the valley from Nimaling we camped on a level patch of moraine at 5100m (16735 ft) below the glacier snout. The weather was poor and it snowed in the night. The next day we made a reconnaissance of the glacier and so clambered up the moraine to quite a large lake, brilliant green in colour and surrounded by utterly lifeless moraine and the dirty snout of the glacier. The atmosphere was strangely oppressive. Mike and Mark made rapid progress and reached the foot of an ice wall at the head of the glacier. I was still suffering the after effects of the garlic chappatties and was unable to get any further than 5300m (17390 ft) on the glacier where I sat on a boulder feeling very sorry for myself, the mountain seeming hostile, uninviting and singularly bleak and ugly. It was one of those days when one longs for home comforts and resolutely determines to appreciate such comforts in the future. On the way down we were surprised to see a flock of black winged stilts (a species of wader)*, flying gracefully round the lake in tight formation rather like a pack of racing cyclists.

Next morning, 1 September, we toiled up the moraine and screes and cramponed up frozen snow-ice to the crest of the long east ridge which appeared to offer the best route up the peak. There were magnificant storm clouds boiling up over Chang Tang and Rupshu. The ridge was initially a corniced snow ridge, then loose rocks and a couple of pinnacles which were turned without difficulty. At 5800m (19030 ft) we had to make a tiresome traverse on the south side across ice gullies interspersed with

* See page 130

ribs of atrocious rock. Then the final summit pyramid was before us, a very steep ice face on the north side topped by cornices, and a big snowfield at a moderate angle on the south side. The fierce midday sun and the intense glare induced a langour that was only overcome by counting fifty steps and then having a short rest, with a deep breath for every step. The final rock arete was superb, being perched on the very edge of the sheer north face, with a view of the glacier lake far below and peaks all around, and led to a very fine summit at 6020m (19750 ft). Mark and Mike reckoned we would save time by descending the west ridge, thus making a complete traverse of the peak. I did not relish the prospect of climbing back up to the summit if the descent was impossible and was therefore more in favour of returning the way we had come. However curiosity carried the day and from what we could see the west ridge did not appear to have any insuperable obstacles. We descended steep, soft snow for some way but the lower part of the ridge is primarily rock and we kept to the crest except for avoiding a few large pinnacles. The last and tallest pinnacle Mike and I avoided by traversing some slabs to the left whilst Mark took a more airy and aesthetic route on the sheer side of the pinnacle above the glacier. The face on this side was steep ice with a few bits of rock sticking out and a number of crevasses and bergschrunds. At 4 p.m. we reached the col at the head of the glacier at 5680m (18635 ft) some two hours after leaving the summit. After traversing snow covered water ice we gingerly descended a loose scree shoot to the glacier at 5550m (18210 ft) and then began a long plod down the glacier which was riddled with little streams and holes in the ice and a few crevasses. In the ablation valley near the camp we were surprised to see some wolf tracks, but we never caught sight or sound of the wolves themselves.

The next morning Mark set off for Leh again since he wanted to make a journey up the Zangskar gorge via Chiling, and we arranged to meet in Skiu at the bottom of the Markha valley, on or about 7 September. Mike and I planned to go round to the west side of the range to investigate two other high peaks which we had seen to the south. Mike was looking and feeling very unwell so we spent a day at Nimaling and awoke the following morning to find snow lying. We had quite a send off from some pretty shepherd girls and several impish kids who gratefully took all sorts of discarded boxes and packets. Walking at a good pace we soon reached Tatchungtse and then turned off up the beautiful Lang Tang Chan valley, which runs into the Markha valley just above Hankar, where there is a large wolf trap near the confluence. The valley floor was very green and fertile with abundant grasses and mosses and even some attempt at marshland. Bird life was abundant, and the valley probably receives a fair amount of rain owing to the proximity of the Kang Yisay peaks which catch a lot of bad weather. We camped at a place called Taktok at 4350m (14270 ft) where there are some deserted shepherd huts and a mani wall.

There was a tributary valley just near the camp and Mike reckoned this would lead to our peak. I was not so sure, but since there was no way of being certain (the peaks were not visible due to the depth of the valley), we decided to try it.

The next morning we set off up the nullah with Namgyal and the two mules. It was rough going and we traversed up on to a spur on the right, with Mike in front finding the way, Namgyal leading one mule whilst I drove the other mule from behind. Now I admire the mule for his hardiness but there is nothing more exasperating than driving a mule on steep ground where he stops at will to graze and dashes off in the wrong direction, thereby destroying one's rhythm, essential for flogging uphill at 15000 ft or more. The country was fairly teeming with life today and a herd of bharal appeared on the crest of the peak high on our left, probably disturbed by Namgyal who was yelling at the poor mule. We also saw what I thought was a hare, though Namgyal swore it was a fox. Whether my short sightedness or Namgyal's ignorance of local fauna is to be blamed for this inconsistency, is a moot point. Mike also stumbled on a flock of Tibetan Snowcock who scuttled off uphill at an incredible pace. We could now see the glacier above us, and a peak which looked more or less like we expected it to be from this side and managed to get the mules over some difficult boulders to a reasonably level patch at the foot of the ice at 5250m (17225 ft). After a brew of tea and a discussion with Namgyal about the merits of Ladakhi, Japanese and English women, he went down to Taktok and we cleared some rocks to pitch the tent. Later we had a stroll on the glacier and I made the rash pronouncement that I was 95% certain that it was the right peak, the high isolated pyramid that we had seen before from the north-east. Back at the camp we were amazed to find water lapping round the door of the tent as the meltwater stream rose and flooded the gravel terrace. This made fetching water a negligible chore. The night was very cold and we were disturbed by loud crashes as the ice on a nearby tarn caved in with the drop in the water level.

The next morning (5 September) was clear, but bitterly cold. We set off slowly up the glacier with tremendous views back to the Stok Kangri range and the rugged gorges below. Soon the sun came up and added some cheer and we climbed a snow slope on the right, with a rather hollow sound as we crossed some hidden crevasses, to a col at about 18500ft. Now we could see that there was still another glacier between us and the peak we wanted to climb. However we were on an unclimbed peak of over 20,000 ft so although it was the wrong peak, we were annoyed by our bad route finding rather than disappointed. A rock ridge led to the steep snow fields and rock ribs of the summit. At one point we were forced to stop and take our boots off to rub the circulation back into our feet. The summit was 6120m (20079 ft), a narrow ridge with cornices on the east side, and we could see our old camp far below on the east glacier of Kang Yisay. Despite the brilliant sunshine, it was very cold, there was not a drop of water anywhere, and Mike was very dehydrated because of persistent stomach trouble. The rocky pinnacle at the north end of the summit appeared to be a bit higher so we carefully traversed the corniced ridge through deep powder snow. Typically when we arrived and looked back, the other end of the summit appeared higher. Bad weather was coming in so we descended quickly to the col in an hour and a half. The descent to the glacier was in a strange white out - it was not snowing and the air was very still but because of the clouds and unusual light conditions

it was impossible to distinguish the earth from the sky. Back in camp we felt exhausted but after polishing off the mars bars and the condensed milk we made a rapid recovery and decided to descend to Lang Tang Chan that evening.

The following day, Colin, Mike and I walked to the Zalung Kurpo La (17040 ft). The valley was very fertile as far as a fork at 4650m (15256 ft), and after that it was an utterly barren nullah, but the view from the pass was magnificent. Beyond were some jagged rock peaks of over 18000 ft, with a wild valley leading down below. Colin and I climbed a small peak to the south, some 800 ft above the col. Then we walked for two days to Skiu, arriving on 8 September, where Mike's symptoms were finally diagnosed as dysentery, whereupon we gave him appropriate drugs and told him to lay off the chang. The day after, Mark arrived after walking up the Zangskar gorge from Nimu. Mike and Colin returned to Leh with Namgyal via the Gunda La (16310 ft) which they crossed in thick weather. The rest of us returned to Leh via Nimaling and the Gongmaru La.

PART II : SECOND ZANGSKAR JOURNEY (SEPTEMBER - OCTOBER)

Jhung Lam

In mid-September, Mike and Mark had to return to commitments in England. It was my intention to return to Zangskar by a direct route across the mountains from Leh, known as the Jhung Lam or "middle road", to have a look at the uninhabited country beyond the Markha valley. For this journey I teamed up with Ian Coward and Nick Woods, two English friends who were in the area and who were interested in walking to Lahul and in climbing a peak or two on the way. Our party was also joined at the last minute by Helena Norberg-Hodge, a fluent Ladakhi speaker. We foregathered at Karu on 20 September, one day later than planned, since Namgyal had been too drunk to travel, and camped that evening at Shang Sumdo. That evening was probably the biggest food disaster of the entire expedition; Ian, normally a tolerably good cook, poured kerosene instead of water over a freshly prepared pile of aubergines, cauliflower and tomatoes and rendered the whole lot inedible. So it was chappaties, rice and dal for supper as usual. Two days later and we reached the old camp at Taktok in Lang Tang Chan. The nullah from which Mike and I approached our last peak was the fifth above the confluence with the Markha Chu and we reckoned that the seventh nullah would lead to the high peak which had proved so elusive. This supposition was again partially incorrect since we realised later that the sixth nullah drains two glaciers coming off the peak, and it is the more southerly of these two glaciers which offers the best approach. However, Ian and Nick and I set off up the seventh nullah on the following day with Namgyal and the two mules, and arranged for the main camp to be moved to the foot of this nullah the next day. It was cold and cloudy and snowed occasionally. The gorge was very rough going for the mules and Namgyal needed a lot of persuasion

to get to 4800m (15750 ft), where there was a tiny patch of level gravel for the tent. Ahead the gorge narrowed to a deep cleft which was impassable, and on either side we were hemmed in by tottering cliffs of rubble and loose rock. We wondered whether any of this would collapse on to the tent, but there was nowhere else to camp and it would have been abnormally hard luck if a boulder had chosen to land on the tent in preference to other parts of the gorge. Ian made the camp ship-shape whilst Nick and I set off on a reconnaissance. The gorge could not be followed because the walls were vertical and hung with icicles which plunged straight into several feet of water so we were forced to climb up the loose sides of the gorge and traverse across the screes to the glacier snout at 5150m (16900 ft) where we dumped some climbing gear. The round trip from the tent took three hours.

We awoke at five o'clock the day after to find that a couple of inches of snow had fallen. The mountain tent had been taken back to England and although the one we now had was designed for touring France in summer, it was managing quite well at 16000 ft in the Himalaya. We peered out to a very gloomy morning, the scene more like a coire in the Cairngorms than an unknown range in Zangskar. There seemed to be little chance of reaching the summit, since we could not afford time to sit out the bad weather, and we were also camped too far from the glacier. We walked up there in threatening weather, with snow squalls hiding the peaks and a piercing wind blowing off the glacier which was blanketed in deep, fresh powder snow. When we saw the summit high above us in a gap in the racing clouds, we decided not to make an attempt. The sun came out for a while and great clouds of spindrift blew across the ice like smoke. Here at only 17000 ft it was very cold so we set off down the hill. Ian stumbled on the way back and the shaft of his ice axe snapped like a carrot, a brand new axe at that. We were back in Lang Tang Chan again that night and several inches of snow fell although the morning dawned cold and sunny. Storm clouds came in again and we issued the lads with warm clothing and snow goggles, which they wore with delight. Most of the day was fine although bad weather clung to the peaks as we crossed Zalung Kurpo La (17040 ft) and descended a wild and desolate valley to a camp at 4250m (13945 ft). Huge precipices soared for 4000 ft above our heads on the west side of the valley and some terrific rock towers formed an impressive gorge lower down. We passed along the foot of the towers amongst dwarf willows tinted with autumn colours of red and gold. It was quite a surprise to come across a prayer wall since we were under the impression that the area was uninhabited. Nearby were a few deserted buildings and fields which we found out later to be the Changpa settlement of Tsogra, occupied briefly during the summer. In fact the nomads had left Tsogra that very morning for the autumn and winter pastures. The confluence of this valley with the Khurna Chu (known locally as Chang Chu) is called Tantse Sumdo. It is dramatically beautiful, wild country, the valley floor densely wooded with willows and poplars and shrubs in exquisite autumn colours, contrasting with massive rock walls that form the sides of the valley. The path was very indistinct and rarely used and much of the time it was

necessary to force a way through quite dense woodland, broken by lovely glades and clearings. Our first camp in the Khurna gorge was probably the finest we ever had in Ladakh, amidst a grove of trees with abundant firewood (which we used that evening to have the luxuries of a blazing fire and baked potatoes). The entire valley was characterised by staggering rock scenery, every corner turned brought into view another colossal rock buttress whose height we hesitated to guess at. The next camp was reached after wading the river about 56 times, easy crossings but bitterly cold water and a strong current. The route is out of the question in the summer months on account of the water level, and in some sections there is no option but to walk down the river itself between vertical walls. The next day was a short march which took us past the confluence of the nullah descending from the Ruberang La, after which the going was much easier and the path more obvious. This was the first tributary valley we had seen since Tantse Sumdo except for several spectacular canyons, merely slits in the immense rock walls of the gorge. We passed but failed to recognise the defile which would lead up to Shapodok La, a pass of 18530 ft leading to Zangskar and the Shadi district but which hardly anyone we asked had heard of. We also met a party of four Zangskaris from Zangla who were taking a herd of goats and dzo to sell in Leh, via the Ruberang La. The camp was a bleak spot with poor grazing but Helena contracted a fever and was delirious for a night so we spent the next day resting there. On September 30 we reached Tilut Sumdo at 3595m (11795 ft) after a total of 70 river crossings. It is a conspicuous valley and the spot is marked by some prayer flags but is devoid of any habitations or shelter. We set off up the valley and camped at 3915m (12845 ft) below the Charcha La. On the way to the pass we met two Zanglapa who were carving up a tree trunk to use in a water mill, a cheerful pair who thought nothing of the strenuous task ahead of them, carrying this awkward and heavy load over the pass. Higher up there were more Zanglapa taking herds to Leh. They gave us potatoes, tea and a revolting concoction of fermenting barley grain. From the top of the pass at 4840m (15880 ft) we had a good view of the Himalaya which was very close now, towering up behind Padam. We camped 3000 ft lower and the next morning reached Zangla. The lads were installed in the monastery courtyard and most of the villagers came to see us, bringing eggs and potatoes and yos (roasted barley grain) in return for medical attention, mainly for inflamed eyes. There were superb views across the Zangskar valley, the river a deep turquoise blue instead of the dirty brown of summer. We also paid our respects to the elderly gyalpo (king) of Zangla who treated us with great courtesy and hospitality.

The last march to Padam was a long one but very leisurely, for we stopped for chang at Zuzzar, and at Thonde to watch the farmers threshing and winnowing the crops. The harvest is the busiest period of the agricultural calendar and also the most picturesque from the point of view of the traveller. All day there were very strong winds and great dustry storm clouds were swirling round the peaks which grew in stature as we drew closer.

It was a dark and windswept night when we finally reached the camp in the fields near Padam after a hair-raising crossing of a swaying rope bridge in the gloom. We struggled to pitch the tents and sort out a choas of baggage; it felt rather like arriving in North Wales late on a Friday night, but with the notable absence of a pub.

A small peak in the Himalaya (by N.H.Woods)

On 4 October, Simon and Helena set off for Kargill, and Ian and I rented a room in Padam. From 5 to 7 October we climbed Segali Mentok Riga (18600 ft), first climbed in 1976 by J.P.Crowden and F.M.Lumsden. The first morning, designed to be a smooth piece of administration and logistics, was seriously held up by our lack of paraffin and the erratic opening hours of the government stores. Eventually a small boy appeared and set up a table and two folding chairs, hung up a pair of scales from a joist, placed ledgers on the table, unlocked the various doors to the stores (each door with two or more padlocks) and placed sacks on the ground to weigh the supplies.

Much later we trudged uphill to our objective with Angyal and one trusty mule. The weather was perfect. Our north facing peak had two white, sloping shoulders which it shrugged in a mild sort of defiance, standing against a very dark blue sky. We followed a shepherd trail up the left bank of a long, barren nullah and camped at c.16000 ft on a flat patch of moraine just below the snowline. Our Alpine start was a disaster. After sleeping badly and experiencing Cheyne-Stokes breathing we woke early and started a brew. Starting the Indian primus stove was a feat in itself for a candle had to be placed under the tank to melt the frozen fuel, and the candle had to be lit by an inferior Indian match. The effort was too much for us and we fell asleep until dawn. But at last we set off and after crossing the moraine to the foot of the right hand gulley, the sun reached us and softened the deep snow. Exhausting but steady progress brought us via Crowden's route to the shoulder of the peak, and we traversed loose rock to a col. There remained about 500 ft of soft snow at a constant 45 degrees. We reached the summit at 1 p.m. To the south was a chaos of tottering rock spires and loose walls, presenting what is possibly nature's most effective barrier to human progress across the face of the earth. From this direction, a heavy grey storm cloud moved towards us, a departure from the perfect weather we had so far experienced. We stopped only for photographs and to eat an entire packet of chocolate biscuits especially conserved for the occasion. We descended by the south east ridge and then down a snow gulley to the camp where we arrived exhausted at 4 p.m.

The following morning was the coldest of my life, and the snow on my trousers was still unmelted inside the sleeping bag. We had to thaw the boots over the primus and relief only came when we had descended into the sunshine. The descent to Padam was uneventful except that Ian's rucksack disintegrated and we noticed that the green plants were surrounded by beautiful ribbon formations of delicate white ice, (due to the respiratory products of the plants freezing as they emerged ?)

The remainder of our time in Padam was relaxing in contrast to our mountain exertions. We each had a wash, bought half a tough old goat for 12 rupees and hired ponies to ride to Kursha gompa. A serious twelve year old guide rode pillion and for riding turnout Ian insisted on wearing a purple sweater and an orange balaclava. On the road we passed the gyalpo of Zangla. There was a panoramic view from the rooftops of Kursha, and the monastery was beyond words. We visited other monasteries and Ian invented a brass-rubbing technique for prayer stones using lavatory paper and goat or sheep droppings. On 10 October we left Padam after buying supplies. Inexplicably all red tape was cut, the stores were opened and the supplies weighed within minutes. The journey to Darcha took eight days, crossing the Himalaya by the Shingo La (5097m, 16722 ft). The journey can be done in six days but the wallahs evidently wished to earn another day's keep, and we wished to make a detour up the Niri Chu to Phuktal gompa, a large monastery built on a steep precipice under a huge natural cave, full of doves. The monastery was deserted and we were told that the monks had gone to Padam for supplies. But we met almost the entire population of each village we passed through, and everyone asked us where we had been and where we were going. We traded our dried apricots and empty coffee jars for milk and arak (distilled chang). Sometimes we gave medical aid and often we were asked for elastoplasts to treat unsuitable ailments such as rheumatism. At Pune we met several Changpa driving an enormous flock of 1000 sheep from the Rupshu plateau to Padam. Some sheep were carrying salt to be exchanged for grain. Over the Shingo La we met mule trains bringing potatoes down to the road.

After Padam we were joined (at his own invitation), by a tiny Zangskari trader who was also on his way to Manali. Despite his diminutive 4 feet 9 inches, Sonam Stetin struggled along with us, carrying a large sack of dried cheese on his back and also some uncut sapphires to sell in the plains. He was quite happy to eat our food and to wash up occasionally. During the whole trip his hands remained a livid purple from recent wool dyeing. The evenings in Angyal's tent were entertaining affairs. We were introduced to strange concoctions of native food, and they were amazed by our description of the aeroplane that brought us 500 marches in a day from the other side of the world which for them had hitherto been flat (albeit mountainous).

The weather grew increasingly cold as we approached Shingo La. The morning in Kurgiakh was appalling and the apricots froze as I washed them. At our last camp before the pass we were joined by two more Zangskaris with two horses and a foal who were going to Manali. They had no tent and slept in the open despite falling snow for the next two nights. They were tough ! We gave them some custard. Then over the glacier on the pass and past a chaotic ice fall of wondrous pinnacles and icicles. The bright sun was blotted out by cloud which seemed to make all the colours brighter, with brilliant lichens, beautiful rock formations and a few colourful flowers. There were numerous stone circles and huts and a few

tiny mani walls. Crossing the wide river involved removing trousers. It was very cold and deep and several times I nearly slipped on the slimy rocks. The Zangskaris rode across. We reached the tree line and the country became much greener, although it was being rapidly blanketed by falling snow. The final day was a beautiful walk across the snow amidst sunlit peaks. We washed our smoke-blackened faces in the stream and crossed an exciting bridge across a 60 ft chasm where Angyal placed a juniper sprig by a cairn. Soon we reached his native village where we were feted and feasted by his ear-ringed and half-crazy father who was ignored by all and talked continuously. Everyone except the disciplined Sonam drank far too much arak and chang. We paid our respects to the local gompa and I fell down the stairs of the house. There remained only a long bus journey between us and the plains of India.

PART III : MARKHA AND KARNAK (OCTOBER - NOVEMBER) (by S.F.)

Markha valley

After leaving Padam, I reached Kargil by truck from Tungring bridge, a mere four hours walk from Padam. We divided up some of the equipment such as stoves, pressure cooker and spare clothing between Angyal and Namgyal. The latter was very proud of a ghastly yellow nylon jacket which he now wore fully zipped up, hood and all. The back of the truck was exceedingly dusty, noisy, cold and uncomfortable; a loathsome way to travel after three months on foot. But it did the trip to Kargil in two long days and the scenery was truly magnificent, passing one great peak after another, including the giant Nun Kun massif (23410 ft). The highest point of the road is Pensi La (14439 ft), after which one leaves the Buddhist country behind and enters the dramatically different Moslem populated Suru valley.

On 13 October I set off for Markha and spent the first night in the monastery at Stok with old friends from 1976. My load was so heavy that I engaged a porter the next day to share the weight as far as Rumbak on the other side of the 16000 ft Stok La. I slept on the roof of a house in Rumbak, where we stayed last year. Snow fell in the morning, for unless the sun shines it is quite chilly at this time of year at 3910m (12830 ft).

The sun started to shine as I set off across the white landscape towards the hamlet of Yurutse (13,288 ft) before the long haul to Gunda La (16310 ft). The first settlement beyond the pass is Shingo (13450 ft), a couple of hours above Skiu (11000 ft), where I arrived feeling absolutely whacked and thankfully dropped my load and camped in the open near the small monastery. I had made arrangements to stay in a house in Markha, and on the last Zangskar journey had left 12 kg of lentils and 5 kg of sugar at a house in Hankar, to be picked up later and given to my Markha hosts, Tsewang Rinchen and his wife Gunzang Yangskit. Staying in the valley provided a completely new

insight into village life after the more general impressions obtained by briefer visits in the past, particularly by living with a family and experiencing native conditions without the distractions of European companions and conversation.

In a very short while, my surroundings took on a pleasant familiarity and I attained some degree of acceptance in Markha. For the most part, the weather was very fine, day after day of brilliant blue skies, warm autumn sunshine and the flawlessly clear atmosphere characteristic of Tibetan lands. The countryside hereabouts is extremely rugged and no Markhapa would find cause to disagree with Ruskin that 'Mountains are the beginning and the end of all natural scenery'. The main activity in October is completing the harvest work and each day everybody worked very hard on the threshing floors, singing and whistling traditional tunes as they worked. At this time of year the air is alive with birdsong, and the blazing sun catches the gentle autumn colours of the trees and bushes along the valley floor that provide some relief from the otherwise barren and desolate landscape of rock and snow. At night the land is gripped by hard frosts that intensify as winter progresses and temperatures drop as low as -30°C in the coldest months. The days passed quickly, and by talking to many different people, I gradually learnt more about the valley and its inhabitants, although the absence of any English speakers was a considerable barrier and I had to rely entirely on my limited grasp of Ladakhi which slowly improved over the weeks.

By chance, my stay in the valley coincided with the visit of the Tukshe Rinpoche from Himis gompa. The visit of such a high lama to this remote valley was an event of considerable significance and no one could recall the last time such a holy man had made an official tour of the district. The Rinpoche came with a retinue of some twenty monks and assistants and visited each house in every village he passed through from Himis, to Hankar (via Gongmaru La), to Markha, Skiu-Kaya, Chiling, and back over the Gunda La to Rumbak and Stok. Naturally, such an event was celebrated (apart from religious rituals) by great festivities, dancing and chang drinking. The houses were whitewashed, new prayer flags were printed and hung on the roofs and chortens, and everyone dressed in his best clothes. To an outsider, the whole pageant was like something from another century, and was certainly one of the highlights of my stay in Ladakh. When the Rinpoche was about to arrive at each village, an escort of horsemen set out to greet him and all the women stood by the chortens and mani walls on the edge of the village to present ceremonial silk scarves (katak) and chang, served in ornate brass vessels (chabskyem) decorated around the rim with pats of butter. In each house there was a ritual to bless the household, attended by the immediate family while all the relatives and family friends, accompanied by musicians, sat outside on the roof in their best clothes, eating and drinking. The fine days and cold, starry nights in this isolated Buddhist village and the wild mountain setting made a perfect background to the festive atmosphere and numerous ceremonies. Dr Johnson wrote that 'Human life is everywhere a state in which much is to be endured, and little to be enjoyed'. After living in Markha, I was confirmed in my opinion that for most Ladakhis, much is to be endured, but much is to

be enjoyed as well. They set an example of unfailing cheerfulness, good humour and consideration of their fellow-men, even in the most adverse circumstances. They also possess the fortitude and physical hardiness necessary to withstand the unremitting toil characteristic of life at high altitude in Central Asia.

During late October, parties of Changpa nomads passed through the valley, en route from Leh to their high camps on Chang Tang and Rupshu. Driving large herds of sheep and goats, the Changpa had a wild, fierce appearance with their weatherbeaten faces and rough sheepskin coats. They were a very friendly lot but it was hard to understand them because of the different accent. Karnak, the settlement for which they were making was only a few days journey, and early in November I went there with Sonam Stanzin, a 28 year old Markhapa who was taking some grain there to exchange for wool and salt. Stanzin was the son of a nomad who had married a Markha girl, and his own wife was a Changpa from Karnak. In Ladakh, journeys always seem to commence at some absurd hour before dawn, or very late in the day. In this instance, after an initial procrastination of several days due to some impromptu house parties in the wake of the Rinpoche's visit, we set off in the late afternoon for Lang Tang Chan. Naturally we stopped in Hankar for tea, so it was dusk by the time we reached the bottom of Lang Tang Chan and pitch dark when we finally arrived at the small pulu called Ma-les (13650 ft). The following day we crossed Zalung Kurpo La in a snowstorm; I was amazed to find that Stanzin's bare hands were as warm as toast, whilst mine were only just warm enough in dachstein mitts. At about 14000 ft we stopped for a meal, and crouched round a small fire to brew tea and made thukpa (soup) whilst the falling snow settled rapidly on our backs and shoulders. Stanzin cut strips of meat off a joint and ate them raw, though at the risk of seeming fastidious, I roasted mine. Then we continued through the gloom and slept in a stone hovel at Tsogra, the deserted Changpa settlement, and pressed on to Karnak the next day, a few hours walk upstream from Tantse Sumdo. High on a spur above Tsogra stands an old Changpa fort, a relic of troubled days long ago. The route to Karnak passes through a deep canyon of awesome dimensions before opening up into the wide landscape typical of Tibetan lands. Beyond Karnak is the Yar La leading to Chang Tang. Karnak (also known locally as Ldat) is situated at 13910 ft and consists of two separate camps about a mile apart, Shehyen and Rdango. There are about sixty families here, some in yak-hair tents, others in small stone huts. Approaching a nomad camp for the first time was very exciting, made more so by the ferocious dogs that roamed the outskirts of the camp to attack wolves and other undesirables. To meet a dog in Ladakh is to be attacked, but the Changpa controlled these brutes by shouting and throwing rocks. It was interesting to hear from Stanzin that there are sixty of these dogs at Karnak; once I witnessed a dog-fight which was a sight well worth watching. When we arrived in Shehyen we received a very hearty welcome and everyone rushed over whilst we unloaded the horses. We repaired at once to a rebo (tent) where we were served with tea and a huge plate of rice and meat. The interior of the rebo was surprisingly spacious and little different to a Ladakhi house in its layout. There were small tables, carpets, fire and kitchen area, and a small shrine. The floor was sunk a couple of feet lower than the ground outside and

a low stone wall round the perimeter gave the dwelling a vestige of permanence, as indeed it was in the winter months. Points of light from the brilliant sunshine pierced the woven yak-hair cloth of the rebo and lit up the column of smoke that spiralled up from the fireplace. All the women wore the ornate headress (perak) of Ladakh, comprising numerous pieces of turquoise sewn onto a wide strip of leather and felt reaching from the top of the head to half way down the back. Their dress differed slightly from the normal Ladakhi style in that they wore long sheepskin cloaks, rectangular in shape, lined on the outside with brightly coloured cloth in simple but striking designs. Both men and women wore the leather and embroidered felt boot of Tibetan style.

For the rest of the day, Stanzin and I paid visits to one tent after another. At each the procedure was the same, tea and tsampa followed by a huge plate of rice and meat. By the time we were starting the third meal, I was much too full but the custom is to accept the food and not to eat it, rather than to refuse it altogether. Usually, another Changpa would come in during the meal and invite us to his tent for yet another meal. I believe the first round of social visits took in six different familes. Later we visited the monastery, a rather dilapidated building half a mile away in a desolate spot at the foot of some rugged peaks whose harsh shapes were somewhat softened by the winter snow. The sight of a building in this remote spot seemed to accentuate the solitude and isolation of Karnak. It seemed to be quite insignificant in the sheer enormity of the landscape. As we approached the monastery, we could hear the deep booming of drums, and entered the temple through a massive door. Inside, a solitary lama sat chanting his prayers, alone amidst rows of dusty religious books, thankas, figures of the Buddha, butter lamps and grotesque masks. Behind him were frescoes of various divinities and in the corner a black door with a horrific demon painted on it. For no apparent reason, the sight of that door filled me with dread. The place was deathly chill and the lama wore a massive Changpa coat of sheepskin. I was shown around the gompa by a one-legged nomad who hopped about on a crutch. Returning to the camp, I was impressed by the determination of the dogs to tear me apart, but I had borrowed a heavy stick from one of the tents so they generally kept their distance.

The nights at Karnak were very cold and still, the only sounds came from the dogs roaming around the valley and howling. At dawn the fires were kindled and spirals of smoke caught the rising sun whilst barefoot children fetched water and played in the dust. The thin air held no warmth and the slightest breeze carried with it an unrelenting chill, although sheltered spots in the sun were blissfully warm. The hillsides above Karnak afforded a fine view of the settlements but as soon as I was spotted, every dog started voicing his disapproval, and the really enthusiastic ones chased me up the screes. Otherwise it was a tranquil spot, one of the world's lonely places, with nothing to disturb it except the wind. Many such areas have been rarely, if ever, visited by foreigners, who habitually class such regions as 'unknown' even though the country is no doubt tolerably familiar to the native inhabitants.

When the time came to return to Markha, we did not leave until late in the afternoon, after further social visits and the drinking of much chang. By the time we had passed through the canyon above Tantse Sumdo it was dark so we stopped at the first stretch of woodland and unloaded the horses. Soon we had a blazing fire but whilst we were dining, the horses became increasingly restless and we heard the cries of snow leopards. Stanzin looked quite worried and when we heard the snow leopards again, they were only a few yards away in the trees. The horses were very excited now so we stoked the fire up into a big blaze, Stanzin picked up a heavy stick and went off into the blackness to drive the cats away whilst I held the horses. He came back having seen two snow leopard and said we must move, so we struck camp and set off down the valley although it was so dark in the trees that it was virtually impossible to see anything. Presently we came across an encampment of Changpa returning from Zangskar with herds of sheep, goats and yak. We lay down near them in the open and saw that despite the intense cold they slept comfortably under a couple of blankets. Due to some stomach upset I had to get up six times in the night and was chilled to the bone each time; the hours crawled past. The nomads set off at 3 a.m. but we waited until first light. We passed Tantse Sumdo and set off up the gorge to Tsogra. The defile is so deep and narrow that the sun never penetrates it in the winter so powder snow lay deep on the rocks and the river was a crumpled sheet of ice. The trees had lost their warm autumn colours of red and gold and the gorge was now a frigid landscape of ice and rocks that thrust up into the cold blue sky like the bones of the earth. Everything was cast with a ghastly blue light. Then we passed a cheerful party of Changpa and soon we reached Tsogra in the first rays of the sun. It was a long haul to Zalung Kurpo La and even Stanzin paused to rest on the last dreadful slopes. From the top we could see nothing but mountain ranges in every direction, dusted with winter snow under an immense sky. It is a splendid pass, one of the finest in a land of many passes. By now it was late afternoon and as soon as we reached lower altitudes where there was a semblance of vegetation, we made a fire and brewed tea. The upper streams were white ribbons of solid ice but lower down it was possible to break through the ice to find running water. At dusk we reached Taktok, our old campsite,* and slept in a pulu on the other side of the river. The next morning we climbed high above Lang Tang Chan and crossed the Konka Ngonpo La (16945 ft) to Nimaling. The path leads to high pastures on the flanks of Kang Yisay and then traverses steep slopes high above a deep nullah. In summer the route would be narrow and airy enough but now it traversed steep icy slopes of frozen snow, quite tricky for pack animals. The pass lies right at the foot of the north west spur of Kang Yisay and we emerged from the confines of the nullah to see sweeping snowfields falling away gently. We tramped down through deep powder snow, dazzled by the blinding white expanse, crossed another small pass and then descended to Nimaling where a solitary shepherd girl gave us some butter-milk and yogurt. The taste was ecstatic.

The journey was nearly at an end. Stanzin and I climbed quickly to the Gongmaru La and stood together in the screaming wind, reluctant to part. For the last time I gazed at Kang Yisay, now

* see also sketch map p. 68

wearing its winter coat, with a snow plume being driven off the summit by a gale. The seracs and ice fields of the north face lay in blue shadows, untouched by the winter sunshine. Exposed to all the winds of Asia, the mountain in front of us, like the stones on the pass and the madly flapping prayer flags, seemed a symbol of permanence in an unsettled world. After many weeks upon the mountains, it was with some regret that I turned round and plunged down the steep slopes towards Chogdo and the Indus Valley. Stanzin went back to his home in Markha. On this side of the pass, everything was gripped by the frost and the waterfalls were great pillars of ice. I stayed with Stanzin's uncle in Chogdo and reached Leh the next day.

At the end of November, I set off for Kashmir, and was promptly robbed of passport, money and plane ticket by a Kashmiri truck driver. Fortunately everything was retrieved after various adventures in Leh, and the thief was given a going-over by the police chief, a disagreeable spectacle. I eventually reached Srinagar without further incident, having spent a total of eight months in these Buddhist highlands of northern India during the two expeditions. Travels in the Himalaya, and anywhere else for that matter, are best summed up in the words of the eminent mountain explorer T. G. Longstaff : 'Happiness is most often met by those who have learned to live in every moment of the present; none has such prodigal opportunities of attaining that art as the traveller'.

APPENDIX B

HISTORY

This appendix is very much an 'optional extra'. It is intended for those who may be interested in Ladakhi history but who find (as I do) that the old books are somewhat heavy going. This precis of the earlier works suffers all the usual shortcomings of abreviated histories in respect of simplifications, ommissions and dryness of narrative, but I hope this is offset by the intrinsic interest of the events described.

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Ladakhi history is derived from folklore, ancient scripts and carvings, and other highly esoteric sources. As far as the lay-reader is concerned, the 'standard work' is A.H.Franke's 'History of Western Tibet' (1) and his 'Antiquities of Indian Tibet' (2), both published around the turn of the century, which supersede General Cunningham's earlier work, 'Ladak' (3). Franke was a Christian missionary working on the basis that "God, who claims also to be the God of the heathen, as the prophets of the Old Testament assert, claims also the steppes of Western Tibet as His own." His history is a work of great scholarship in which he pieces together the scant evidence, often in great detail, and always with a Victorian matter-of-factness that seems almost farcical to the uninitiated reader today. Where else, for example, would you learn that "dGaldan Tshewang alias THU-Wo-bLO-aZAN-Padma was the son of Dalai Khuri-thai-jie of Mongolia in Chhu-Mo-phag (water-female-hog year) or 1682/83"? Nevertheless the narrative is balanced and varied and the history has a pleasing medieval, if not classical quality. ("Basgo, having been besieged for six months with catapults..").

The earliest reference to Ladakh, or Western Tibet, was by Herodotus who assets that the place was inhabited by "the most warlike of all Indians" and also by gold-digging ants, "smaller than dogs but larger than foxes". On the other hand, Franke states that the only inhabitants at this time were an ancient tribe of Tibetan nomads. He adds, significantly perhaps, that "their life probably in no way differed from that of Tibetan nomads of the present day". The first settlers were the Mons who belonged to an Aryan race and it is interesting that they still survive today as musicians and carpenters in most villages. This is a result of the stigma attached to belonging originally to a low class or caste of a subject race. The Mons were overrun by the Dards who migrated from the Gilgit area and they too survive today in certain parts of Ladakh. They were subjugated in turn into various "petty kingdoms" but they did not give in easily. Franke recounts vivid tales of their resistance such as the old man who would not work for the king and was immured. "When the wall reached up to his neck he was asked once more if he was ready to work, but, as he still refused, the wall was closed."

And the Samson-like story of the Dards besieged in their castle when "the oldest man pushed away the stone on which stood the central pillar supporting the roof, and the falling roof buried them all." These early kingdoms were seemingly always at war, either with each other, or with the Celestial Chinese empire which was expeditioning as far West as Kashmir at this time (c.700 A.D.). Franke comments that "we can well imagine that the country was shaken to its very foundations by this continual warfare." The Dards also intermarried with the Tibetan nomads to produce a race from whom most present day Ladakhis are descended.

The earliest religion was the Bon Achos which only began to be systematised when it came into contact with Buddhism around 400 A.D. Lamayuru, one of the most famous monasteries in Ladakh, was originally a Bonpa monastery. Buddhism made many concessions to Bon chos such as adopting the popular 'nation epic' in which an elaborate story of "the mission of the youngest son of the king of heaven to earth" is told. However, Buddhism did not become widespread until a certain king openly accepted it around 600 A.D., and even then there was considerable resistance until the time when the Ladakhi kings' dynasty branched off from the Central Tibetan dynasty around 900 A.D. From this time on, the 'chronicles' were kept and much of the history can be deduced from their "masterly translation" by Franke's "beloved teacher", one Karl Marx, who was none other than a Moravian missionary. Unfortunately the early chronicles are little more than glorified pedigrees of the various kings, although some reference is made to buildings and monuments made at the time. But even this can be confusing; for example, a certain king "built the Spituk monastery, though in reality he did not build it, but it came into existance by a miracle." The next important event seems to have been the life of a great Lama (monk) called Tsongkapa who set about purifying the Buddhism by founding a new sect, popularly known as the 'yellow hats' after the hats they wore to distinguish themselves from the unreformed 'red hats' at the beginning of the 15th century. He also abolished live sacrifices which used to involve "tearing the hearts out of live goats" before the altars of pre-Buddhist deities. Franke even mentions human sacrifices, and again I am forced to quote his story because it appeals to the modern sense of humour. A certain Lama was due to be sacrificed when he borrowed the executioner's axe..... "Then he stepped before the idol and said, 'well, Lord of the Fields, if you really want my life, take it please; if not, I shall take yours'. As there was no reply, the hermit raised his axe and cut the idol in pieces. Then he threw the fragments in the river and everybody went home." The two religious sects, Gelukpa (yellow hat) and Nyihgua (red hat) still coexist in Ladakh today.

The lineage of kings was broken around 1500 and the second, or 'Namgyal' dynasty was founded. The first few kings in the new line undertook extensive miliatary campaigns ("to subdue the vassal-chiefs") and during their reign the Western Tibetan kingdom reached its greatest extension. They also accummulated religious merit by having manuscripts copied and monuments erected, and the shrewdest of them extended the idea into construction projects, such as building bridges, by declaring that this was a means for everybody to accumulate merit and thus gain release from 'the Wheel of Life'. However there was some difficulty in subduing neighbouring Baltistan to the north-east. The Ladakhi army suffered a defeat there and the

king was forced to marry a Balti (Mohammedan) princess. But their son, Sengge (lion) Namgyal, fortunately favoured Buddhism and he achieved notoriety by entering, in conjunction with a famous Lama, on "a great scheme of building enterprises." Among the most well-known of the buildings he commissioned were the nine-storey palace at Leh and the 'red hat' monastery at Himis, both of which stand today as impressive reminders of what is considered the 'Golden Age' of the Western Tibetan empire (c.1550-1650 A.D.).

Sengge's son continued his father's work and made several military campaigns - even regaining the old Balti territories towards the end of his reign. His son, Delegs, on the other hand, became involved in the 'Great Mongol war' (c.1646-47) and had to call on the Moguls, who at that time ruled Kashmir, for assistance. He was forced in return to make many concessions to the Moguls including trade 'agreements', his conversion to Mohammedanism and its encouragement in Ladakh which was unpopular at the time. Furthermore, as soon as the Mogul army had gone home, the Mongols mounted a counter-attack and poor Delegs was forced to make concessions to them as well. Many of the trade agreements made in this incident with both parties were observed right up until the closing of Tibet in 1951.

The next hundred years saw a line of relatively insignificant kings who lived "debauched lives", and occasionally occupied themselves over "quarrels for the succession". Franke does praise one of them, however, for his wisdom as an arbitrator and describes in some detail how he settled disputes - "the elders, having carefully listened to the case, cast lots to find exactly the truth...." Three out of the last four kings were evidently mad. The only sane one ("he was diligent, and obtained proficiency in Tibetan grammar and mathematics") died heirless and the throne passed to his brother, Tsepal, who was recalled from his life as a monk. At this time (1820-22) the British representatives, Moorcroft and Trebeck, visited the area but the Ladakhis were suspicious of their idea to build a fort. The 'chronicles' significantly record : "These were the first European sahibs who came". Tsepal also had to turn to the monastery for a successor when his first son died young. There seems to have been a problem here because the second son was unwilling to leave the monastery and take a bride. Eventually he relented "for the sake of the dynasty" and, "having once tasted the sweetness of matrimony", he took no less than three wives. But for all this he was never succeeded for, at the end of his father's reign, the empire was to fall at the hands of a Dogra invasion.

Franke's account of the Dogra wars is apparently one-sided and I refer now to the duller description given by Gergan and Hussain in their critical introduction to a recent reprint of Franke's work. At the beginning of the 19th century the Sikh Empire was looking for ways to expand itself and in 1834 Gulab Singh, then Maharaja of Jammu and head of the Dogra tribe, managed to gain the consent of the British for an invasion of Ladakh. 10,000 men equipped with "modern weapons" were despatched under the command of Wazir Zorawar and were matched by a Ladakhi army numbering 5,000 under Dorje Nyamgal. A small force of 200 faced the Dogras at Karkse but were defeated and Zorawar continued unopposed until faced by a Ladakhi army which

by now had grown to 9,000 men. With winter approaching, Zorawar decided to buy time and negotiated a settlement with the King while his army lived off goods plundered from villages. A settlement was reached, but was imprudently opposed by "Queen Ziza" who issued a call to arms, resulting in the Ladakhis suffering a serious defeat. As many as 400 men are said to have drowned while trying to escape the carnage following the collapse of a snow-bridge across the Indus. The treaty signed in April 1835 was considerably more expensive for the Ladakhis who had to pay, among other things, a "tribute" of 50,000 rupees a year to Gulab Singh. Meanwhile there was an uprising in Suru and this was swiftly dealt with by Zorawar. The King was suspected of a plot and was deposed in favour of a traitor named Nurub Skauzh but was later reinstated on instructions from Gulab Singh. Later there was trouble with neighbouring Baltistan but again Zorawar acted swiftly and the unfortunate instigator of the uprising was tortured mercilessly : "At first he cut off his hands and dipped the stumps in hot oil. Then he cut off his tongue and then his ears and showed him to the whole army". King Tshepal, who had been taken as prisoner, died on the journey back from Baltistan. However Zorawar overstretched himself on his most ambitious and final campaign into Tibet. He was not prepared for the severe winter conditions on the Tibetan plateau, nor was he match for the large army of Tibetans sent to meet him and he died in the Dogras' conclusive defeat on 10 December 1841. So ended the Dogra wars in Ladakh, but not before extensive damage had been done to most of the monasteries. Franke describes how "the soldiers did not stop at the looting of silver, gold, copper and precious stones...." and how "in place of birch bark for roofing they used leaves of religious books written on parchment paper". Some of the vandalism perpetrated by the Dogras is still visible today.

The Tibetans, at this time, owing to a complex series of internal factors, had expansionist ideas of their own and the victorious army marched on towards Ladakh. The British became alarmed at this and sent General Cunningham to make peace. The Ladakhis raised a new army of 8,000 and routed the Tibetans after which the area enjoyed relative peace for the next hundred years. Here Franke's story ends although he does add a further chapter entitled "Missionary's Review" in which he comments that "since 1842 the country has made little progress". No doubt he would have made the same comment had he lived a further 50 years. The British Raj never sought to develop or exploit the area but, at the same time, they recognised its strategic significance on the important trade route with Central Asia. A British representative was stationed in Leh while a Consul was posted to Kashgar, the capital of the Yarkand to see that the caravans could continue the trade (mainly tea, salt, spices and opium) without 'let or hindrance'. Perhaps the most famous man to take up the latter post was the explorer Eric Shipton just before the second World War. He noted particularly the friendliness of the Ladakhi people who were "free from any sign of apprehensive retiscence" ! (6) Earlier Sir Francis Younghusband had passed through on his great journey across "the Heart of a Continent" (7) and observed that the mountains resembled "giant tinder heaps" and that the only redeeming feature of the land was the"picturesqueness of its monasteries perched high upon every prominent crag or pinnacle".

General Bruce had also looked over into Zangskar from the Baralacha La pass; "its intense savageness attracted me..... there was nothing dull in its outlook nor tame in its desolation".

Ladakh became part of Jammu and Kashmir state in 1946 and its recent history as part of independant India is better known and certainly better documented. The invasion of Tibet by the Chinese in 1949, the uprising in Tibet and consequent closure of the trade routes in 1951, the construction of the road from Srinagar to Leh in 1959, the war with China in 1963 (8) and with Pakistan in 1968, the opening to foreigners in 1974, these are familiar dates in many peoples' minds and it would be rash to attempt to put such recent developments into any sort of historical perspective.

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The first draft of this appendix contained a lengthy postcript on the recent developments in Ladakh. It argued that the traditional society and culture, which has existed unchanged for centuries and is unique to Ladakh (and certain other Himalayan regions), is faced with massive, irreversible change as a result of the army presence and the recent influx of foreign tourists. It went on to urge immediate and far-reaching administrative action. However, we consider that such an extension of the paper would be outside the scope of this report. Individual readers who may visit Ladakh, or have already done so, are left to draw their own conclusions. Certainly, Ladakh faces a period of change which is unprecedented in its history. It can only turn to India for its future. A heavy responsibility rests therefore, with the Indian government to see that development is intelligently applied with a minimum of social and environmental harm. Unfortunately, the performance of the administration in other parts of India does not leave one with much cause for optimism.

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APPENDIX C

ORNITHOLOGY

1. SYSTEMATIC LIST

The list below gives details of all the species seen in Ladakh during the 1977 Southampton University Expedition. We have kept to the scientific names and species order given in Ali and Ripley's 'Handbook of the Birds of India and Pakistan' (1968 - 1974). There are one or two species for which the Latin names given in the Handbook differ from those in current European field guides. In these cases we have given the alternative nomenclature in brackets but we have not included outdated scientific names from the past literature on Ladakh's avifauna.

We have kept to species rather than subspecies headings in the list because for most species a firm statement on subspecies identity would be foolhardy without detailed in-the-hand examination. Even for species where only one race has ever been recorded in the area listing them as belonging to a particular subspecies gives a false impression of the accuracy of our field identification. However subspecies identification is discussed for the species we ringed and for those where in-the-field identification down to race was possible. Ali and Ripley give different English names for each subspecies but no common name for the species as a whole, consequently we were unable to follow the Handbook's English names but have used the least confusing and usually most wide-spread one for each species and mention some of the common alternatives alongside.

Under each species heading details of sightings during our Suru Valley survey in July and those during our migration study around Tikse from August to October are dealt with in separate sections but these may be followed by general statements on status or habitat applying to both areas. Information gleaned from earlier literature, particularly on previously recorded status, has been included where we feel it is needed to put our own observations in their proper context but we have not attempted exhaustive summaries of all the information available on each species' status in Ladakh. Where statements on status are made without a specific reference being quoted the information has come from Ali and Ripley's 'Handbook of the Birds of India and Pakistan' (1968-74).

For the species ringed specific and subspecific identification is discussed here but weekly catch totals, sex and age composition of the catch and other details are given in the separate ringing section. Weekly bird-day totals for several species seen in the Upper Indus Valley are tabulated on page 180. For the sake of completeness a few species whose identity we are not absolutely sure of have been included. Buzzards and "ring-tail" harriers have been treated as groups in the list below as these difficult raptors were not often seen well enough to be identified to species.

We apologise for what may appear excessively detailed lists of sightings for some of the less common species but the report is aimed primarily at people intending to do more fieldwork in the region and to whom fairly exact lists of records will be more useful than

subjective generalised statements on status. In listing sightings we have used some abbreviations for sex and age et cetera which are explained at the end of this section. The only abbreviation of a locality is "Chog. Bridge" referring to the area of river bank and wet grassland just west of Choglamsur Bridge mentioned earlier. In referring to "Ladakh" in this section we arenot limiting ourselves to Ladakh proper but include the Suru and Dras Valleys, Zangskar and Rupshu (but not Baltistan, Lahul or Spiti). In the same way we have used the word "Tibet" to describe the region covered in Vaurie's "Tibet and its Birds" (1972) and not political Tibet which we refer to as 'Tibet proper'.

Cormorant (Phalacrocorax carbo)

Upper Indus :

At least three adults and one immature were seen by the Indus during our first week at Tikse.

The records are :

7.8 : 3+ (2 ad., 1 imm.) Tikse-She, flying N.W. and later on river.
9.8 : 2 (1 ad., 1 imm.) Tikse-She, flying S.E.
10.8 : 1 Tikse.
11.8 : 2+ Tikse-She. 1 (ad.) Chog. Bridge, flying N.W.
13.8 : 2 (ad.) Chog. Bridge, 1 flying N.W.

All the adults were in non-breeding plumage apart from one near Choglamsur on 13 August (the race found over the whole of continental Eurasia is P.c.sinensis with white on the head and nape in breeding plumage).

Cormorants are uncommon in Ladakh and of the previous bird-watchers here only Meinertzhagen (1927) and Denby and Phillips (1977) mention seeing the species. Both Denby and Phillips' record of three birds in August and Meinertzhagen's three sightings during June and July are from the Indus near Leh. The dates of Meinertzhagen's records suggest the species had bred locally but we know of no nests ever having been found in Ladakh, Baltistan, Lahul or Spiti. In South Tibet Ludlow (1928, 1950) saw cormorants regularly in spring and autumn and thought they were probably local altitudinal migrants, which might also be the case in Ladakh. However as there is some evidence for an influx of extralimital breeders into the Indian Plains in winter the Ladakh sightings may be of long-distance migrants.

Grey Heron (Ardea cinerea)

Upper Indus :

Quite frequent along the Indus between Tikse and Choglamsur during August and September and sightings include several of small flocks. Weekly bird-day totals show a rather erratic pattern with two peaks, 14 - 20 August and 11 - 17 September. All the herons had apparently left the area by October, the last sighting being of a single bird landing in the Tikse plantation on 30 September.

More than two birds were seen on the following days :

17.8 : 9 (5 + 4) Tikse, flying S.E.
19.8 : 7 Tikse, flying S.E.
20.8 : 3 Chog. Bridge
13.9 : 4 Tikse, flying N.W.
14.9 : 2 Tikse, flying N.W. 12 Chog. Bridge (on an island 1 km. downstream).
28.9 : 5 Tikse, circling over.

Of the herons seen in flight a total of 13 were heading N.W. as against 26 going S.E. On four days single first-year birds were seen but usually the herons were too far off to be aged with certainty.

The known status of the Grey Heron in Ladakh is rather similar to the Cormorant's with the few records concentrated in the Indus Valley and no real evidence of breeding, though Osmaston's (1925) sighting of an adult with two fully fledged young near Leh in mid-May suggests it. Meinertzhagen (1927) saw herons frequently on the Indus between Khalatse (Khalsi) and Leh in April, May and August but not in the Nubra and Shyok valleys during July. Apart from these records the two specimens collected in Ladakh (in late August and October) mentioned by Vaurie (1972) and the Southampton University Expedition records (including one in 1976) are the only ones we know of. Though there are a few large trees in the Indus Valley around Leh the amount of suitable heron nesting habitat in Ladakh is extremely limited and we think that our and previous records are mainly of non-breeding summer visitors or of passage migrants breeding north of the Himalayas.

Night Heron (Nycticorax nycticorax)

Upper Indus :
A single juvenile flew into the Tikse plantation on 20 September. It was flushed from small pools and wet ground among the scrub several times during the afternoon giving brief views.

Night Herons have never been recorded in Ladakh or any part of Tibet before to the best of our knowledge but we feel our field notes are detailed enough for positive identification. The only other species with which confusion is possible is the Bittern (Botaurus stellaris), an uncommon winter visitor to the Indian lowlands, from which our bird differed in the colour of its upper parts which were less golden brown than a Bittern's without blackish barring and mottling and with buff tips on the greater coverts forming a noticeable thin, pale bar on the wing as the bird flew off. The underparts were also streaked brown rather than black.

Night Herons breed commonly in the Vale of Kashmir and along the foothills of the Himalayas and are also broadly distributed through Soviet Central Asia including nearby Tadzhikistan. The Soviet breeding populations are mainly migratory and juvenile Night Herons characteristically disperse widely in all directions after leaving the nest. Given these facts our sighting is not as unlikely as we at first thought. It would be interesting to know whether the bird was from India or from a more northern population. If the former it would appear to be exceptionally naive moving north into such unsuitable territory.

Ruddy Shelduck (Tadorna ferruginea)
(Brahminy duck)

Suru : We had two sightings of single adults at Rungdum. The first was flushed from the edge of the marshy grazing land east of Zuildo on 14 July. The second (a male) was on marshy grassland

with scattered pools near the road 11 kms west of Zuildo on 20 July. This bird's anxious behaviour as it circled overhead calling suggested its mate was nesting in the cliffs just north of the road.

Despite some apparently suitable habitat at Rungdum the Ruddy Shelduck was not recorded from the Suru Valley by Ludlow (1920) Osmaston (1926, 1930) or Koelz (1940) and seems to be a very sporadic breeder in Central and Western Ladakh though it is a common summer visitor around the Rupshu lakes (Ali and Ripley 1968 - 74, Ludlow 1920, Meinertzhagen 1927, Osmaston 1925).

Upper Indus :

We only saw a single Ruddy Shelduck in the upper Indus Valley during the autumn. It was spotted flying two or three hundred feet up heading south-east over Choglamsur on 26 September. Considering the species' abundance in East Ladakh in summer and in the lowlands during the winter the lack of autumn sightings is rather surprising but as wintering birds reach the north Indian Plains in October and November we may have left before the main migration periods. Alternatively it may simply be that few breed directly north of Leh, or those that do choose to make a non-stop flight to the plains.

Pintail (Anas acuta)

Upper Indus :

Seen fairly regularly though usually in relatively small numbers throughout our stay at Tikse. The first was a drake in eclipse between Tikse and She on 7 August and the last a duck or eclipse drake flying east over Tikse on 11 October. Records of more than five are :

31.8 : c.15 Tikse
13.9 : c.8 Tikse
14.9 : 11 and later 14 Tikse
25.9 : 6 Chog. Bridge
28.9 : 21 Tikse
3.10 : 11 Tikse

As Pintail usually arrive in the north-west Indian plains in September and October our August records are early but by no means the earliest for Ladakh. Osmaston (1930) saw 8 at Rungdum in late June.

Common Teal (Anas crecca)

Upper Indus :

Definite sightings are relatively infrequent though the difficulty in separating duck and eclipse drake Teal from duck Garganey at a distance has no doubt led to an underestimate of the species' abundance. The definite sightings are :

31.8 : 2 (m.) Tikse
1.9 : 1 Chog. Bridge
14.9 : 1 Chog. Bridge
18.9 : 1 Chog. Bridge
19.9 : 3 Tikse
22.9 : c.12 Chog. Bridge, with some Garganey.
11.10 : 1 Tikse, flying E.

Mallard (Anas platyrhynchos)

Upper Indus :

The only definite record is of three, a duck and two drakes largely out of eclipse, flying north-west along the Indus at Tikse. The following day four possible Mallard flew south-east along the river with two possible Tufted Duck.

Wigeon (Anas penelope)

Upper Indus :

Less frequently seen than Pintail or Shoveler though female Wigeon, being less distinctive on the wing than females of these two species, probably went unidentified more often.
Definite sightings are :
24.8 : 2 Tikse, flying N.W.
29.8 : 8 Tikse
31.8 : 5+ Tikse
7.9 : 10 Tikse - She, flying N.W.
13.9 : 2+ Tikse
14.9 : 4 Tikse
28.9 : 10+Tikse, a flock of 40 ducks flying S.E. contained 10 males and the bulk of the remainder were probably females with a few Pintail.

Garganey (Anas querquedula)

Upper Indus :

Though only recorded on 8 days and despite similarities between female Garganey and Teal at a distance the species has the second highest bird-day total of any duck we saw.
The records are :
11.8 : 26 (mainly eclipse m.) Chog. Bridge
13.8 : 1 (f) Chog. Bridge
18.8 : 4 (2 f., 2 m.) Chog. Bridge
28.8 : 7 (5 f., 2m.) Tikse
30.8 : c.15 Tikse
22.9 : c.10 (c.6 f., 4 m.) Chog. Bridge, with Teal
25.9 : 24 Chog. Bridge

Garganey are usually the first wintering wildfowl to arrive in lowland India in the autumn. Meinertzhagen's (1927) record of 8 at Kardong (4,100 m.) on 30 July is the earliest Ladakh record we know of.

Shoveler (Anas clypeata)

Upper Indus :

The commonest duck, seen fairly regularly from our arrival at Tikse until late September.
11.8 : 1 Chog. Bridge
19.8 : 15 Tikse
24.8 : c.10 Tikse, flying N.W.
29.8 : 5 Tikse
31.8 : 40 Tikse

7.9 : 8 She - Chog. Bridge
13.9 : c.17 Tikse
14.9 : 8+ Tikse (c.6 flushed, later 8 flying N.W.)
20.9 : 6+ Tikse (1 later 4 and then 6 flushed)
23.9 : 1 Tikse

The lack of records after 23 September suggests the passage of this species was largely complete before we left Ladakh.

Common Pochard (Aythya ferina)

Upper Indus :

Seen on three days during the last three weeks :
22.9 : 1 (f.) Chog. Bridge with Teal, Garganey and Pintail.
9.10 : (3 f., 1 m.) Tikse, flying S.E.
11.10 : (1 f.) Tikse, flying S.E. with a Teal and Pintail.

These appear to be the first Ladakh records.

? Tufted Duck (Aythya fuligula)

Upper Indus :

Two ducks seen from Tikse flying south-east with four possible Mallard were probably Tufted Ducks. Surprisingly they left the main Indus as we watched and flew north up a side-valley towards the peaks of the Ladakh Range.

Goosander (Mergus merganser)
(Merganser - Ali & Ripley)

Suru : We had two sightings of single females at Rungdum, the first flushed off the river about 3 kms east of Zuildo on July 16 and the second fishing in the river near the ruins of Shama Kurpo on 19 July. Osmaston (1930) also saw a few Goosanders on the river at Rungdum in late June but there is no evidence of nesting in the area.

Upper Indus :

One of the less frequently seen ducks. Our records are :
12.8 : 7 Chog. Bridge
20.8 : 6 2 kms E. of Chog. Bridge
28.8 : 5 Tikse
3.9 : 4 Tikse
7.9 : 1 2 kms E. of Chog. Bridge
1.10 : 1 (m. in breeding plumage) Tikse

All the Goosanders seen in August and September were either females or eclipse males. All were on the Indus. Apart from the Ruddy Shelduck the Goosander is the only species of duck known to nest in Ladakh, in fact ducklings have been found on the Indus a few kilometres from Tikse (La Personne 1928).

Unidentified Ducks

Suru : A small brown duck, either a Teal or a female Garganey, was flushed from a marshy pool by the river at Sanko on 25 July.

Upper Indus :

Views of wildfowl were often fleeting and/or at extreme range so that a rather high proportion went unidentified. Our records of "Teal/Garganey" total at least 80 bird-days and those of "Large duck sp." (i.e. probable Pintail, Wigeon or other species of similar size) at least 150 bird-days.

Black Kite (Milvus migrans)

Suru : A kite was circling over Rungdum Gompa on 17 July. Rungdum is perhaps the last place in the Suru Valley one would expect to find this usually urban raptor. The bird may well have been migrating south.

Upper Indus :

In 1976 Denby and Phillips (1977) found kites common near Leh but this is the only area in Ladakh where they are so and where breeding has been confirmed (Meinertzhagen 1927). Around Tikse they were seen on only nine days. Most of the sightings were concentrated in mid-September. Unfortunately there is no way of telling whether these birds were from the local Leh population or migrants from farther afield. Records of more than one kite are as follows :

13.9 : 3 Tikse, gliding N.W.
16.9 : 3+ Tikse, 3 circling over and later 1 drifting N.W.
17.9 : 15 Tikse, 7 gliding W. and soon after 8 circling over monastery garden.

All the kites seen had the large pale underwing patches of the Black-eared Kite (M.m. lineatus)

Northern Goshawk (Accipiter gentilis)

Upper Indus :

First observed on 28 September Goshawks were subsequently recorded almost daily until we left. All were seen either in or from the Tikse ringing-site. Most were flying low over the netting area, usually into or out of the monastery garden, or were perched near our nets. A brief resume of our records is given below :

28.9 : 1 (f.), soaring high over the Indus and drifting S. towards Matho.
30.9 : 1 (f.), flying steadily S.E. along valley, mobbed by a Kestrel as it flew over the netting area.
1.10 : 2+ (1+ f., 1+ m.), 3 sightings of females, perhaps all the same bird, and later a male mobbing a Long-legged Buzzard.
4.10 : 1 (f.)
6.10 : 1 (f.)
7.10 : 1 (f.)
8.10 : 1 (m./small f.)
9.10 : 1+ (f.), 4 views, the last soaring away S.W.
10.10 : 2+ (f.)
11.10 : 1 (f.), soaring S.W.

The Goshawk has never been seen before in Ladakh or any of the adjacent regions of the Tibetan "Outer Plateau" and the only collected specimens Vaurie (1972) records were taken in east Tibet. In India the species is said to breed sparingly above 2,400 m. in the northwest Himalaya, presumably in forests on the southern slopes, but is mainly a rare winter visitor. It is extremely unlikely that the Goshawks we saw at Tikse had bred to the south and ventured north into completely unsuitable barren desert habitat for no apparent reason. They were almost certainly birds from further north crossing the Himalayas on their way to wintering areas south of the main range. Dementiev (1966-70) states the subspecies A.g.schvedowi breeds as far south as the Tien Shan Mountains and is a partial migrant south to Sinkiang and northern India in winter. In the U.S.S.R. its main passage is in early October which coincides well with our records.

Eurasian Sparrowhawk (Accipiter nisus)

Upper Indus :

Seen on about every other day from 18 September onwards. All but two of the records are from Tikse, the exceptions being a female near Choglamsur Bridge on 18 September and a possible juvenile in the same place on 6 October. Dates on which we had more than one sighting at or near the ringing-site are 25 and 28 September and 7, 9 and 10 October. The hawks were generally seen flying low through the scrub or soaring and once or twice perched in trees and bushes near the nets.

Two subspecies of the Eurasian Sparrowhawk are possible in Ladakh. The Indian Sparrowhawk A.n.melaschistos has been collected in the area and apparently breeds locally where suitable habitat is available. It also nests east along the Himalayas and in Baluchistan, Afghanistan and Tadzhikistan. The Asiatic Sparrowhawk A.n.nisosimilis is a sparse winter visitor to the Indian Subcontinent, breeding further north in north and central Asia including the eastern and central Tien Shans directly north of Ladakh. Though definite statements about subspecies identity from field observations are generally ill-advised these two are dissimilar enough to make some discussion of the possible race of our Sparrowhawks worthwhile.

A.n.melaschistos is described as much more rufous below and darker slate above than the nominate race (Brown and Amadon 1968, Ali and Ripley 1968-74) while A.n.nisosimilis is if anything a little paler than A.n.nisus. Most of our sightings of Sparrowhawks in Ladakh were brief but those we did see well usually appeared similar above and below to females of A.n.nisus, the exceptions being two birds which were noticeably paler and browner (possibly juveniles) and one which approached the colour of a male A.n.nisus. Having seen skins of the subspecies we think that though the amount of rufous on the underparts is of limited useas a means of separating females in the field the typical A.n.melaschistos would look distinctly darker above than A.n.nisosimilis even at a distance, most females of the race being the slate colour of a dark male A.n.nisus and the males blackish slate. This strongly suggests that most of the birds we saw were the wintering Asiatic Sparrowhawk passing across the Himalayas on their way south. However the palest A.n.melaschistos skins come close to a typical A.n.nisosimilis in shade and in addition

juveniles of the two races though clearly different, are not as distinctive as the adults so that we have concluded that it is not definite, though highly probable, that at least some of the Sparrowhawks we saw were A.n.nisosimilis.

Suru : A Sparrowhawk was seen briefly in the riverside plantation between Kargil and Baru during our day's stop on 14 October but we saw none in the Suru Valley in July.

Long-Legged Buzzard (Buteo rufinus) and other records of Buzzards (Buteo Sp.)

Upper Indus :

Considering that the only previous Ladakh record we have found is of unidentified Buteos seen twice in Rupshu (Meinertzhagen 1927) buzzards were surprisingly frequent around Tikse during September and October with sightings on eight days. Ali and Ripley (1968-74) state that the identification of Buteos to species is impossible in the field but we regard this view as over pessimistic given recent advances in raptor identification which have culminated in Porter et al's "Flight Identification of European Raptors" (1976), a book we found invaluable while in Ladakh.

However, anyone trying to identify buzzards in the Himalayas has their difficulties compounded by the possibility of the Upland Buzzard (B.hemilasius) occurring. Because of its wholly Asian distribution this species is not covered in Porter and its field characters seem much less well known than other Palearctic Buteos. We could find no really good published discussion of its separation from the Long-legged Buzzard (B.rufinus) and are very grateful to Alan Kitson who has sent us notes on the distinctions between the two species, his experience of B.hemilasius being the result of a six month stay in Mongolia. Despite this help variability within each species and especially the similarity between certain colour phases of B. rufinus and B. hemilasius prevented definite species identification of all but one of the buzzards we saw.

We saw buzzards in both "melanistic" and "normal" phases in Ladakh but all had proportions and flight action distinctly different from the Common Buzzard (B.buteo). Their "jizz" was more aquiline with wings noticeably longer, tail a little longer and narrower-based and head sometimes more prominent; these features combining to give the birds a less dumpy, compact silhouette especially when soaring. The wing beats were always loose and easy, quite unlike the stiff flapping of B.buteo. The birds hovered quite frequently and we never saw them gliding in the typical Common Buzzard attitude with the "arm" angled well forward and the whole "hand" pointing well back. But for their distinctive "jizz" the melanistic buzzards we saw might have been very dark Common Buzzards. However our "normal phase" birds' combination of pale head and breast, dark belly patch, large blackish carpal patches and off-white primaries would be very unusual in B.buteo especially as those breeding in the western Himalayas south of the main range are characteristically dark (Voous and Bijleveld 1965). Combining the field marks of plumage and "jizz" we are satisfied that none of the buzzards we saw were B.buteo.

The other three possible species, B.rufinus, B.hemilasius and B.lagopus, are less easily separated as they all have several colour phases with intermediates and share a more eagle-like appearance compared to B.buteo. There are subtle differences in size, proportions and flight action but without previous field experience of the species we felt unqualified to use these. The Rough-legged Buzzard (B.lagopus) is unlikely to occur in the Himalayas given its arctic breeding range. It has never been recorded in India, Pakistan, Nepal or the Tibetan region as far as we know, though Lavkumar (1955) mentions a possible B.lagopus in western Tibet. The other two species appear much more likely. Vaurie (1972) only records one B.rufinus collected in Tibet as against 32 B.hemilasius but Lavkumar (1955) mentions them as occurring sparsely in west Tibet proper in mid-summer while Ali (1946) recorded a pair of Buteos from the same area, which sound like typical B.rufinus from the description he gives. This species is also said to breed along the Himalayas in northwest Pakistan, Kashmir and Garhwal and is a common winter visitor to northern India. Given the meagre nesting data from India most of these wintering birds are probably from the Soviet Union and/or western China. Ali and Ripley (1968-74) suggested the species may breed in Ladakh, but we have been unable to track down any definite records from the region. B.hemilasius has been definitely identified from Kashmir and elsewhere along the Himalayas outside the breeding season. The total number of Indian records is very small but the difficulty in separating the species from the commoner B.rufinus might account for this. All the specimens mentioned by Vaurie (1972) were taken well away from Ladakh in southern, eastern and northeastern Tibet.

Our records of buzzards are as follows (all were seen from the Tikse forestry plantation unless stated otherwise) :

2.9 : 1 'normal' phase, flapping and gliding S. across valley.

7.9 : 1 'normal' phase about 2 kms upriver from Chog. Bridge, gliding down from a crag to the north into Hippophae scrub on the south bank of the river.

1.10 : 2 sightings which from our field descriptions must have been of different birds :

(i) "normal" phase soaring and flapping E. of the ringing site.

(ii) "normal" phase excellent views as it hovered and soared over the netting area, perched in poplars in the monastery garden and then flew off W, passing low overhead.

8.10 : 2 sightings, again of different birds :

(i) "normal" phase, soaring over Indus drifting S.E.

(ii) "melanistic" phase,soaring and gliding E. of Tikse.

9.10 : 1 "melanistic" phase gliding, soaring and hovering to the E. then close overhead before disappearing N.W.

10.10: 1 "melanistic" phase soaring over, and drifting E.

11.10: 1 "melanistic" phase soaring over, later put up from a tree at the edge of the monastery garden and circled off S.E.

12.10: 1+ "normal" phase 2 sightings, but probably of the same bird, soaring and gliding between the nets and the river. The second time mobbed by Choughs.

Only one of the "normal" phase buzzards was identified with certainty (the bird seen very well on 1 October).. The field characters used are discussed below :

(i) Tail pattern : Alan Kitson says all the "normal" phase B.hemilasius he has seen have had tails which looked whitish at a distance (not cinnamon as in many B.rufinus) and that obsolete terminal barring can be seen at close range against the light. A sketch he sent shows the tail with a narrow pale tip followed by a darker sub-terminal band and at least two narrower, fainter bars visible towards the base. Descriptions in Ali and Ripley (1968-74) and Brown and Amadon (1968) confirm the lack of rufous in the background colour and the more prominent barring on the tail of B.hemilasius compared to adult B.rufinus, and all the skins of B.hemilasius we looked at in the British Museum showed at least three bars near the tail tip. In contrast the buzzard seen on 1 October had a "pale warm brown" tail unbarred except for a narrow slightly darker tip. This description fits an adult B.rufinus well. Considering the agreement between different sources on the point of tail-barring in B.hemilasius and the excellent views we had of the bird we are sure it was a B.rufinus, a conclusion backed up by most of the other field characters mentioned below. No barring was seen on the tails of the two buzzards seen in September or the first one on 1 October but these were distant enough for faint markings to have been missed. The first buzzard on 1 October showed a very broad brown terminal band on the otherwise pale tail from above which at first made us confident it was a juvenile B.lagopus. However this band was not very marked and a similar impression could be given by B.rufinus at a distance as the tail is generally palest at its base. In addition this marking did not show from below. The last "normal" phase bird seen had not only a mid-brown terminal bar but narrower fainter barring right up the tail - a pattern which fits B.hemilasius well but also fits a juvenile B.rufinus.

(ii) Underwing pattern : All the "normal" phase birds had very pale buff/ off-white primaries, slightly darker secondaries (seen to be barred on a reasonable view), large blackish carpal patches and the rest of the underwing coverts varying from nearly white to warm mid-brown. The wing tip and trailing edge were blackish. This pattern fits a pale B.rufinus, B.hemilasius or B.lagopus equally well.

(iii) Upperwing pattern : Alan Kitson states the most obvious difference between the B.rufinus and B.hemilasius he has seen is the large white primary patches on the upperwing of the latter. B.rufinus does show paler primary bases from above but not to the same extent. The buzzard we saw on 1 October did show somewhat paler primary bases but no more than is typical for B.rufinus. The upperwing was seen on only one other, the bird on 8 October and this buzzard had more noticeable pale patches, striking enough for the bird to be mistaken for a juvenile Golden Eagle when first spotted.

(iv) Head and body pattern : Alan Kitson writes that B.hemilasius has a darker head than a normal B.rufinus and a pale throat and upper breast and streaky moustachial stripes. The skins we have seen confirm this as the typical pattern. The buzzard we saw on 1 October had a creamy white head very sparsely marked darker - fairly typical for B.rufinus but unusually pale for B.hemilasius though the palest skins approach it closely. Other "normal" phase birds also showed whitish heads except for the last which had a brown head and a breast paler than both the throat and belly - a

pattern which by itself suggests B.lagopus but in combination with the tail pattern would point to B.hemilasius rather than a juvenile B.rufinus.

Another difference Alan Kitson mentions is in the position of the dark patch on the underbody. He states that though at a distance the whole belly on B.hemilasius may look black it is only the thighs that are really dark. Again a look at skins confirmed this, the blackish area being on the thighs and sometimes extending onto the flanks and sides of the breast, usually leaving the centre of the belly a paler mid-brown. This is the one field mark which suggests most of our "normal" phase buzzards were B.hemilasius as their body pattern agrees well with the above description - an atypical pattern for B.rufinus. However owing to the variation in body colour possible in this species we do not think this character carries the same weight as tail pattern.

(v) Leg feathering : We were lucky enough to get a view of the extended legs of the buzzard seen on 1 October as it hovered. They showed a fair length of bare tarsus which strongly suggests B.rufinus though some B.hemilasius can have a third of the tarsus unfeathered (Dementiev 1966-70).

The only difference between melanistic phases of B.rufinus and hemilasius appears to be in tail barring. All melanistic B.hemilasius seen by Alan Kitson showed a broad terminal tail band with the rest of the tail pale and without noticeable barring, a pattern similar to B.lagopus and which contrasts with melanistic B.rufinus which has the tail barred right to its base (Porter et al 1976). The melanistic buzzards we saw (quite possibly all the same bird) showed this pattern but we are not completely certain of their identity as one of the two skins of malanistic B.hemilasius we looked at had a tail pattern quite similar to a typical B.rufinus and some melanistic B.rufinus skins had a pattern approaching B.hemilasius though they still showed barring to the base on the central tail feathers.

In conclusion here are our decisions as to the identity of the buzzards we saw :

2.9 : B.rufinus/hemilasius / juv. lagopus
7.9 : " " " "
1.10 : (i) B.rufinus/hemilasius
(ii) B.rufinus
8.10 : (i) B.rufinus/hemilasius/juv. lagopus
(ii) melanistic B.rufinus (or possibly B.hemilasius)
9.10 : " " " " "
10.10 : " " " " "
11.10 : " " " " "
12.10 : B.hemilasius (or possibly atypical juv. B.rufinus)

Booted Eagle (Hieraaetus pennatus)

Upper Indus :

Two seen at Tikse. A dark phase bird flying low over scrub near our hut on 28 September and a beautiful pale phase eagle on 4 October hunting over the ringing area before drifting away northwest. Vaurie (1972) records a specimen taken in the Nubra Valley, but it would appear the bird is rare in Ladakh as none of the papers we have read mention it. Kozlov recorded breeding from

the Chang Tang (Vaurie 1972) but we do not know of any evidence of nesting from Ladakh or adjacent parts of the "Outer Plateau".

Golden Eagle (Aquila chrysaetos)

Suru :
12.7 : 1 (ad.) north of the Chalong Nullah a few kms upstream of Panikar at c.3,500 m.
29.7 : 2 (imm.) Safi La (c.4,800 m.) chasing each other overhead.

Upper Indus :

We did not expect Golden Eagles around Tikse as we were several miles from the birds typical mountain habitat but single immatures were seen on 16 and 20 September. On 29 August a single Golden Eagle was seen over the shepherd's summer settlements near the top of the Stok Gorge at 4,500 m. It was soaring with a Himalayan Griffon. In 1976 Denby and Phillips saw Golden Eagles several times at Himis, Stok and Sabu.

Golden Eagles definitely appear to have become commoner in Ladakh since the first half of the century as records in the literature are noticeably sparce. For instance in a two month expedition concentrating on western Ladakh Osmaston (1930) had only a single sighting of the species while on his four month trip across to the Rupshu lakes (Osmaston 1925) he had no definite sightings but recorded one "Aquila ? Sp." Meinertzhagen (1927) saw only two in his four month visit and neither Koelz (1940) nor Wathen (1923) saw any at all in Ladakh.

Himalayan Griffon (Gyps himalayensis)

Suru :
8.7 : 1 over Panikar, soaring with a Bearded Vulture
9.7 : 2 sightings : (i) 1 Panikar - Kochak, soaring over mountains W. of the valley.
(ii) 1 several kms south of Panikar again high over the west side of the valley.
11.7 : Several sightings : (i) 3, W. of Panikar, soaring together over the 16,000 ft peak behind the village.
(ii) 3 about 3 kms S. of Panikar, soaring together between the Chalong Nullah and the main valley.
(iii) & (iv) single Griffons in the same area.
13.7 : 1 over mountains a few kms E. of Parkachik
19.7 : 4 Rungdum between Zuildo and Shama Kurpo, soaring together over peaks to the N.
23.7 : 3 sightings of singles about 4 kms E. of Umba La at c. 4,300 m gliding over crags and alpine pasture.

Upper Indus :

Just one from the main Indus Valley, a Griffon flying north high over Tikse on 6 October. Himalayan Griffons were also seen up the Stok Gorge during Williams' brief visit in late August.
The records are :
28.8 : 2 sightings of singles near Stok Kangri Glacier (c.4,800 m).
29.8 : 3 sightings of singles near the shepherd's settlements at 4,500 m. and later 2 gliding over the gorge about 8 kms S. of Stok.

Our separation of G.himalayensis from G.indicus, the Indian Griffon was partly by range and habitat differences - Indian Griffons are characteristic of the plains and have never been recorded north of the Main Himalayan Range. But the Himalayan Griffon's paler plumage is noticeable even at a distance, the contrast between the buff body and underwing coverts and the dark flight feathers being particularly striking.

We were surprised to come across Griffons so regularly in the Suru Valley as neither Osmaston nor Koelz saw them though Osmaston (1925) states that "a few may occasionally be seen in the Dras Valley". The Himalayan Griffon appears to be one of those species that prefer the slopes of the Main Himalayan Range rather than the more arid mountains to the north and east. It is fairly widespread in Spiti (Koelz 1937), Lahul (Whistler 1925) and Baltistan (Matthews 1941) but we have found no previous records for central and eastern Ladakh.

Our Suru Valley and Stok Gorge records suggest the species has increased in abundance in the last fifty odd years, a trend which may not be restricted to Ladakh as Alexander (1951), describing a trip to Lahul, writes "I think Griffon Vultures (Gyps himalayensis must have increased in the past twenty-five years as I believe they have done in other parts of the Himalayas".

Bearded Vulture (Gypaetus barbatus)
(Lammergeier)

Suru : Records from the Suru Valley are as follows :
8.7 : 1 (imm.) over Panikar with a Griffon.
9.7 : 3 sightings of singles : (i) & (ii) soaring and gliding along the slopes across the valley from Kochak.
(iii)E. side of valley opposite Panikar, only about 30m. above the river. The last two were immatures.
15.7 : 1 (probably ad.) over ridge N. of Tazi Tonazas.
20.7 : 1 (imm.) high over mountains just N. of Rungdum and W. of Zuildo.
22.7 : 1 (ad.) over mountains Sanko - Thang.
23.7 : 1 (ad.) over high pasture (c. 4,200 m.) near the Umba La.

All but the last were seen from the main valley.

Upper Indus :

Not seen around Tikse but as Denby and Phillips (1976) recorded the species is common in the mountains near Stok. During Williams' short visit to the area they were seen daily with a maximum of 3+ at the top of the Stok Gorge.

From earlier papers one gets the impression that the bird was rare in Ladakh in the 1920s and 30s and, like the Golden Eagle and Himalayan Griffon, has increased since but the evidence for an increase is less concrete than for those species as Meinertzhagen (1927) states he saw Bearded Vultures "often" during his four month expedition though he does not give details. Certainly in the Suru Valley they appear to be a lot commoner. Osmaston, during a total of nine weeks in the valley, only recorded the species twice (Osmaston 1926, 1930).

Hen Harrier, Pallid Harrier and Montagu's Harrier
(Circus cyaneus, Circus macrourus and Circus pygargus)

Upper Indus :

No adult males of any of these species were seen and as immatures and females are difficult to distinguish in the field the large majority were not identified with certainty. Consequently though we did have definite sightings of all three species our records of 'ringtails' are best treated together.

Immature Montagu's and Pallid Harriers are easily separated from adult females and from Hen Harriers by the unstreaked rufous underbody and underwing coverts. In telling the immatures of these two species apart we used head pattern differences as described in Porter et al (1976), drawing firm conclusions from only the closest views. Most of the adult female ringtails we saw appeared to be Hen Harriers from their less bouyant flight and broader-looking wings. These harriers also had the indistinct head pattern characteristic of that species and were certainly not Pallids but from skins and photos we have seen it seems that head pattern differences between Hen and Montagu's Harriers are not as clear cut as between Montagu's and Pallid so that on the views we had we could not be completely certain we had seen Hen Harriers in Ladakh. Luckily the identity of one of these probable Hen Harriers was confirmed on our return to Britain as a photo of one we took at Tikse on 28 September clearly shows that the bird's fifth primary is slightly longer than the second (rather than being considerably shorter as in Pallid and Montagu's).

All our records of ringtails are given below along with their identity as far as known. They were seen over the Tikse forestry plantation unless stated otherwise. Three times ringtails were flushed off the ground during net rounds but most were quartering over the area. There was seldom an obvious flight direction.

3.9 : 1+ (imm. C.macrourus/pygargus) Tikse-She, over wheat fields and riverside scrub, two sightings.
6.9 : 1
14.9 : 1
16.9 : 1+ (probable imm. C.macrourus)
20.9 : 1 (definite imm. C.macrourus)
25.9 : 1 (imm. C.macrourus/pygargus) Chog. Bridge over scrub covered island.
27.9 : 1 (f. probable C.cyaneus)
28.9 : 3 (f. probable C.cyaneus, one photographed proved to be definitely this species)
1 (f. probable C.macrourus/pygargus)
1 (probable imm. C.macrourus)
1+ (definite imm. C.pygargus), three sightings
7.10 : 1 (imm. C.macrourus/pygargus)
1 (f. probable C.cyaneus)
10.10: 1 (imm. C.macrourus/pygargus)

All three species are new for Ladakh, though, like a number of other migrants we found, we think the lack of previous records is just due to bird-watchers usually leaving the area before the species pass through. These harriers all breed in the Soviet Union north of the Himalayas and are winter visitors to India, the Hen Harrier

being generally rarer and more restricted to north and west India but perhaps the commonest on the Himalayan slopes (Fleming et al 1976). The only records we have found from regions adjacent to Ladakh north of the main Himalayan range come from Spiti where Koelz (1937) collected two Pallid Harriers and saw the species almost daily between 10 September and 1 October. He also collected a juvenile Montagu's Harrier on the same September trip and presumably some of his sight records of Pallids may have been Montagu's. In south Tibet Ludlow (1927, 1928) recorded Hen Harriers as quite frequent winter visitors around Gyangtse as well as a few Pallids on autumn passage.

Marsh Harrier (Circus aeruginosus)

Upper Indus :

Though there is only a handful of previous Ladakh records a marked passage of Marsh Harriers through the Indus Valley during our stay at Tikse made this the most frequently seen raptor, with a total of 70+ bird-days. The first records were of two females over the ringing-site on 16 August and after this we saw the species almost daily until we left. The pattern of the migration is shown by weekly bird-day totals (Table I). Numbers built up to a maximum around mid-September (19+ bird-days in the week 11 - 17 September) and then fell away somewhat in late September and early October. The maximum number recorded in one day was 6+ on 14 September.

We only had four sightings of non-juvenile males (on 8, 9, 13 and 16 September) and of 39 juvenile/female harriers seen well enough to be designated first year birds or females older than this 23 were juveniles. (We were using the absence of pale areas on the upper forewing to tell juveniles, an ageing characteristic which is reasonably reliable though not fool-proof). Most of the Marsh Harriers were seen over the forestry plantation at Tikse, a particularly suitable hunting area. They were also seen near Choglamsur Bridge on three days and over cultivation, riverside scrub and grass between Tikse and She on five days as well as once over Leh and once near Stok.

As with a number of other passage migrants Koelz (1937, 1940) all but monopolises the previous sightings from the north-west Himalayas. He recorded them at every settlement he visited in Spiti during September and has also taken specimens from Zanskar (2) and Rupshu (1). Interestingly Ludlow (1927, 1928, 1950) never saw any during his years in South Tibet though he recorded both Pallid and Hen Harriers.

Saker (Falco biarmicus) (Falco cherrug)

(Ali and Ripley treat the Laggar and races of the Saker as one species F.biarmicus but in discussing identification we use the classification of Brown and Amadon (1968) which treats the two as separate species).

Suru : A single sighting on 11 July in the mountains about 3 kms west of Panikar. The falcon was gliding along a ridge at about 3,700 m. and passed quite close overhead. We managed to get a reasonable photograph.

Upper Indus :

Recorded on two days :

18.8 : 1 Tikse, flying high N.W. mobbed by Common Terns.
14.9 : 1 Chog. Bridge, flying quite low S.E.

The bird seen in August was quite far off and was told from a Peregrine by its proportionally longer wings and tail and mid-brown upperparts. The September bird was seen better and was a fairly typical immature Saker with earth-brown upperparts with darker flight feathers, quite a well developed moustachial stripe and heavily streaked underparts and underwing coverts, the primaries not conspicuously barred underneath and with darker tips.

The falcon seen near Panikar was less typical, combining dark brown moustachial stripes as heavy as most Laggars, (F.jugger) with rather lightly marked underparts. The upperparts, seen briefly, looked earth brown on the mantle and upperwing coverts and dark brown on the remiges. This contrast together with the lack of dark markings on the thighs (which from skins appears to be exceptional in Laggars) are the field marks which indicate the bird was F.cherrug not F.jugger, but really we cannot be totally certain that any of the "Sakers" we saw were not Laggars. Laggars are typically lowland birds and have never been recorded in the Tibetan region but as they occur as near as Tashkent to the northwest and up to 1000 m. in the Himalayas they cannot be completely ruled out. Sakers have been collected in several parts of Tibet including Ladakh, where they are rare in summer. Last years' expedition saw a probable Saker in August but Meinertzhagen, Koelz, Osmaston and Wathen all failed to see them though Ali (1946) saw one in west Tibet proper in summer and they are regular in south Tibet in autumn and winter (Ludlow 1928, 1950).

Peregrine (Falco peregrinus)
(Again we are using Brown and Amadon's classification which treats the Shaheen Falcon as a subspecies of F.peregrinus)

Upper Indus :

A Peregrine flew low over the Tikse ringing area on 27 September arriving from the southeast, circling overhead and then disappearing towards the village. It had broad blackish moustachial stripes and looked dull black above but as it was a juvenile and the view rather brief any attempt at subspecies identification would be futile.

Vaurie treats Shaheens and Peregrines as distinct species and records one specimen of the former from Tibet and none of the latter, though there are scattered sight records in the region including one for Ladakh (Osmaston 1925).

Eurasian Hobby (Falco subbuteo)

Suru : Regular sightings from around Panikar and further downriver. Seen on six days, as follows :

8.7 : 1 near Baru
9.7 : 2 sightings of adults over the Suru River near Panikar.
10.7 : Heard from willow grove near Namsuru.
24.7 : 2 sightings, Sanko.
30.7 : 1 near Shargol.
1.8 : 1 near main bazaar Kargil.

All were in or very close to cultivated areas and as expected none were seen at Rungdum, which is virtually treeless.

Upper Indus :

The commonest falcon around the Tikse ringing-site. Also seen near Choglamsur Bridge three times and elsewhere over cultivation between Choglamsur and Tikse, particularly over the marshy grazing land below She monastery. Hobbies were also seen at Leh and Stok. Though they were often recorded several times in a day we were sure we had seen more than one in the stretch between Tikse and Choglamsur on only nine days, the dates being 14 and 20 August and 1, 3, 6, 7, 11, 14 and 16 September. At least three were seen on 11 and 14 September. Our last definite record was on 30 September but a falcon seen flying fast southeast over Tikse on 9 October was probably a Hobby. Whether birds seen during August and September were mainly local breeders or migrants passing through is impossible to say, but the fact that we had only one sighting during our first week at Tikse while birds became particularly frequent here in early September suggests these had not all bred in the immediate vicinity though they may well have been local birds wandering outside breeding territories before migrating.

? Merlin (Falco columbarius)

Upper Indus :

A possible female/juvenile Merlin was seen perched on a mound near Choglamsur Bridge on 8 October. The bird appeared to have much less rufous upperparts than a female or juvenile Kestrel without any black barring visible, making it look superficially like a female Sparrowhawk till it flew off, chased by Crows. However the view was too brief and distant to be sure the falcon was not an atypically marked Kestrel.

Kestrel (Falco tinnunculus)

Suru : Kestrels were seen almost daily between Kargil and Parkachik but were not common around Rungdum. We only saw one during our weeks stay here, a male carrying a fully grown Citrine Wagtail. Unlike Hobbies, Kestrels are not confined to irrigated, cultivated areas. Sightings in the mountains include two near the Umba La at c.4200 m., one in the gorge between Safi and the Suru Valley at c. 3400 m., and one near the Safi La at c.4600 m. Even in the main valley Kestrels were more often seen over nearby cliffs and hillsides than over the fields. Most records are of single birds, an exception being a pair soaring over cliffs between Sanko and Thang where later a male was seen visiting a crevice from which young could be heard.

Upper Indus :

Kestrels were seen around Tikse every few days but were on average less frequent than Hobbies. Unlike Hobbies they were as common in October as when we arrived. Only one sighting at Tikse was of more than one bird, a pair hunting over stubble on 6 October. A pair were also seen circling together over ruins near She monastery on 3 September and we saw a female once near Choglamsur Bridge. As in the Suru Valley the species was not confined to agricultural land and was one of the few birds seen out in the desert between Tikse and Stakmo.

Osmaston (1930) noted that "the Kestrel in Ladakh and Baltistan seems to be much more addicted to attacking birds than the European bird" a statement we would agree with. (As well as the Kestrel at Rungdum carrying a wagtail we saw one at Tikse stoop at and catch an adult sparrow just outside our hut). Perhaps because of this increased tendency to hunt birds, Kestrels in Ladakh seem to hover less frequently than in the U.K.

Himalayan Snowcock (Tetraogallus himalayensis)

Suru : Three of these huge grouse were seen on 9 July only about 120 m. above the Suru on a dry, cliffy slope across the valley from Kochak. At c.3400 m., this record is rather low as the species does not usually come below 4000 m., in summer. . We also heard Snowcocks calling from the mountain slopes north of Zuildo. The call is very wild and suits the stark, spectacular scenery admirably. It is rather like a curlew's in quality. At long range the best distinguishing character between this species and the similar Tibetan Snowcock (T.tibetanus) is the contrast between the white throat and upper breast and the uniformly dark lower breast and belly.

Koelz (1940) also heard Snowcocks at Rungdum and though Osmaston did not see them in the Suru Valley itself he found them in mountains not far to the east and west, The Tibetan Snowcock has not been recorded in western Ladakh as far as we know.

During their trek to Leh, Fraser, Dravers and Ritchie saw Snowcocks in the Nimaling Range in groups of six to twelve on three separate occasions..

Chukar (Alectoris chukar)

Suru : Nearly all previous ornithologists in Ladakh, including Denby and Phillips in 1976, have found Chukars common especially near cultivation so we are rather ashamed to admit that our only sighting was of a covey of five put up from a steep grass and scree slope at about 4000 m., near Panikar. Despite its apparent abundance in Ladakh as a whole the Chukar's recorded status in the Suru Valley is ambiguous. Koelz (1940) states it is found in Purig, a fact local people in Kargil agreed with, but Osmaston (1926) does not mention a single one in his paper on breeding birds in the area, though perhaps only because he felt it unnecessary to mention such an abundant species !

Baillon's Crake (Porzana pusilla)

Upper Indus :

Tiny crakes, either Little or Baillon's, were seen frequently in the patches of boggy grass in the northwest corner of the Tikse forestry plantation during late September. They were seen daily between 21 September and 1 October and there was also a single record on 6 September. On only one day does our total definitely exceed one though we usually had two or three sightings a day and given the abundance of cover and the birds' shyness there were probably several in the area.

Definite identification of the birds as either Baillon's or Little Crakes in the field was impossible on the brief views we had but we managed to catch and ring two on 23 September using a funnel trap. These turned out to be juvenile Baillon's Crakes and as all the other small crakes we saw were similar as far as we could see and the Little Crake is a lot less likely to occur in Ladakh all our sightings were probably of Baillon's. Even in the hand separating juveniles of the two species by plumage differences is difficult and it was wing and tail measurements and wing formulae of our birds which clinched their identification though the white outer web to the first primary is a good diagnostic plumage characteristic for Baillon's. We have assumed our birds were the expected Asian race P.p.pusilla but they fit Witherby's description of juvenile P.p.intermedia well.

The nominate race breeds in central and eastern Asia. In India it breeds commonly in Kashmir and perhaps elsewhere. It winters throughout the Indian sub-continent and there is an apparent influx of extralimital migrants. There are no previous Ladakh records but Koelz (1937) found two in Spiti in September. All the other Tibetan specimens Vaurie (1972) records were taken during spring and autumn passage periods.

Spotted Crake (Porzana porzana)

Upper Indus :

A dead adult Spotted Crake was brought to us by local children on 16 September. It was easily told from Little and Baillon's Crakes by its larger size, unbarred buff undertail coverts and grey brown head, neck and breast spotted with white. The bird was quite fresh and though it had an abdomen wound had not been fed on. The children (whom we rewarded with sugar, empty coffee jars and plastic bags) had found it near the edge of the forestry plantation. The only previous Tibetan record we have found is of a specimen taken on the Northern Plateau in 1870 (Vaurie 1972). In India it is a winter visitor and may breed as near as Gilgit.

Moorhen (Gallinula chloropus) (Indian Gallinule)

Upper Indus :

Our first Moorhen, a juvenile, appeared at Tikse on 9 September. After this thespecies was seen frequently with records on 18 days. On most days we had several views, dates on which our day total exceeded two being as follows :

21.9 : 3 (1 ad, 2 juvs.) Tikse
24.9 : 3+ (1+ ad, 2+ juvs.) Tikse
25.9 : 3+ (1+ ad, 2+ juvs.) Tikse. 1(ad.) near She on waterlogged pasture
27.9 : 3+ (1+ ad, 2+ juvs.) Tikse.

The adult at She on 25 September was the only Moorhen seen away from the ringing site. All the others were seen around the main pool and in the wet northwest corner of the Tikse forestry plantation. Most of our records may refer to the same two juveniles and one adult but a second adult was brought in dead on 16 September by Forestry Department workers who had found it in the plantation. It was very fresh and had no external injuries. Our last sighting of live Moorhens (an adult and a juvenile) was on 8 October but the headless corpse of another adult was found near our hut on 12 October.

Moorhens have never been seen in Ladakh before and again Koelz seems to have a monopoly on previous records from the western part of the Tibetan Region. He collected four in Spiti (Koelz 1937) and one in Lahul (Koelz 1939) all during September. He gives all these as G.ch. indicus. However, if Ali and Ripley's description of this subspecies is accurate, and we have no reason to believe that it is not, the dead adult brought in on 16 September certainly was not G. ch. indicus as it did not have a green bill tip but a bright yellow one like the nominate race. It would thus appear to be the first record of G. ch. chloropus for India. Unfortunately, not being aware of the possibility of two subspecies occurring we did not keep notes on the live adults we saw, though as far as we can recall they looked identical to this dead specimen and to British Moorhens.

Though the Indian race is said to be smaller than the nominate (Witherby 1938 - 41) comparing wing measurements for Soviet populations of G. ch. chloropus in Dementiev et al (1966 - 70) with those of British Moorhens of the same subspecies in Witherby et al (1938 - 41) and with those for G. ch. indicus in Ali and Ripley (1968 -74) reveals that there is a bigger difference between the two samples of the nominate race than there is between Dementiev's G. ch. chloropus and Ali's G. ch. indicus. These two have a large area of overlap, the wing length ranges being 150-181 mm and 152-172 mm respectively. In fact the wing length of our specimen fits all three samples. Dementiev does not give any other measurements so further comparison is confined to G. ch. indicus and British G. ch. chloropus. The bill length of our bird fits both these while the tarsus is afew mms shorter than either (45 mm. as against 48-53 mm. for the nominate race and 47-50 mm. for the Indian). The tail measurement however does fit G. ch. chloropus and not G. ch. indicus (75 mm. compared to 65-80 for British G. ch. indicus and 52-68 mm. for G. ch. indicus).

As Ali and Ripley record that the Indian population of Moorhens is "vastly augmented" in winter it seems highly likely that some of the nominate race, which is migratory in central Asia (Dementiev et al 1966 - 70), winter in India. Though Dementiev does not mention India as a wintering area his map of winter range shows the subspecies reaching into Sinkiang and nearly to the Indus.

Despite being fairly confident that the dead specimen we were given in Ladakh and probably all the live Moorhens as well were G. ch. chloropus a close examination of museum specimens to assess the extent of variation in measurements and bill colour is really called for before the nominate subspecies is put on the Indian list.*

Eastern Golden Plover (Pluvialis dominica) (Lesser Golden Plover)

Upper Indus :

A close view of two near Choglamsur Bridge on 18 August, both birds partially in summer plumage. Two other records of single plovers flying over north-west calling (14 September at Tikse and 18 at Choglamsur Bridge) were most probably this species.

Little Ringed Plover (Charadrius dubius)

Upper Indus :

Two records :

9.8 : 1 Tikse-She, a bird in summer plumage on a riverside mud bank.
24.8 : 1 Chog Bridge with a Kentish Plover on a grassy islet.

Kentish Plover (Charadrius alexandrinus)

Upper Indus :

The commonest plover, seen on eight of the visits to Choglamsur Bridge, the records spread between 11 August and 26 September. Singles on 11, 15 and 24 August and 4 and 22 September and two birds on 18 August and 25 and 26 September. All were in winter/juvenile plumage.

Lesser Sandplover (Charadrius mongolus) (Mongolian plover)

Suru : During his visits to Rungdum Osmaston found these plovers quite common in the stony desert around Zuildo (their typical nesting habitat) and also located eggs and newly hatched young. But during our stay in the area we saw them in this habitat only once (two pairs between Rungdum Gompa and Tazi Tonazas), nearly all our sightings of this striking little plover being close to mud and shingle banks along the river and nearby creeks. We suspect the birds were absent from the desert areas where Osmaston saw them because we found them at a later stage of their breeding cycle when adults and young had moved from the barren nesting areas to more suitable feeding habitat. The most favoured stretch of riverside was between Rungdum Gompa and Zuildo where our maximum daily total was 15+ on 16 July, including two pairs of downy young and a female doing a broken-wing distraction display. The species also occurred, though less abundantly, along the river between Zuildo and Shama Kurpo.

* See Addendum to Moorhen at the end of the Systematic List.

It is worth pointing out that the subspecies which breeds in Ladakh (C.m.atrifrons) has a different face pattern to C.m.mongolus the race occurring in the Middle East and shown in Heinzel, Fitter and Parslow (1974). It has a broader solid black mask than the nominate race without the white forehead patch.

Curlew (Numenius arquata)

Upper Indus :
One heard calling over the ringing-site at dusk on 18 September and a single bird seen flying over south east the following evening.

Spotted Redshank (Tringa erythropus)

Upper Indus :
Recorded for the first time in Ladakh by members of the 1976 expedition this species was not seen in 1977 but we heard the diagnostic "tew-it" call-note several times from the Indus near Tikse on 19 August. Since the 1976 report was written we have found two sight records of the species from south western Tibet proper (Lavkumar 1955).

Redshank (Tringa totanus)

Suru : Like the Lesser Sandplover this species' breeding status at Rungdum seems to have remained unchanged since Osmaston's visits. We estimated at least three pairs on the area of marsh immediately east of Zuildo and about four pairs along the 8 km. stretch west of Zuildo and north of the river. The anxious behaviour of the birds suggested they had recently hatched young though we did not see any. Redshanks favoured the wettest areas of lush grass and sedge. None were seen elsewhere in the Suru Valley.

Upper Indus :
Only two Redshanks seen, one by the Indus near Tikse on 7 August and another at Choglamsur Bridge on 20 August.

Marsh Sandpiper (Tringa stagnatilis)

Upper Indus :
Recorded for the first time in the Tibetan region by Denby and Phillips in 1976 this species turned up again in 1977. Two were feeding in one of the shallow pools near Choglamsur Bridge on 14 September. Both birds were in winter plumage and were seen close enough for all the diagnostic characteristics of size, shape and plumage to be noted. This is one of the least common Sandpipers in the Indian lowlands during the winter and the absence of earlier passage records from Tibet should probably be taken more as a reflection of its rarity as a winter visitor to India than as evidence for the species taking a more roundabout route into and out of the subcontinent than other waders.

Greenshank (Tringa nebularia)

Suru : One was flushed from a creek near the Suru southwest of Rungdum Gompa on 16 July and we also had three sightings of a single Greenshank by the river about 3 kms. further west on 18 July.

Upper Indus :
A common migrant, seen on the banks of the Indus near the ringing-site, at Choglamsur Bridge and along the river between these localities. The species was seen or heard about every other day. Our first sighting was on 11 August. Weekly bird day totals show the pattern of the autumn passage, which reached a peak in early September and remained fairly steady till the end of that month when records cease abruptly. Our last record is of a Greenshank heard calling from the Indus on 1 October.
Most daily records are of one or two birds with the following exceptions.
7.9 : 11 Tikse - Chog. Bridge spread out along the river, the total includes a party of six near She Gompa.
11.9 : 3 Tikse, 1 Chog. Bridge.
14.9 : 3 Tikse.
22.9 : 1 Tikse, 2 Chog. Bridge.

Green Sandpiper (Tringa ochropus)

Suru : Records from Rungdum are as follows :
15.7 : 1 about 2 kms. upstream of Zuildo, flushed from riverside.
16.7 and 17.7 : Singles over Rungdum Gompa.
19.7 : 2 and later 1 a little downstream of Zuildo, flushed from the riverside.
We also had sightings elsewhere on three days :
9.7 : 1 between Panikar and Namsuru, flushed from scrub on the west bank of the Suru.
25.7 : 1+ Sanko, three sightings of single birds : 1 flying north over the village, 2 flushed from the banks of the Suru nearby.
29.7 : 3 between Fokarphoo and Shargol, flying west.

Upper Indus :
The commonest wader, seen almost daily throughout our stay. Green Sandpipers were mainly attracted to the shallow pools in the Tikse forestry plantation and were only seen once at Choglamsur Bridge. Despite the species' frequency our day totals definitely exceeded one on only eighteen days. Records of more than two are :
7.8 : 4 Tikse.
11.8 : 5+ Tikse.
18.8 : 2+ Tikse, 7 Chog. Bridge.
20.8 : 3+ Tikse.
7.9 : 8+ Tikse - She.
9.9 : 5+ Tikse.
Though weekly bird-day totals vary little throughout the period there is a slight decline after a peak during the week 4-10 September. It would be interesting to know what proportion of the birds seen in autumn spend the whole winter in Tibet. Vaurie (1972) summarises the species' status in the region as follows : "A very common migrant and present virtually throughout the year in most regions of Tibet but apparently does not breed".

Wood Sandpiper (Tringa glareola)

Suru : One of the most numerous waders at Rungdum. On 18 July we found about twenty-five on the grazing marsh just east of Zuildo. This was a surprisingly early date to find such numbers and is easily the largest number of the species seen in one place in the northwest of the Himalayas. Between one and three birds were seen elsewhere between the monastery and Shama Kurpo on three other days during our stay at Rungdum.

Upper Indus :

We had six sightings of the species scattered between mid-August and late September. The records are :

13.8 : 1 Chog. Bridge.
19.8 : 1 Tikse, flying high over, calling.
4.9 : 1 Chog. Bridge.
8.9 : 1 Tikse, flying over SE.
14.9 : 2 Chog. Bridge.
25.9 : 2 Chog. Bridge.

Terek Sandpiper (Tringa terek) (Xenus cinereus, Tringa cinereus)

Upper Indus :

One sighting of a single bird on 11 August feeding with Common Sandpipers near Choglamsur Bridge. The species apparently migrates mainly along the coast of India and thus it is not surprising to find it is one of the rarer migrant waders in Tibet, though there are several scattered records from the region.

Common Sandpiper (Tringa hypoleucos)

Suru : Surprisingly we had only one sighting in the Suru Valley itself, a single bird by the Suru at Sanko on 25 July. We also had three (a lone bird and a pair) on the Wukka Chu about 30 kms. from Kargil on 30 July only a few kms. from where Osmaston (1930) found a nest in the 1920s.

Upper Indus :

The most regular wader near Choglamsur Bridge, seen on the banks of the Indus on all but one of the visits there up to 22 September. Near Tikse it was recorded on nine days though the bird's preference for the riverside rather than pools and creeks near the nets probably led to it being under-recorded. The species disappeared earlier than other waders, the last record being of a single bird on 22 September. Records of more than two birds are :

11.8 : 3 about 1 km. west of Tikse, 2 Chog. Bridge.
13.8 : 6 Chog. Bridge.
18.8 : 5 Chog. Bridge.
20.8 : 4 Chog. Bridge.
4.9 : 4 Chog. Bridge.
7.9 : 2 Tikse, 2 about 1 km. west of Tikse.

Solitary Snipe (Capella solitaria) (Gallinago solitaria)

Upper Indus :

Despite records of snipe on twelve days only the last one seen was identified to species with certainty. This was a very tame and photogenic bird, perhaps tired after a long migratory flight, which was found feeding by irrigation channels near the Tikse forestry plantation on 5 October. It was separated from all other possible species by the following combination of field marks :

1) Large size (compared to C.gallinago) and heavier, slower flight.
2) Sides of tail not white.
3) White edges to scapulars.
4) Belly white (though flanks and breast heavily barred).

Dates of other records of unidentified Snipe at Tikse are : 25 August, 3,11, 16, 17, 18, 20, 27, 28 and 29 September and 1 October. All these records are of single birds except for the first which is of three flying low northwest. Two of the others were also flying northwest and the rest were flushed near the nets. What notes we have on these brief sightings suggest they were also of C.solitaria. Larger size and heavier more direct flight than C.gallinago is usually mentioned and the call, heard from five of the birds, was similar to that species.

Though the Solitary Snipe probably breeds locally in the northwest Himalayas we have not come across any midsummer records or any record of nests or birds in breeding condition collected in Ladakh. The dates of our records at Tikse show that Snipe were migrants rather than summer residents around the ringing-site.

Little Stint (Calidris minutus)

Upper Indus :

Only two definite sightings, both at Choglamsur, a pair on 13 August and a single on 14 September. Individuals of the species might have been missed in small flocks with Temminck's if they kept silent as sometimes flushed stints could only be identified on call.

Temminck's Stint (Calidris temminckii)

Suru : Three on 17 July by the river near Tazi Tonazas.

Upper Indus :

One of the most regular waders during the first half of our stay, particularly at the ringing-site where the species was recorded almost daily from 10 August to the end of the first week in September. After this more scattered sightings continued till 26 September when the last was heard flying over Choglamsur Bridge. Weekly bird-day totals show that the species' passage was earlier than any of the other common waders, being apparently at or past its high point when we arrived at Tikse in the second week of August. Dates when more than two Temminck's Stints were definitely seen are :
11.8 : 8 Tikse, 1+ Chog. Bridge.
13.8 : 6-12 Chog. Bridge.
21.8 : 3 Tikse.
14.8 : 5 Tikse.

Differences in the abundance of Temminck's and Little Stints on passage during the autumn of 1977 fit in with known differences in their migration. Little Stints migrate mainly southwest and most winter in West Africa, hence their relative scarcity in Tibet and the Himalayas on passage and in the Indian lowlands in winter. Temminck's Stints travel more directly south and a much smaller proportion of the world population winters in Africa. Despite their tiny size they appear to tackle the Himalayas on a broad front rather than skirting them and are common on passage right across Tibet (Vaurie 1972).

Curlew Sandpiper (Calidris testaceus) (Calidris ferruginea)

Upper Indus :
A Curlew Sandpiper in winter plumage was flushed from a creek near Choglamur Bridge on 24 August.

Ruff (Philomachus pugnax)

Suru : A flock of 33 was on the marshy land east of Zuildo on 18 July. Some of the males were in nearly full summer plumage with cream or brown ruffs and black on the flanks and belly. This is by far the largest flock recorded in Ladakh and a surprisingly early record.

Upper Indus :
We only recorded the species once, a single bird on 22 September at Choglamsur Bridge.

Black-Winged Stilt (Himantopus himantopus)

Upper Indus :
This species, one of the finds of the 1976 expedition, was also seen quite regularly in 1977. Dates of records from the pools near Choglamsur Bridge are as follows (all records are of single birds except where stated otherwise) :
11, 18, 20 and 24 (2) August, 1 (2), 11 and 18 (2), September and 3 October. All the Stilts bar two were in winter plumage and had greyish caps on the rear crown sometimes extending down the nape. The two on 18 September were obvious juveniles. Our only record away from Choglamsur is of a pair flying southeast over Tikse on 14 September.

Perhaps the most significant wader sighting of the expedition was made by the mountaineers who saw a flock of thirty Black-winged Stilts by a tarn at 5,200 m. on 31 August. Several of these were adults with all-white heads. They had departed by the following day. This is the largest flock seen in Tibet as far as we know and the altitude proves that these birds at least were not following river valleys but were taking a direct route over the highest passes.

Though the Southampton University Expedition records are the only ones from Ladakh in its more restricted sense single previous records do exist for Rupshu (Koelz 1940) and Lahul (Koelz 1939).

Ibis-Bill (Ibidorhyncha struthersii)

Suru : Though it was one of the first species we saw in the Suru Valley we only recorded this striking wader twice during the rest of our time there. The sightings are :
6.7 : 1 Kargil - Baru, on shingle islands in the Suru.
7.7 : 1, as above.
12.7 : 1 on the Challong Nullah near its junction with the Suru by Panikar. The bird was using its long curved bill to reach under boulders, wading up to its belly in the torrent to do so.
Osmaston reported Ibis-bills from Sanko and Parkachick and found them breeding between Sanko and Panikar (Osmaston 1925, 1926, 1930).

Upper Indus :
Koelz (1940) found Ibis-bills common on the Indus between She and Spituk and in the stretch we covered, which partly overlaps the area he mentions, they were seen and heard regularly.
Most of our records are from the river near Tikse or between Tikse and She though single birds were seen near Choglamsur Bridge on 18 August and 26 September and a pair was there on 4 September.
Near our netting area they became quite vocal after early September and one or more were heard from the river about every second day for the rest of the month. The last record is of one heard on 6 October.
Despite the frequency of sightings we have no evidence of breeding and all the Ibis-bills seen were adults. Generally the species would appear to be decidedly local in Ladakh and perhaps completely absent east of Leh. Meinertzhagen (1927) in his extensive four month tour did not see any.

Great Black-Headed Gull (Larus ichthyaetus)

Upper Indus :
These huge gulls were seen at intervals from mid-August with almost daily sightings after 1 October. Our records are given below, all are from the Indus near Tikse unless stated otherwise.
The great majority are of gulls flying along the river but no predominant direction is evident from our field-notes.
15.8 : 3+ (juv.) Chog. Bridge.
18.8 : 1 (juv.)
27.8 : 1 (juv.) Chog. Bridge.
11.9 : 2 (juv.) Tikse - She.
22.9 : 1 (juv.)
29.9 : 1 (juv.)
30.9 : 3+ (2+juv., 1+ 2nd winter).
1.10 : 3+ (2+juv., 1+ 2nd winter).
2.10 : 2+ (1+juv., 1 2nd winter).
4.10 : 3+ (1+juv., 2 2nd winter).
5.10 : 3+ (1+juv., 2 2nd winter).
6.10 : 3+ (1+juv., 2+ 2nd winter).
7.10 : 5+ (2+juvs., 3 2nd winter).
8.10 : 2
9.10 : 2 (1 juv., 1 2nd winter).
10.10: 2 (1 juv.,(same bird as 9.10), 1 2nd winter).

The species' large size and powerful build and the wide black tail-band on the otherwise white tail of first and second year birds are diagnostic and noticeable even at long range. Photographs were taken of the juveniles seen in mid-August and have been used with field-notes to check that other diagnostic plumage details tally.

Great Black-headed Gulls have never been recorded from Ladakh before but the species was not completely unexpected as it breeds in Soviet Central Asia particularly from the Aral Sea to Lake Balkash and eastwards into northwestern Mongolia and North China. It probably also nests on the Tibetan Plateau and is a winter visitor to the coast of India and Pakistan. Ludlow (1950) recorded it as an autumn and winter visitor to Lhasa but this is the most westerly previous record for Tibet, though we suspect that the large gull seen by Denby and Phillips during the 1976 expedition was a Great Black-headed.

Brown-Headed Gull (Larus brunnicephalus)

Upper Indus :

A very tame juvenile was seen on flooded grassland near She on 18 August. All other records are of adults which were seen almost daily from 25 September to 5 October. At least one of the gulls present during this period still had a complete dark hood. All were flying over the Indus near Tikse except for one at Choglamsur on 25 September. Once or twice they were in company with Great Black-headed Gulls. Day totals definitely exceeded one on only two days, 28 and 30 September when three were seen. This is the expected gull in Ladakh as it breeds by the Rupshu Lakes and is a common winter visitor to coasts of the Indian Peninsula.

Whiskered Tern (Chlidonias hybrida)

Upper Indus :

Apart from two possibles near Tikse on 30 August our only records are of a single juvenile flying upstream near Choglamsur Bridge on 3 October and one, quite possibly the same bird, at the ringing-site the next morning.

Whiskered Terns have turned up in Ladakh a few times in the past, though Denby and Phillips' daily sightings at Choglamsur over an eleven day period of up to seven birds are unprecedented. Vaurie (1972) records two specimens collected in Ladakh proper (both in September) as well as single specimens for Rupshu (1 October) and Spiti (17 September). Koelz (1940) mentions an additional specimen he collected at Spituk, a few kilometres west of Choglamsur, on 21 August.

The Whiskered Tern is the only species of marsh tern to have been recorded in Ladakh. It is also the only one to breed in the Indian subcontinent, the Indian race C.r.indica being a common summer visitoras near as the Vale of Kashmir. Though Vaurie (1972) does not discuss subspecies identity for the specimens he mentions, Koelz (1937, 1940) gives the two he collected (one in Spiti and one in Ladakh at Spituk) as C.r.indica. Judging from its breeding range the nominate race is less likely than the two other marsh terns to reach the northwest Himalayas on migration as unlike them it does not appear to breed directly to the north (Dementiev et al 1966-70, Voous 1960). It is known to breed as near as the Aral Sea, Syr-Darya and Amu-Darya down to Kelif but for these birds to reach Ladakh they would have to fly across the western Tien Shans or

Pamirs-Alai mountain systems before reaching the Himalayas, an unnecessarily arduous and roundabout route into India. All these facts tend to support the view that all the Ladakh Whiskered Terns are members of the Indian race which have wandered 200 kms north into the Himalayas instead of migrating south !

However, there is a possibility, especially given the characteristically fluid state of the species' breeding range, that breeding populations of C.r.hybrida occur beyond this race's accepted eastern limit. In fact Suskin (1938) reported breeding in the Zaisam depression though Dementiev et al state this record probably refers to "stragglers". There are apparently no specimens recorded from other parts of Tibet and the nominate race has not been recorded wintering in India. But the frequency of records from Ladakh certainly appears strange considering the species' accepted breeding range.

Gull-Billed Tern (Gelochelidon nilotica)

Upper Indus :

Despite Gull-billed Terns being new for the Tibetan region we saw them along the Indus on seven occasions during August and September. Our records are :

11.8 : 3+, near She, one of these with a Common Tern.
13.8 : 2 Chog. Bridge.
15.8 : 1 Chog. Bridge, flying SE.
18.8 : 1 Chog. Bridge, drifting slowly SE.
20.8 : 1 Chog. Bridge and later 4 possibles in the distance towards She.
11.9 : 1 near She, sitting with 2 Common Terns on a shingle bar. It later flew off NW.
20.9 : 1 near Chog. Bridge - She.

All were in flight apart from the one on 11 September. They were either flying over the river or nearby pasture.

We found these terns, (all of which were in winter plumage) confusingly gull-like in the field with their short, thick bills, nearly completely white heads with only a small dark smudge behind the eye, rather large size, broad wings, short inconspicuously forked tails and rather heavy flight. However, the wing-pattern - very pale even grey above darkening gradually to mid-grey near the tips of the primaries and without any black or white patterning - separated them from all possible gulls even at long range. On a closer view the black bill and legs, as well as the tail-shape and other tern-like characters became visible.

Occurrence of the species in Ladakh is not too surprising. To the north the breeding range extends in a broad band between 40^{o} and 50^{o} N. to the Aral Sea, Lake Balkash and further east to Lake Zaisan. To the south the species breeds in Pakistan and northwest India. The Indian breeding population is known to be augmented by extralimital migrants in winter.

Common Tern (Sterna hirundo)

Suru : We saw several Common Terns over the river and adjacent grazing marsh during our stay at Zuildo though further east, near Rungdum Gompa, there were none. The maximum seen at one time was a party of five a little east of Zuildo. Further west, in the stretch between Zuildo and the ruins of Shama Kurpo, there were at least three. Like Osmaston we found no signs of breeding, in fact the species' status seems very much as it was during his visits. Elsewhere in the valley we saw pairs or single birds by the river in the following places :

i) 15 kms. east of Parkachik (2)
ii) Near Parkachik (1)
iii) Directly east of Panikar (2+)
iv) c.3 kms. north of Panikar (2)
v) Near Sanko (2+)

Again we saw no evidence of breeding. All the birds were adults in summer plumage. Unfortunately we did not cover the large islands near Hjook where Osmaston (1926) found terns nesting in 1925. Familiar with the nominate subspecies we found the slightly darker summer plumage of the Ladakh birds (S.h.tibetana) noticeable.

Upper Indus :

Though we were recording Common Terns near the Indus between Choglamsur and Tikse until 3 October weekly bird-day totals show a steady decline in numbers from early August. Dates when we saw four or more are :

7.8 : 4 Tikse - She
11.8 : 6 - 10, Tikse - She. 2 Chog. Bridge.
13.8 : 5+ (including one juv.) Chog. Bridge.
15.8 : 4 - 5, Chog. Bridge, including a pair mobbing a Great Black-headed Gull.
18.8 : 6+ Tikse with 3 mobbing a Saker. 1 Chog. Bridge.
22.8 : 4 Tikse.

A juvenile was seen being fed by an adult on a shingle island between Tikse and She on 7 September and begging from one in the same place a few days later. Adults were seen carrying fish both here and at Choglamsur Bridge.

Snow Pigeon (Columba leuconota)

Suru : These handsome pigeons were quite common around Rungdum and were seen every day we covered the valley bottom here. Our two largest day totals were about 20 flying low over the marshy area east of Zuildo and 15 between Zuildo and Shama Kurpo.

As remarked by a number of previous ornithologists the species keeps to more moist, vegetated slopes. Our only sightings away from Rungdum were of three at Parkachik and about five on each of the two days of our walk from Trazpone to the Safi La. On the first day we flushed a bird off its nest about five metres up a cliff at about 3,500 m. The bird's status in the Suru Valley seems to have remained unchanged since Osmaston's visits.

Snow Pigeons seem to be rare away from the Dras and Suru Valley area as they are not birds of the arid Tibetan biotype and are generally confined to the Main Himalayan Range and not the drier mountains beyond. Denby and Phillips' (1977) sighting of one up the Stok gorge must be the most easterly record for Ladakh.

Hill Pigeon (Columba rupestris)

Suru : We had sightings of C.rupestris from Kargil to Rungdum Gompa. The species was common and seen daily in the valley at and above Panikar with maximum day totals of 20+ between Zuildo and Shama Kurpo and 11 to 15 near Panikar. Downriver of Panikar they were only occasional. None were seen during our stay at Sanko and the only record near Kargil is of 5+ in a side valley a few kilometres west of the village. We did not see Hill Pigeons anywhere away from the main valley.

Upper Indus :

Although Denby and Phillips found Hill Pigeons around the settlements they visited in 1976 we did not see the species at Tikse until late September when small numbers joined the Rock Pigeons around Tikse monastery and the nearby fields. The maximum seen in a day was 13 circling round crags north of the monastery on 5 October.

Blue Rock Pigeon (Columba livia)

Suru : Not seen upstream of Panikar and even here we only had a single sighting of three on the steep banks of the Suru. The only records in the main valley below Panikar are one from Kargil and 10+ by the river near Sanko, but unlike the previous species, Rock Pigeons were seen away from the Suru up narrow side valleys. We saw four along the high precipitous banks of the Umba River and the species was quite common in the wild gorge leading from Trazpone to Safi, around Safi itself, and in the valley running down to the Wukka Chu at Shargol. On the three days of the Trazpone to Shargol trip, day totals were 10+, 20+ and 25 - 30 respectively. Our highest records for the species were from above Safi at around 3,800 m.

Though generally the Hill Pigeon is said to occur higher than the Rock Pigeon in Ladakh and to be less associated with cultivation the ecological separation between the two species does not appear to depend on such simple factors around the Suru Valley. We noticed that Rock Pigeons here were particularly associated with narrow valleys and riversides with steep rocky banks or nearby cliffs and were not the normal species around cultivation. This is in contrast to their status in the Indus Valley around Leh.

Upper Indus :

A flock of up to 40 frequented the crags around Tikse monastery throughout our stay, and in August Rock Pigeons were seen almost daily flying to and fro over the netting area. During September these sightings became less and less frequent, probably because as the harvest progressed the pigeons which roosted on crags on the north side of the valley no longer had to go far afield to forage but could feed on stubble between the road and the Indus.

The difference in the relative abundance of Rock and Hill Pigeons at Tikse and Panikar, which are at about the same altitude, emphasises the fact the these two species are distinguished as much by different habitat preferences at a given altitude as by different altitude zones.

Rufous Turtle Dove (Streptopelia orientalis) (Western Turtle Dove - Ali & Ripley)

Suru : These doves are common in the valley wherever there is cultivation with some trees. They were seen south to Panikar but not at Rungdum. The species was generally seen singly or in pairs; our maximum day totals were around ten.

Upper Indus :

At Tikse they probably nested in the monastery garden and were seen flying low over the netting area on most days. Maximum day totals were about 15. From the second half of September there was a decline in numbers but we had sightings of single birds on four days in October, the last on the 9th. The only flocks we saw were groups of five and nine birds flushed from willow scrub near the nets on 14 September. The species did not feed in the forestry plantation as a rule.

Three were seen by the Wukka Chu near Kargil on 14 October.

Cuckoo (Cuculus canorus)

Suru : Cuckoos were seen and heard several times near cultivation usually in areas with plenty of trees or scrub. One or two were seen and/or heard each day of our stay at Panikar, from the village itself and from cultivation round the nearby villages of Kochak and Khous. Elsewhere in the valley we saw one among willows and poplars near Kargil and two, an adult and a juvenile, in willows and willow scrub near Sanko.

The Suru Valley seems to be about the best place in Ladakh to see cuckoos, probably because of its peripheral position. Osmaston saw them here on both his visits but unlike us he found them common at Rungdum (Osmaston 1930). Elsewhere in Ladakh they are scarce (Meinertzhagen 1927, Osmaston 1925, Wathen 1923) though Osmaston (1925) saw one as far east as Tankse.

Upper Indus :

We had three sightings of single cuckoos as follows :

11.8 : Juv. over fields near Tikse
18.8 : Brown phase f./juv. flying low over netting area.
19.8 : One flushed from ringing-site.

In the past cuckoos have been collected in August from two nearby villages, She and Spituk, by Koelz (1940).

Little Owl (Athene noctua) (Tibet Owlet)

Suru : We saw at least three, probably four of these owls on a crag overlooking the road about 2 kms. west of Zuildo on 20 July. As owls are typically solitary when not breeding these birds were most probably a family group. Although the species has been seen and collected sparingly in Ladakh, including the Suru Valley, this group sighting is the nearest thing to good evidence of breeding in India. The Tibetan subspecies of the Little Owl is very pale compared to its European counterpart.

Spine-Tail Swift SP. (Chaetura sp.) (Hirundapus sp.)

Upper Indus :

A large dark swift, as big as an Alpine Swift, drifted southeast over the ringing site on 26 September. It had the characteristic short, square tail, barrel-bodied, short-necked appearance of a Spine-tail, the diagnostic white horse-shoe mark under the tail and pale patch between the wings. As this is the first record of a Spine-tail for any part of the Tibetan region, as far as we know, it is frustrating that we cannot be positive as to its species. The only species at all likely to occur in the northwest Himalayas is C.caudacuta but identification problems arise because the race of this species which is known to breed along the Himalayas to Pakistan is C.c. nudipes which has a large white throat patch, a field-mark our bird definitely lacked. We think it was in fact the race C.c.rupchandi which has a smoky grey chin and throat and whose range is little known, although it has been collected from central Nepal. However, from our field-notes the bird could also be C.gigantea, although this species is much less likely as its known range is far to the south and east.

Swift (Apus apus)

Suru : A common bird over cultivation in the main valley, particularly around Panikar and Sanko. Getting an accurate idea of the numbers seen was difficult but on good days estimates were around 20 or 30 plus. Swifts were not common around Kargil and our maximum day total here was only five, probably because there are not wide areas of cereals for them to feed over. Swifts also occurred at altitude and well away from cultivation. We saw several up the Challong Nullah and over the ridge just south of Panikar at 4,000 m. some near the Umba La at around 4,300 m. and a close flock of 30 at the top of the gorge leading up to Safi. In fact the only area where we did not see Swifts was Rungdum.

Upper Indus :

In August 1976 Denby and Phillips recorded day totals around a hundred several times, the birds usually moving west, but in1977 although we had scattered records from Tikse, She and Choglamsur our highest day total was only 24. Records of more than two are :

15.8 : 7 Chog. Bridge, flying slowly NW.
24.8 : 2+8+9+5 during the day hawking over fields around Tikse
2.10 : 7 Tikse, drifting SE.
2.10 : 8 Chog. Bridge, drifting SE.
6.10 : 24 Tikse, flying steadily NW.

As can be seen there is no evidence for a predominant flight direction. The difference in the numbers of Swifts seen in 1976 and 1977 is probably due to low cloud and rain during mid-August 1976 keeping migrating birds low. The last Swift we saw was a single at Tikse on 11 October. Our October records are among the latest for the species in Tibet although latest recorded dates for summer visitors probably just reflect the time of year when bird-watchers normally head for home.

Roller (Coracias garrulus)

Suru : A Roller was seen briefly at Sanko on 8 July sitting on telegraph wires near the main road. Walter Koelz has a monopoly of previous Tibetan records, these being of a specimen shot at Spituk (19 August) a carcass found at Rungdum (11 September) and a bird seen near Jispa, Lahul (September). Considering the date and position of our record it was more likely to have been a straggler from Kashmir than a true migrant.

Wryneck (Jynx torquilla)

Suru : We had four sightings of this typically arboreal species in the Suru Valley, three in July and one on our day's stop in mid-October. A Wryneck was seen collecting ants from the ground among Hippophae bushes by the east bank of the Suru across from Panikar before flying off with a beakful. The next day another was flushed from more open scrub four kilometres downriver. The third July record is of one up a side valley with apricot, poplar and willow trees a few kilometres west of Kargil. We also saw a Wryneck in the willow and Hippophae scrub we covered between Kargil and Baru on 14 October. This is, as far as we know, the latest autumn record for the species in Tibet. Osmaston (1925) heard a Wryneck near Kargil in August but apart from this the only records we have found for Ladakh are the three collected specimens mentioned by Vaurie (1972). The Suru Valley's relatively abundant willows and poplars and the apricot orchards, as well as its position just over the Main Himalayan Range make it about the best breeding area for Wrynecks in Ladakh.

Upper Indus :

Three records from the forestry plantation at Tikse. Adults were caught and ringed on 9 September and 7 October and a bird was flushed from scrub on 17 September. From their warmer and more heavily barred underparts the two birds caught would appear to be the Kashmir Wryneck J.t.himalayana rather than the nominate race. However we cannot be sure of this as the subspecies' differences are subtle and our judgement is based on descriptions only.

(We have not seen skins of J.t.himalayana and our only photograph of the underparts of one of the birds we ringed was destroyed during processing.) Although J.t.torquilla is the slightly larger race, wing and tail measurements of our birds are if anything above average for this subspecies.

Scaly-Bellied Green Woodpecker (Picus squamatus)

Suru : Soon after our arrival at Kargil the brother of our hotel proprietor surprised us by saying he had seen 'wood-tappers' several times nearby. He directed us to the best locality a little north of the main bazaar and sure enough we managed to see a Scaly-bellied Green Woodpecker there on 27 July. The bird was probably a juvenile and the combination of green barred upperparts and a complex head pattern with prominent white supercilia, red in the crown and dark cheek stripes was diagnostic. The Woodpecker was seen in tall poplars on a terraced slope not far from the main road. This area with its abundant willows and poplars and adjacent apricot orchards seemed very suitable habitat and considering that the species breeds as high as 3,300 m. in the western Himalayas (including Kashmir and Baltistan) the idea of Woodpeckers around Kargil should not have startled us as much as it did. Our local informant assured us he had seen the species quite a few times and our sighting was obviously not just a freakish coincidence. Probably these Woodpeckers have extended their breeding range to Kargil from nearby Baltistan.

Hoopoe (Upupa epops)

Suru : Hoopoes are one of the most conspicuous and widespread birds in cultivation and around the villages. We never saw them more than a few hundred yards from fields or scrub and nowhere upriver of Parkachik although one was seen at Safi which is at similar altitude to Rungdum but has a few trees. Our day totals were generally between five and ten birds.

Upper Indus :

Although they were as common in the fields around Tikse as they are in similar habitat in the Suru Valley, Hoopoes were not numerous in the forestry plantation. Our maximum day total for the netting area was only four and we found no evidence of breeding in the plantation although the nearby monastery garden looked good nesting habitat. As well as being common in cultivation, Hoopoes were frequently seen feeding on grazing land on the river banks and in the desert area just north of the main road where their most likely prey was young rock and toad agamas.

Two Hoopoes caught in the nets on 12 August were the nominate subspecies as expected and none of the Hoopoes we saw in the field looked different. The species began to decrease noticeably in the second half of September and the last was seen on 28 September near Tikse.

Hume's Short-toed Lark (Calandrella acutirostris) & Calandrella sp

Separation of Hume's Short-toed Lark (C.acutirostris) from the Short-toed Lark (C.cinerea) is only possible in the hand, and Ali and Ripley consider that "sight records unsupported by specimens are worthless". Previous records of Short-toed Lark (C.cinerea) in Ladakh mainly concern migrants. Vaurie (1972) lists thirteen specimens all of which were collected between 9 September and 2 October. Koelz (1940) found Short-toed Larks (C.cinerea) in flocks up to several hundred strong in Spiti, due south of Ladakh in September 1931, and this species is an abundant winter visitor to the Indian plains. Osmaston (1926) recorded a nest of C.cinerea at Hjook in the Suru Valley in July 1925 and gives other sight records of the species elsewhere in the area, and Ali and Ripley consider that the race C.cinerea dukhunensis probably breeds in Ladakh. The thirty specimens of Hume's Short-toed Lark (Calandrella acutirostris) listed by Vaurie (1972) were collected throughout the summer months between 29 April and 20 September. Of C.acutirostris, Osmaston (1925) wrote "Next to the Sparrow this little bird is undoubtedly the commonest bird in Ladakh", being found "almost everywhere between 10,500 and 16,000 feet". From this hasty summary of the literature there seems to be little doubt that Hume's Short-toed Lark (C.acutirostris) is the common breeding species in Ladakh, and that the Short-toed Lark (C.cinerea) migrates through the area in September and probably breeds sparsely.

Suru : Short-toed Larks (Calandrella cinerea/acutirostris) were found in the valley bottom in most dry, open areas visited between Rungdum and Panikar, but not around Sanko or Kargil or away from the valley bottom. They were nowhere very numerous, and the most we saw together was a loose colony of about a dozen birds near the Suru outside Panikar. From the above summary, the species involved was very probably Hume's Short-toed Lark.

Upper Indus :

Between 10 August and 2 September, eighteen Calandrella sp. were caught and ringed, every one of which was in wing moult. Since Short-toed Lark (C.cinerea) is only separable from Hume's Short-toed Lark (C.acutirostris) on wing formula, only birds in the relatively early stages of wing moult could be identified. Nine of the birds trapped could not be identified because the outer primaries were moulting. Of the remaining nine, five were definitely Hume's Short-toed Larks (C.acutirostris) and four still could not be identified. These four birds had wing formulae intermediate between Short-toed Lark and Hume's Short-toed Lark, all having the fifth primary between $5\frac{1}{2}$ and 6 mm. shorter than the wing-point. On our return from India we examined skins at the British Museum, and twenty Short-toed Larks (C.cinerea) measured had the fifth primary $7\frac{1}{2}$ to 12 mm. shorter than the wing point, and twenty Hume's Short-toed Larks (C.acutirostris) had the fifth primary $\frac{1}{2}$ to 4 mm. shorter than the wing point. It can be seen that our four birds had wing formulae almost exactly intermediate between the two species.

Explanations for this are difficult to think of, but it seems likely that since all the birds handled were within days of moulting their outer primaries, the feathers were abraded to a maximum level, and perhaps did not represent the true wing formula of relatively fresh birds. Other more doubtful possibilities are that our measurements were incorrect, or that there is a population of Short-toed Larks (Calandrella sp.) intermediate in wing formula between Hume's Short-toed Lark and Short-toed Lark. The fact that all the birds trapped were in moult is itself remarkable, and birds would appear to have been using Tikse as a communal moulting ground prior to migration.

Small flocks of Short-toed Larks (Calandrella acutirostris/cinerea) frequented drier, more open parts of Tikse Forest Plantation throughout our stay, and there was a considerable migration which probably involved both species. We stopped catching them after 2 September only because, due to damage incurred by livestock, we moved our nets out of the areas which these birds used. Visible migration over Tikse was first noted on 11 September, when twenty birds flew over high, moving N.E. Eight flew over on 14 and five on 19 September, but the main passage was between 25 and 30 September. During this period between thirty and sixty birds were estimated to be passing over each day, with birds moving in all directions, but predominantly southeast. Movement of up to ten birds a day continued until we left Tikse on 12 October. In the desert zone between Tikse and Stakmo, fourteen were seen on 25 September and about eighteen on 5 October.

At Choglamsur, Calandrella acutirostris/cinerea was seen on seven dates between 18 September and 8 October, and flocks in stubble south of the main marsh numbered twenty-five on 22 September and forty-five on 29 September. On 18 September at Choglamsur a flock of birds was watched behaving and calling in a distinctly different way from any of the Calandrella Larks we had seen before. They were flying around actively in tight flocks, calling a distinctive clipped, sparrow-like chirupping which we had not heard before. Fifteen birds calling in this way were again seen at Choglamsur on 25 September, and the call was heard over Tikse on 24 and 29 September, when thirteen birds were counted. We think that these sightings probably involved Short-toed Larks (Calandrella cinerea) but cannot be sure since the calls of the two species are poorly documented. Ali and Ripley write that the "chirp" of C.cinerea is distinctive to the species, whilst "a sharp Trree" is distinctive to C.acutirostris. Fleming (1976) however writes that C.acutirostris flies up with a "chirp".

Horned Lark (Eremophila alpestris) (Shore Lark)

Suru : Horned Larks were the commonest birds at Rungdum with over thirty seen on most days. Most abundant in areas of grass and low Salix scrub these larks were also found on the shallow scree slopes immediately north of the road to Kargil and occasionally out in the stoney desert around Rungdum Gompa and Zuildo.

Osmaston found a loose breeding colony on a dry slope near Panikar at about 3,500 m. but we never found Horned Larks below 4,000 m. Away from Rungdum our records were :

(i) 2, (juvs. moulting into adult plumage) on a dry ridge just south of Panikar (c.4,000 m.).
(ii) 10+, alpine pasture near the Umba La (c.4,200 m.)
(iii) 2 (1 ad., 1 juv.) on a dry slope with low scattered shrubs near the Safi La (c.4,500 m.).

Upper Indus :

The first few Horned Larks arrived in the valley during the last few weeks of our stay, with seven on stubble near Choglamsur Bridge on 26 September and two in the same place on 8 October. Horned Larks winter in cultivated areas round the villages and leave for their mountain breeding areas in May (Ludlow 1920, Osmaston 1930).

Small Skylark (Alauda gulgula)

Suru : This was the most widespread of the species of larks we found. The song, very like the Skylark's (A.arvensis), is a familiar background sound in fields around the villages. Like A.arvensis in Europe the species is most common where there are comparitively large open areas of cereals and less so where the fields are small and interspersed with many trees, as at Kargil. At Zuildo two or three Small Skylarks were seen around the few tiny barley fields near the village and about four more on open grassland at the edge of the grazing marsh to the east. Towards Shama Kurpo this type of lush but not marshy grassland becomes more extensive and the Larks become a little commoner. Further west still the trend continues and though we did not cover this area of grassland properly Small Skylarks were quite frequent along the roadside when we drove past on our journeys to and from Rungdum. Osmaston (1930) describes Small Skylarks as "very common and nesting in the drier parts of the swamp". We presume it is this western part of Rungdum he refers to, though the area may have been subject to habitat changes as discussed later.

Upper Indus :

Though seen, usually singly or in pairs, when we covered fields around Tikse and neighbouring villages Small Skylarks did not feed in the forestry plantation. Neither were they seen out on the short grass near Choglamsur Bridge and elsewhere. At the forestry plantation they were recorded flying over singly or in small parties on most days from the last week in September, though day totals were nearly always ten or less and the maximum was seventeen. In the same period these larks became more abundant on the stubble near Choglamsur Bridge with a maximum of thirty on 29 September. The last seen were three flying over the netting area on 9 October.

Crag Martin (Hirundo rupestris)

Suru : We had scattered sightings of Crag Martins from Kargil to Rungdum, usually near cliffs. The localities are :
(i) 10 kms. west of Zuildo (3)
(ii) Parkachik - Rungdum (c.5)
(iii) Across the valley from Kochak (5-6).
(iv) Challong Nullah above Panikar (5-10).
(v) Gorge leading up from Trazpona to Safi (15+).
(vi) Side valley a few kms. west of Kargil (1).
(vii) Wukka Chu Valley c.25 kms. from Kargil (2+).

Upper Indus :
Though not near typical breeding habitat we had a few sightings of Crag Martins in the main valley. The records are :
7.8 : 1, She, 1, near Chog. Bridge.
26.9 : 3, Leh, flew off S.
5.10 : 1, Tikse, going SE.

We also had a single at Saspul and two near Lamayuru on our way out on 13 October.

Swallow (Hirundo rustica)

Upper Indus :
Seen flying fairly low over the ringing-site on seven days.
14.8 : 2, no obvious flight direction.
16.8 : 2, no obvious flight direction.
31.8 : 1, going NW.
2.9 : 1, going NW.
18.9 : 10, in a single party, going SE.
1.10 : 1, going SE.
6.10 : 1, with a party of Swifts going NW.

As can be seen no obvious flight direction emerges. All these Swallows had the short tail-streamers of juveniles except for six of those on 18 September which may have had but were seen only briefly. The bird seen on 2 September flew into our nets soon after. This was the first time it has been possible to identify a Swallow seen in Ladakh down to subspecies as no one has collected the species here, where they are generally rare. We have come across only five previous records for Ladakh (Denby and Phillips 1977, Meinertzhagen 1927, Osmaston 1925, 1930), though no doubt this apparant scarcity is partly a reflection of poor spring and autumn coverage. The bird we ringed turned out to be of the larger western subspecies on winglength, as Meinertzhagen (1927) predicted.

Red-Rumped Swallow (Hirundo daurica)

Suru : First seen in Ladakh by Denby and Phillips in 1976 this attractive swallow was seen again in 1977, this time near Karmba on 30 July in the narrow cultivated valley leading down to the Wukka Chu at Shargol. The pair flitting over the barley fields here had the pale rumps of H.d.rufula. We know of no records for Baltistan, Spiti, or Lahul but the species breeds in Gilgit, Kashmir and Himachal Pradesh up to 3,300 m. as well as in Soviet Turkestan. It is thus not too unexpected.

House Martin (Delichon urbica)

Suru : House Martins were seen in the following places :
(i) Parkachik - Rungdum (3).
(ii) Cliff face across the valley from Kochak (1).
(iii) Challong Nullah above Panikar (3-4).
(iv) Gorge leading from Trazpone to Safi (c.5 from 3,400 m. upwards).

All our sightings are from places where Crag Martins were also seen.

Upper Indus :
We had scattered sightings, from mid-August to October, as follows :
15.8 : 5, Chog. Bridge, flying slowly NW with swifts.
13.9 : 3, Tikse, flying NW.
14.9 : 10, Chog. Bridge, flying SE.
28.9 : 2, Tikse, flying NW.
1.10 : 1, Tikse, flying NW.

As with the Swallow and Swift our last autumn sightings are the latest for Tibet according to Vaurie (1972).

Rufous-Backed Shrike (Lanius schach)

Suru : A single adult was seen on 25 July near Sanko in an area of small fields interspersed with narrow belts of Hippophae scrub and willows.

Upper Indus :
We saw a single adult in the Forestry Department's Tikse plantation on 7 August during our first visit there and during our stay had records of adults or juveniles on a total of fifteen days.

On 11 August we caught and ringed an adult and retrapped this bird on 3 September. Later, on 13 September, we caught a juvenile. In August our only other record from the forestry plantation was of an unringed adult on the 12th but in September the species was recorded on ten days. Most of these records are of the raucous squawking of a juvenile or juveniles near our nets. On 20 September an unringed juvenile was seen, so at least four birds, two adults and two juveniles, had been present in the plantation. We think the adults had nested in nearby scrub and the birds were a family group. Certainly the persistent squawking suggested that at least one juvenile had fledged close-by. Our last record is of a bird heard on 5 October. The only sighting away from the Tikse plantation was of an adult on telegraph wires below She monastery on 24 August.

As the superficially similar Grey-backed Shrike L.tephronotus is perhaps more likely in Ladakh judging by previous records it is worth discussing identification. We had notes from Ali and Ripley (1968-74) as well as a copy of Fleming et al (1976) with us in the field and having had a chance to examine two of our birds in the hand and subsequently checked skins at Tring against our notes and photos

we are sure all the Shrikes we saw in Ladakh were L.schach erythronotus. We identified them on the following characters :

(i) Shade of grey on back and head : pale ashy rather than slate.
(ii) Extent of brown on upperparts : reaching well above rump and on to back and all scapulars.
(iii) Presence of conspicuous clear white patches at primary bases.
(iv) Tail colour : without rufous.
(v) Measurements : not conclusive but the wing-lengths of both the Shrikes we ringed are middle of the range for L.schach erythronotus and at (the adult) or below (the juvenile) the lower limit for L.tephronotus lahulensis (Ali and Ripley 1968-74).

There seems to be confusion in the literature as to what Shrikes occur in Ladakh. This has been aggravated by changes in nomenclature since the early 1900s. The Ladakh Grey-Backed Shrike, L.t.lahulensis, which is intermediate between the nominate race of that species and L.schach erythronotus in appearance, was originally considered a subspecies of L.schach and called L.s.tephronotus. Given the lack of knowledge of the two species in their region of overlap this may well be the true situation. Vaurie (1972) records two specimens of L.tephronotus collected in Ladakh and a single L.schach. Who collected these we do not know. Osmaston (1925) also gives a sight record of a pair of L.s.erythronotus from Kargil. These are the only records we have come across so our sightings of typical L.s. erythronotus are particularly significant, especially as Ticehurst (1925) subsequently took Osmaston's Kargil records as a mistake in identification. As Meinertzhagen (1927) points out there is no reason why the species should not breed in Ladakh as it does so up to 10,400 feet on the Gilgit Road in northern Kashmir. As he says L.s.tephronotus (now L.tephronotus lahulensis) "is probably as much an eastern as an altitudinal race". Our records would appear to bear him out and to extend the known range of L.schach erythronotus into central Ladakh.

Golden Oriole (Oriolus oriolus)

Suru : Golden Orioles are quite common at Kargil and provide a beautiful mellow dawn chorus. However, they fall silent soon after dawn and as they are as secretive as in Europe we had only occasional fleeting glimpses, usually in trees between the main bazaar and the river. Our highest estimated day total was six. Kargil, with its abundance of trees and its position near Baltistan and Kashmir is probably the best place in Ladakh for Orioles. Osmaston (1930) just says there were "a few" on his visits but Meinertzhagen (1927) describes them as "extremely abundant" between Kargil and Skardu. There is one previous record from elsewhere in the Suru Valley, a single bird at Guntung (Koelz 1940). We had one sighting of a male in a small willow grove near Kochak but no others away from Kargil.

Upper Indus :

We had two sightings of the species at the Tikse ringing-site, both males, on 26 August and 3 September. Several authors have recorded Orioles in the Indus Valley from Khalsi to Leh.

Different people seem to have different ideas about the species abundance in Ladakh, statements varying from "far from common" (Ludlow 1920) to "not uncommon" (Osmaston 1925). These differences probably reflect the fact that though areas of suitable habitat are very restricted they are exploited quite fully where they occur.

Brahminy Mynah (Sturnus pagodarum)

Upper Indus :

We had several sightings of this species in the Tikse forestry plantation. These seem to be the first records from any part of the Tibetan region though we have found a previous record of a single Brahminy Mynah at Sissoo, Lahul in late May (Whistler 1925).

Our records are of a single adult on 16, 18 and 24 August and 8 September and of two adults together on 4 September. To put the finishing touch to our Mynah-watching an adult was caught and ringed on 11 September. All sightings were from the northwestern corner of the plantation close to the monastery garden. The birds were usually feeding on a patch of short grass at the extreme edge of the plantation or were perched in nearby willows.

Given our close views, including in-the-hand examination and the birds' very distinctive and colourful plumage we feel there is no need to discuss identification. Exactly what this species, which normally occurs in the Himalayan foothills up to about 1,500 m. was doing at over 3,000 m. in central Ladakh is difficult to say. Brahminy Mynahs, though mainly resident in India are subject to marked seasonal movements so our records might be of vagrants from south of the Himalayas, though the possibility that the species bred locally cannot be ruled out. The ringing site and particularly the adjacent monastery garden provided the nearest approximation in Ladakh to the species' normal habitat and there were certainly suitable nesting sites available nearby if the birds had been so inclined.

Rosy Starling (Sturnus roseus) (Rosy Pastor)

Upper Indus :

A single juvenile was seen in the forestry plantation at Tikse on 6 September. Having seen adult Brahminy Mynahs around the nets previously and being unfamiliar with this species' juvenile plumage we initially recorded this bird as a young mynah but on checking up back in Britain it became obvious we had been wrong. Young Brahminy Mynahs, though dowdier, clearly show the adult's plumage pattern, with warm orange-buff underparts and a distinct dark cap. As well as lacking these field-marks our bird had a slightly cleft tail and starling-like direct flapping flight on rather triangular wings. There is a possibility of races of S.vulgaris occurring in Ladakh but our bird's body plumage was too pale for that species, contrasting with the darker flight feathers. The flight feathers and particularly greater coverts had conspicuous broad buff edges lacking in Common Starlings. The Rosy Starling's shorter bill and slightly heavier build do give it a "jizz" similar to a Brahminy Mynah.

Six birds which flew over Tikse on 3 September and another three or four seen briefly at Bod Kharbu may well have been Rosy Starlings but both these groups of "Sturnus sp." appeared when binoculars were out of reach.

Abdulali (1947) describes the main migration of Rosy Starlings into peninsular India - remarkable for its northwest to southeast orientation - as passing between the Himalayan foothills and central Baluchistan. However stragglers occur in Kashmir and there are several previous records for the Tibetan region, mainly from the northwest Himalayas. A specimen collected at Chimre (Vaurie 1972) is the only previous Ladakh record we know of but Abdulali mentions single July records from west Tibet proper (Ali 1946) and Lahul (Whistler 1925). We have found others by Koelz (1937 and 1939) for Spiti and Lahul totalling at least five birds. These records may be of birds migrating rather further north though in the same southeasterly direction as the main body of the migrants and thus finding themselves in the high Himalayas unnecessarily. They might also be true trans-Himalayan migrants coming directly south from the U.S.S.R. or Sinkiang.

Magpie (Pica pica)

Suru : In the Suru Valley, as elsewhere in Ladakh, Magpies are common in and around cultivation and even the most myopic tourists we met had noticed them. We saw them daily between Kargil and Parkachik, our maximum day total being about twenty. Even isolated areas like Safi with just a few trees had their Magpies but the complete lack of trees around Rungdum excluded this and several other typical valley-bottom species.

Upper Indus :

Magpies were as common in the fields around Tikse as they are in similar habitat in the Suru Valley but they were generally infrequent in the forestry plantation and only one was netted, a juvenile on 15 August. In the last three weeks of our stay ones and twos did appear fairly regularly out near the nets but no more were caught. As Denby and Phillips noted, Magpies in Ladakh venture out into the desert areas beyond cultivation where agamid lizards would seem to be likely prey. Nevertheless we never saw them more than a few hundred metres from fields and trees.

The subspecies in Ladakh P.p.bactriana is known as the White-rumped Magpie so we were surprised to find the one we ringed lacked the characteristic white band across the rump joining the white scapular patches. However it was much too small to be P.p.bottanensis and its black rump may be a normal characteristic of juvenile plumage, though we have found no mention of this.

Alpine Chough (Pyrrhocorax graculus) (Yellow-billed Chough)

Suru : This species is the commoner of the two Choughs at Rungdum and was seen everyday of our stay there. Though we never saw them on grassland in the valley bottom here they were frequent in ones and twos along adjacent scree-covered slopes and a flock of 15+ hung

around Rungdum Gompa. Our day totals vary between ten and twenty.

Alpine Choughs were also quite common near Panikar. Our sightings here are of 20+ flying over Kochak and another 20+ over the Challong Nullah. We also had fifteen at Parkachik but downriver of Panikar the species was uncommon even in mountains away from the main valley. We had two near the Umba La and 10+ surprisingly low in a side valley a few kms. from Kargil but not a single definite sighting during our three day trip from Trazpone across the Safi La to the Wakka Chu.

Though we found the species commoner than P.pyrrhocorax towards the southern end of the Suru Valley this is atypical for Ladakh as a whole. Away from the region of the Zoji La and the Dras and Suru Valleys the species is definitely scarce. It is also rare in Lahul and Spiti (Koelz 1937) but is common in Baltistan (Matthews 1941) and in the higher margs of Kashmir (Osmaston 1925). It is clearly a bird of the Main Himalayan Range which extends only a short way into the more arid mountains further north. Differences in the distributions of Alpine and Red-billed Choughs in the northwest Himalayas appear to be primarily connected with aridity and, as with other mountain birds, ascribing ecological separation and distribution and abundance differences between species merely to differences in "altitude zone preference" is over simplistic.

Chough (Pyrrhocorax pyrrhocorax) (Red-billed Chough)

Suru : Our most regular sightings of the species are from Rungdum, where, unlike the more abundant Alpine Chough, they were seen feeding in small groups in grassy areas in the valley bottom on most days. Our day totals vary from four to ten. Some of these groups were obvious family parties with recently fledged juveniles. From around Panikar we have definite records of seven birds at 3,700 m. on the ridge south of the village. Another fifty Choughs seen over Kochak were too high to be identified to species. Only downriver of Panikar did the species become commoner than the Alpine Chough. We had about ten at 4,200 m. near the Umba La, 10+ in the gorge between Trazpone and Safi, 13+ near the Safi La at 5,100 m., 10+ along the Wukka Chu 25 kms. from Kargil and 5+ up a side valley near Kargil. Though the species often feeds in cereal fields during the summer in central Ladakh we never saw any feeding in fields in the Suru Valley during July.

Upper Indus :

Though Choughs doubtless breed in the cliffy outcrops north of the Leh-Himis road they were not very frequent on cultivation until late September. Most of our records from Tikse are of single birds or pairs flying over the ringing-site or circling above Tikse monastery. Choughs were more numerous at She. Sixteen seen feeding on marshy grassland below She monastery was the largest number we saw at one time during August and September. At Choglamsur Bridge a pair fed on grassland by the river during August. In October an influx of Choughs, presumably altitudinal migrants, was apparent as well as an increased tendency for the species to feed in the fields (now stubble left after the harvest). On 11 October a large flock of 115 was

seen flying slowly west and later that day parties of ten to twenty were scattered over fields around Tikse. On 12 October about eighty were soaring over stubble near the village and on our return journey to Kargil similar sized flocks were seen over fields along the Wukka Chu.

Jackdaw (Corvus monedula)

Upper Indus :

A single Jackdaw was seen with a loose flock of forty Carrion Crows flying west over the ringing site on 27 September. There are a few previous records of the species in Ladakh, including two sightings near Leh (Wathen 1923, Meinertzhagen 1927). The majority of records are spring ones, though Wathen's was from early August; most involve small parties. Jackdaws are common breeders in the Vale of Kashmir and wander up to 3,700 m. It is quite likely that the Ladakh records are of stragglers from this breeding population.

Carrion Crow (Corvus corone) (and sightings of Corvus corone/m.acrorhynchos)

Suru : In the Dras and Suru Valleys the range of the Eastern Carrion Crow (C.corone orientalis) overlaps that of the very similar Himalayan Jungle Crow (C.macrorhynchos intermedius) the former being distributed north of the Main Himalayan Range and the latter extending just over it from the south. Ali and Ripley state that the calls of the two differ in quality and that the Jungle Crow has a rather wedge-shaped tail but that they are practically indistinguishable in the field. Some of the crows we saw at Kargil looked unusually raven-like in flight and perhaps a little heavier billed and glossier than those we saw later around Tikse and may well have been Jungle Crows but on balance, given our very limited previous experience of this species (a single bird in the Pir Panjal Range) we feel unqualified to ascribe the crows we saw in the Suru Valley to one or other species. The similarity of the two species has confused previous ornithologists also. Some give all the crows they saw in Ladakh as C.macrorhynchos though the only place in the region from which specimens have been taken is Kargil and several specimens of C.corone have also been collected here. Jungle Crows have also been collected in nearby Baltistan where Matthews (1941) states they are commoner than Carrion Crows.

Crows were regular around Kargil and Sanko in July. Our maximum day totals are five at Kargil and four plus (including a family party) at Sanko. Up-river of Sanko we only saw crows once, a pair in fertile agricultural land near Nanshor.

Upper Indus :

We have called the crows we saw while at Tikse Carrion Crows on the grounds that none of the previous ornithologists who realised that the common crow in Ladakh is C.corone not a race of C.macrorhynchos have collected or recorded the latter anywhere in Ladakh east of Kargil. Generally the crows we saw around Tikse appeared rather dingier and less jet-black than Carrion Crows in Britain.

Though they did not visit the scrub around our nets crows were quite common in the fields between Tikse and Choglamsur and were seen on most days, particularly during August and early September when a family party was present around our hut. Large flocks were seen flying over the netting-area regularly during the last half of August and early September. The crows usually appeared just before dusk and took a consistent easterly flight path across to the north side of the valley where they presumably had a roost. At its largest this flock contained just over 100 birds; it disappeared after the first week in September, perhaps because foraging patterns changed as the harvest got under way, though some crows still trickled past at dawn and dusk throughout September and early October. Crows also occurred on the wet grass near Choglamsur Bridge during August. The maximum recorded here was thirty-five. In general Carrion Crows in the Upper Indus Valley seemed more gregarious than the species in Britain.

On 14 October a flock of about 300 crows was seen circling high to the north of Kargil.

Raven (Corvus corax)

Suru : At Rungdum we saw Ravens on most days, usually flying high over the valley singly or in pairs. We also saw pairs feeding close to the houses at Zuildo twice, when their huge size could be fully appreciated. Our maximum day-total was five. Near Kargil we saw one to three Ravens on the east side of the Suru in the desert area around the army camps on three days but we saw none around Sanko or Panikar. However between them Osmaston (1926, 1930) and Koelz (1940) have had several sightings in the valley between Rungdum and Kargil. On our short trip from Trazpone to Shargol we saw a single Raven at 5,100 m. near the Safi La.

Upper Indus :

We have only two records for the Indus Valley in August, a single bird and later a pair circling near Tikse monastery. But in September they were seen on fourteen days and in October on all but two days. These were generally ones and twos flying high over the valley. Our maximum day total is three plus. This autumn increase could not have been due to the appearance of newly fledged young as Ravens breed much earlier in the year and it was probably the result of local altitudinal movements. Our only sighting of Ravens on the ground in the valley is of a pair feeding by the Indus near Choglamsur in early October, though a pair circled low over our hut at Tikse on 29 September, investigating a nearby calf carcass. Two pairs of Ravens were seen above the summer settlements near the top of the Stok Gorge in late August.

Large Billed Bush Warbler (Bradypterus major) (Long-Billed Bush Warbler)

Suru : A very confiding bird was watched and photographed on 24 July on the southern outskirts of Sanko. A second bird replying to its calls was not seen. We were surprised not to see more of this species. Osmaston (1926, 1930) found them breeding in many places up the Suru Valley between Kargil and Parkachik, and described them as "common" around Sanko between 6 July and 9 July 1925, finding more nests of this species than of Hume's Lesser Whitethroat. Of the twenty-two specimens listed by Vaurie (1972) nearly all are from western Ladakh. It seems very likely that this is a species which has become rarer in Ladakh over the last fifty years, perhaps because of destruction of the scrub and rank grass habitat which it favours.

Great Reed Warbler (Acrocephalus arundinaceus)

Upper Indus :

An adult trapped on 16 August was clearly this species having typical measurements and wing formula, by which it could be told from A.stentoreus and A.orientalis. In colour the bird showed the characteristics of the eastern race A.a.zarudnyi but having examined skins of this and the western race A.a.arundinaceus on our return from India we feel we cannot definitely assign it to one or other race because when in worn plumage, as our bird was, the nominate race can resemble A.a.zarudnyi very closely.

This would appear to be the first record of the species for Ladakh and Vaurie (1972) lists only two specimens from Tibet, from the north and east. In the Indian subcontinent the species is rare, Ali and Ripley describe the eastern race as an accidental or rare passage migrant (the nominate race has never been recorded from the region). Both races winter in Africa, the nominate race breeding only as far east as northern Iran and the western Kirghiz Steppes, A.a.zarudnyi extending east to the Altai and Tarbagatai Mountains and into northern Sinkiang (Williamson 1968). Our Great Reed Warbler is likely to have been an eastern bird taking a route to Africa further south than would appear to be necessary.

Paddyfield Warbler (Acrocephalus agricola)

Upper Indus :

A juvenile trapped on 5 October presented identification problems. Swinhoe's Reed Warbler (A.concinens) was eliminated on wing formula, typically having a second primary considerably shorter, first primary longer and several other small differences from our bird (Williamson 1968). The colour of the upperparts of our bird we described as "warm rufous with a sandy tinge", and whilst young Blyth's Reed Warblers (A.dumetorum) are warmer, less greyish-olive in colouration than adults (Witherby 1938, Williamson 1968, Svensson 1975) we do not think, having examined skins, that Blyth's Reed Warblers are normally as sandy-rufous as our bird. Juvenile Blyth's Reed Warbler is

described by Witherby as "... not so rufous as juvenile or first winter Reed Warbler". Our bird was more so. It had a prominent supercilium, but less prominent than many of the Paddyfield Warbler skins we examined. The wing length - 58 mm. - falls just above the middle of the range given by Williamson for Paddyfield Warbler, whereas it is the minimum length given by Williamson for Blyth's Reed Warbler, and a millimetre shorter than the minimum given by Witherby. Similarly the bill length - 15 mm. - is just above the middle of the range given by Williamson for Paddyfield Warbler, but is half a millimetre short of the range for Blyth's Reed Warbler. The wing formula of our bird fitted that given by Williamson in every respect except for the rather short first primary, which is, however, still within the range illustrated by Svensson. There is some confusion in the literature concerning the length of the notches on the second and third primaries of the two species in question. Our bird had the notch on the second 12½ mm. in length (about 5 mm. shorter than the secondaries) and on the third 11½ mm. long, falling between the 10th primary and the secondaries.

This is apparently the first record of Paddyfield Warbler in Ladakh, whereas Vaurie (1972) lists eleven specimens of Blyth's Reed Warbler from Ladakh and Spiti. It is perhaps surprising that there have been no other records since the species breeds discontinuously throughout the southern U.S.S.R. east to Mongolia and into Sinkiang and winters from north India west to Iran (Williamson 1968).

Lesser Whitethroat (Sylvia curruca)

We came across two distinct subspecies of Lesser Whitethroat in Ladakh which are dealt with separately below. In deciding the identity of these we used the subspecies distinctions given in Williamson (1968) and our own notes from skins.

S.c.althaea (Hume's Lesser Whitethroat)

Suru : Hume's Lesser Whitethroats were found in small numbers in most areas of scrub investigated between Kargil and Panikar. The most seen in a day was about eight on 7 July around Kargil. None were seen in the Suru valley upstream of Panikar, and the species was notably absent around Rungdum. Osmaston (1926, 1930) noted a similar distribution, but the species may have been more numerous in his day. He described them as "common" around Sanko in 1925, and found several nests.

Several birds (probably four) singing from cover outside Kargil on 7 July were seen very poorly, but may have been the eastern race of the Common Whitethroat (Sylvia communis icterops). Very brief views gave the impression of a lightly masked grey head and grey/brown mantle, with no rufous in the wings. This fits descriptions of icterops given by Witherby (1938) and by Williamson (1968), who, however, expresses doubts about the differences between the eastern and nominate races. The remarkable thing about the birds near Kargil was the song, many phrases of which strongly recalled the

rapid, lively warbling of European Whitethroats, these phrases being interspersed with more musical warbled phrases repeated three to five times in no set pattern. Unfortunately we can find no description of the song of S.c.icterops, and the Hume's Lesser Whitethroats we saw subsequently were not normally very vocal. These facts together with the poor views we had make us uncertain as to the identity of these particular birds. A breeding male Whitethroat (S.c.icterops) was collected from Changchenmo by Meinertzhagen (1927) on 1 June 1927, and Vaurie lists four other specimens, three from Ladakh and one from Spiti.

Upper Indus :

Seen on most days in the Forestry Department's plantation at Tikse, usually in Hippophae scrub, this species was one of the most commonly trapped birds (see ringing section for details). As the catch totals show the species declined quite sharply in abundance around the third week in September but despite this up to 3+ were still seen every day in late September and on all but three days in October before we left. The last seen was a single bird on 10 October. On only two occasions was the species seen away from the Tikse plantation, both times in small patches of Hippophae around She. There is no way we can tell whether the birds seen and trapped at Tikse were local breeders and/or migrants from further afield, but it seems likely that the species bred at Tikse and that the population was also increased by birds moving through on autumn passage.

S.c.blythi (Siberian Lesser Whitethroat)/S.c.margelanica

Upper Indus :

On 13, 14 and 17 September Lesser Whitethroats were caught at Tikse which were quite unlike the Hume's Lesser Whitethroats we had been trapping since our arrival. All three showed characteristics of S.c.blythi and of S.c.margelanica and we had difficulty in ascribing them to just one of these two races. They all had rather long tails. Two had contrasting outer tail feathers, having a dark wedge on the inner web and a very white outer web, and two had ear coverts considerably darker than the crown. These are characteristics of S.c.margelanica. All the birds were warm brown in colouration on the mantle, wing coverts and fringes of secondaries and tertials this being a characteristic of S.c.blythi. The wing formulae of all three birds were also typical of S.c.blythi, having the fifth primary half a millimetre shorter than wing point, and two having the sixth primary half a millimetre longer than the range given in Williamson (1968) for S.c.margelanica. The bird trapped on 17 September was probably S.c.blythi, being the most rufous in colouration, having ear coverts suffused with brown, and having a short first primary. It seems likely that the other two birds were also S.c.blythi, especially when past records are considered. Koelz (1940, 1937) collected one at Sarle in Zaskar on 20 September 1931, and two at Dankhar in Spiti on 25 September 1933, on the second occasion noting that there were others present.

Srinagar between 20 and 27 March 1926) so that it is not surprising that we found birds moving through Ladakh in early October.

Plain Leaf Warbler (Phylloscopus neglectus)

Upper Indus :

One was trapped at Tikse on 12 August. The bird was in exceptionally abraded plumage - so much so that a wing formula would have been meaningless. The plumage was entirely brownish grey and buffish white, and the bird was tiny as these measurements show : Bill (to skull) 9½ mm, tarsus 17½ mm, wing 50 mm, tail 38 mm, weight 5.7 gms. The tail was 76% of wing length, which is in the middle of the range given by Williamson (1967) for P.neglectus but 4% below the lower limit he gives for P.sindianus.

Ticehurst (1938) reviewing the status of P.neglectus mentions records from Ladakh made by several people, notably Crump, Ward and Ludlow who stated they had found nests in the region. However he could find no genuine specimens taken in Ladakh and concludes that all Ladakh records were "not satisfactory". Vaurie (1972) mentions one specimen, taken at Panamik in July, presumably this was overlooked by Ticehurst or more probably was collected after he had finished his systematic review of the genus Phylloscopus. Given the dubious nature of previous records and considering the very poor condition of our bird, the possibility of it being an exceptionally small Mountain Chiffchaff cannot be completely ruled out.

Tickell's Leaf Warbler (Phylloscopus affinis)

Suru : We saw this colourful warbler on only two days. About two kilometres northeast of Rungdum Gompa it was quite abundant in patches of dwarf Salix scrub 30 to 60 m. up the steep sides of the valley running towards the Kungi La. During our day's visit to this habitat at least fifteen were seen but we saw none in dwarf Salix scrub in the main valley between Tazi Tonazas and Shama Kurpo. There appears to have been a marked decline of this species around Rungdum as Osmaston (1930) describes it as "fairly common and breeding in the low willow scrub in the swamp". We tentatively attribute this to a reduction in suitable scrub habitat in the valley bottom - perhaps due to increased grazing, removal of scrub for fuel or changes in soil conditions - as it was noticeable that in the small area where we found the species common the Salix bushes grew up to 1.5 m. tall whereas in the main valley they were seldom higher than a metre and often much less. But there are problems with this explanation as Tickell's Leaf Warbler is characteristically a bird of Caragana scrub above 4,000 m. in central and eastern Ladakh and this high altitude shrub is rarely more than one metre high, though differences in the growth form or insect fauna of Caragana and dwarf Salix might explain why low bushes of the former are suitable habitat while those of the latter of similar height are not.

Though Osmaston (1930) found a nest with eggs near Panikar we did not see the species in the main valley below Rungdum and our only other sighting was of one in the gorge between Trazpone and Safi in rose bushes among the scree at about 3,400 m.

It seems reasonable to conclude that there is a small annual passage of Siberian Lesser Whitethroats through Ladakh in September.

Mountain Chiffchaff (Phylloscopus sindianus)
(Sind Chiffchaff, treated as a race of P.collybita by Ali and Ripley (1968-74) and others).

Suru : One of the commonest birds in all areas with tree or scrub cover, with willows being especially favoured. At Rungdum the species seemed unaffected by the lack of trees and was found at high densities in the low dwarf Salix scrub in the valley bottom. Literally hundreds of migrants were found in the Forestry Department plantation between Kargil and Baru on 14 October.

Upper Indus :
Again common wherever there was cover in which to feed, this was our most ringed species at Tikse. Mountain Chiffchaffs undoubtedly nested at the ringing site and it is impossible to say what proportion of the catch was of local birds. Aspects of the catch are dealt with in detail in the ringing section. During September the species was particularly concentrated around the small marshy patches in the northwestern part of the plantation where they were feeding on aphids infesting the reeds.

It is worth noting that until Meinertzhagen visited Ladakh in 1926, even B.B.Osmaston identified the Mountain Chiffchaffs as Siberian Chiffchaffs (Phylloscopus collybita tristis).

Chiffchaff (Phylloscopus collybita)

Upper Indus :
Four birds were trapped at Tikse, on 30 September and 1, 5 and 10 October. All four were ascribed to the Siberian race, P.c.tristis, on the basis of wing formula, size, and colouration. Compared with Mountain Chiffchaffs, the Siberian birds had short first primaries, relatively long second primaries, and one bird also had the eighth primary outside the range given by Williamson (1967). In colouration we found that P.c.tristis was considerably more olive than P.sindianus on the edges of rectrices and remiges, on the wing coverts, especially the greater coverts, and on the rump. The axillaries and supercilium were slightly more yellow than P.sindianus, making P.c.tristis a brighter looking bird. The size difference between Siberian and Mountain Chiffchaff was noteworthy, the wing lengths of the four Siberian birds ranging from 57 to 63 mm. three of them being over 60 mm. One also had a tarsus half a millimetre longer than the range given by Williamson for Mountain Chiffchaff.

We can find no definite previous records of Siberian Chiffchaff in Ladakh, but Vaurie (1972) considers P.sindianus and P.collybita to be conspecific, and does not identify races in his lists of specimens. Ivanov (1954) describes countless Siberian Chiffchaffs overcrowding the valleys around Stalinabad (about 850 km northwest of Tikse), at the end of September, and they are known to winter in Kashmir (for example Meinertzhagen (1927) collected six near

Sulphur-Bellied Warbler (Phylloscopus griseolus) (Olivaceous Leaf Warbler)

Suru : This species' common name is quite apt as its breast and belly, though a lot brighter than a Mountain Chiffchaff's are rather pale straw yellow in contrast to P.affinis' canary yellow underparts. But the alternative common name, Olivaceous Leaf Warbler, is unfortunate as the upperparts are very grey-brown and lack the olive tinge of P.affinis. P.griseolus and P.affinis can also be distinguished by details of their songs and they both differ from P.sindianus in their prominent yellow supercilia and paler legs.

Unlike Tickell's Leaf Warbler we found the Sulphur-bellied Warbler about as common at Rungdum and elsewhere in the Suru Valley as Osmaston had found it half a century ago. We saw about ten on the slope near Rungdum Gompa where P.affinis was common and were able to compare the two species' plumage and song. Differences in habitat and habits also became obvious, with P.affinis keeping to the scrub while P.griseolus crawled about on nearby rocks and scree like a Wall Creeper. The species was also quite common on the shallow scree slopes just north of the road between Zuildo and Shama Kurpo. Our highest day total here was 10+. This included a nest with young in the base of a dwarf willow a few metres from the road, and an adult feeding recently fledged young nearby.

Elsewhere our records are as follows :

i) 2+, 5 kms. above Panikar, on a rocky outcrop above the Challong Nullah.
ii) 3, Sanko, on the boundary between rich pasture with Hippophae bushes and the dry rocky hillside above.
iii) 1, way up to Umba La from Sanko at c.4,000 m.
iv) 8+, in gorge leading up to Safi at c.3,400 m. on scree slopes with scattered rose bushes.
v) 3, near Safi at the edge of cultivation.
vi) 5+, a few kms. from Kargil in narrow cultivated valley.

The species was found in some of the most barren parts we visited and seems to require only a few scattered bushes as cover. Unlike other Phylloscopus species it characteristically feeds out on open screes and boulder strewn slopes.

Greenish Warbler (Phylloscopus trochiloides)

Suru : A number were seen in the valley east of the Safi La, below Fokarphoo (about 25 km. southeast of Kargil) on 30 July. As many as twenty birds were encountered altogether, all in willows along a stretch of river about 5 kms. long, ranging in altitude from about 3,400 - 3,600 m. Some birds were seen extremely well, and two pairs were observed feeding newly fledged young, indicating that breeding had taken place.

Upper Indus :

Seven birds were recorded at Tikse as follows :

21.8 : 2 trapped (1 m, 1 f.)
27.8 : 1 trapped
29.8 : 1 trapped, 2 others seen.
14.9 : 1 trapped.

All birds trapped were juveniles of the race P.t.viridanus. They all had relatively short first primaries, 6-7 mm longer than the primary coverts, and four had the second primary the same length as the seventh - eighth, one having the second equal to seventh. This subspecies breeds from Sweden in the west to northwest Mongolia in the east. The breeding range includes the Tien Shans as well as the western Pamirs, neighbouring Gilgit and parts of Kashmir. Birds from Gilgit and Kashmir are distinguished by a longer first primary and shorter second, being intermediates between P.t.viridanus and P.t.ludlowi (Ticehurst 1938, Williamson 1967). It is impossible to be absolutely sure whether the Greenish Warblers caught at Tikse had bred in Ladakh but the fact that from their wing formulae they were clearly all P.t.viridanus not P.t.ludlowi or intermediates between the two races suggests otherwise. The species seems distinctly rare as a breeding species in Ladakh, in fact we can find only one other record of nesting in the area, that given by Wathen (1923). She found what she called "Green Willow Warblers" breeding at Dras in May 1922. She gives these birds the latin name Acanthopneuste nitidus viridanus which suggests at first glance they were what is now called phylloscopus nitidus, the Green Warbler or Bright Green Leaf-Warbler. However Acanthopneuste nitidus viridanus is one of several old names for races of Phylloscopus trochiloides which in the past was considered conspecific with P.nitidus. Vaurie (1972) does not mention any specimens of P.nitidus from Tibet (though he includes it on his hypothetical list) and Ladakh is well to the east of that species' known breeding range so it seems that Wathen's Dras sightings nearly certainly refer to P.trochiloides. Vaurie (1972) lists seven records of Greenish Warblers from Spiti and three from Baltistan but only one from Ladakh. All were taken in August and September and like those we caught at Tikse were presumably migrants moving through the area en route for peninsular India.

Goldcrest or a Crowned Leaf Warbler (Regulus regulus/Phylloscopus sp.)

Upper Indus :

A tiny olive-green passerine, probably a Goldcrest, was seen with Chiffchaffs on 27 August up the Stok gorge in an isolated patch of willows 6 kms. above the village. It was only glimpsed briefly but a pale crown-stripe bordered by dark coronal bands was definitely seen, as were short double wing-bars. However this combination of field marks is shown by a number of "crowned" Phylloscopus species of which at least five have been previously collected in Tibet (Vaurie 1972). Single specimens of two,

P.pulcher and P.occipitalis have been taken in Ladakh. Only one Goldcrest has been taken in Ladakh, but there are two autumn sight records, from nearby Baltistan (Meinertzhagen 1927) and Lahul (Koelz 1939).

Stoliczka's Tit-Warbler (Leptopoecile sophiae) (Turkestan Tit-Warbler, Severtzov's Tit-Warbler)

Suru : A male Stoliczka's Tit-Warbler with its predominantly blue plumage and unfamiliar "jizz" came as something of a surprise when we came across it in riverside Hippophae scrub between Kargil and Baru on 14 October. A female of the species was seen with the male soon after. At the time we thought the species was something of a find but it turns out that at least nine specimens have been collected in Ladakh (Vaurie 1972), though from the papers we have read it cannot be called common as only Meinertzhagen (1927) mentions seeing it. Although some of the specimens have been taken in mid-summer, breeding in Ladakh has not been confirmed. Ludlow describes the call note as a low subdued "teet" but the call we heard was a high "tsic" or "tsi-tic" very reminiscent of a Grey Wagtail though a little less sharp and more musical in quality.

Bluethroat (Erithacus svecicus) (Luscinia svecica)

Suru : Locally quite common in the lower Suru Valley, this species was not seen anywhere upstream of Panikar. Three were seen on 9 July in riverine scrub on the east Suru bank opposite Panikar, and on the 10th, two males were watched in high scrub with willows outside Nanshor. Most sightings were in the Sanko area, where on 22 July five juveniles and an adult were seen on the road north out of the village. These birds were seen several times during our stay there. On 25 July a loose colony of fifteen - twenty birds was found in mixed willow and scrub outside Braco on the Suru east bank opposite Sanko. Four of these birds were carrying food. The males in all sightings were of both white and red spotted forms, in about equal numbers. On 30 July a juvenile was seen in Karmba in the valley east of the Safi La. On our return through Kargil on 14 October three were seen in the Forestry plantation between Kargil and Baru. Osmaston (1926, 1930) noted a similar distribution, with none seen in the upper Suru Valley but, as Denby and Phillips (1977) mention, this appears to be a species whose numbers have suffered over the last fifty years probably due to clearance of suitable habitat. We found the optimal habitat to be high Hippophae scrub, usually wet and with small willow trees. Scrub less than about one metre high did not seem to provide sufficient cover for the species.

Upper Indus :

Quite numerous at Tikse in the type of habitat described above throughout our stay, Bluethroats were seen daily and trapped on most days. (See ringing report for details). The Tikse birds were probably local breeders and their offspring, but could well have included migrants on their way south. No Bluethroats were seen away from the Tikse forestry plantation.

Black Redstart (Phoenicurus ochruros)

Suru : This was the one species that we found virtually everywhere we went. We can only agree with Denby and Phillips (1977) that "the ubiquity of this bird.....is quite remarkable." Black Redstarts seemed equally at home in the vicinity of the Safi La at nearly 5,200 m. and around the buildings of Kargil and Leh. Population densities obviously varied over the wide range of habitats occupied, the highest being around villages, cultivation and adjacent rocky slopes, where both nest sites and insect food are abundant. (In Ladakh the species usually nests in crevices under or among rocks or in walls (Osmaston 1925).) In the mountains Black Redstarts were relatively sparse on the most arid slopes but we never found any extensive areas without a few pairs.

At Rungdum the species was uncommon among the dwarf Salix and grass near the river but abundant enough by the road along the edge of the valley and around Zuildo. We noticed that they were rather scattered in riverine scrub elsewhere in the Suru Valley and especially so in the Tikse forestry plantation. Food is abundant in this type of habitat but for crevice and hole nesters suitable nesting sites are rare. One habitat we never saw any Black Redstarts in was the stony plain stretching out around Rungdum Gompa - presumably insects were just too few and far between to support a breeding pair.

Upper Indus :

As already mentioned Black Redstarts were not common in the forestry plantation at Tikse and this is reflected in our catching total of only ten birds. The species was found in the surrounding fields and around Tikse and neighbouring villages but was not as numerous as in the Suru Valley and our day totals very rarely exceeded ten, even on days when we walked from Tikse to Choglamsur Bridge. This relative scarcity compared to both the Suru Valley and places like Leh, Stok and Rumbak covered by Denby and Phillips in 1976 is probably partly due to the Redstarts' breeding season being largely over by the time we arrived at Tikse, the birds being less conspicuous and some perhaps having already moved out. But habitat differences must also play a part, the cultivation around Tikse is flat and rather tidy with larger fields, fewer walls and much of the agricultural land separated from the nearest mountain slopes, where nest sites would be more abundant, by a desert zone. In the forestry plantation itself Black Redstarts kept mainly to the open area round our hut. Numbers seen here increased from singles on most days in August to a maximum of at least five in the second half of September. Whether these birds had just moved out of adjacent nesting areas or were from further afield is impossible to say. The species was still being seen daily up to mid-October when we left, our maximum day total for the month being 4 - 5 around our hut on the 7th.

Males of the subspecies P.o.phoenicuroides which breeds in Ladakh differ from European birds in having a handsome plumage of chestnut belly and axillaries and a pale fore-crown. All the adult males we saw were of this subspecies. Black Redstarts were caught on the following dates : 15/8, 29/8, 9/9, 11/9, 16/9 (2), 20/9, 22/9, 1/10 and 2/10. All were adult females or first year birds. Ali and Ripley (1968-74) give the upper limits for the wing lengths of male and female P.o.phoenicuroides as 89 and 81 mm respectively and state that the majority of males have wings less than 85 mm long so we were surprised to find that four of our birds had wing lengths of 85 mm or over. Two, the birds caught on 22 September and 2 October, had wings of 89 mm, right at the top end of this subspecies' range. In fact all but two of the birds we caught had wing-lengths within the range of the longer winged Eastern Black Redstart (P.o.rufiventris) but judging from this subspecies' breeding range it would be unlikely to occur in Ladakh on passage - it nests from Garhwal eastwards along the Himalayas.

Guldenstadt's Redstart (Phoenicurus erythrogaster)

Upper Indus :

Single males were seen at Tikse on 20-22 September, and numbers at the ringing site built up to a maximum of about sixty the day before we left (11 October). Most birds were seen in October, but a minor peak was reached in late September with an estimated eleven males and three females present at the site on 27th, and twelve males and three females on 29th. On this date there were also an estimated fifteen on a scrub covered island 1 km east of Choglamsur. Altogether eighty-three birds were trapped, all except six in October. These birds were clearly all migrants. Details of the catch are given in the ringing section.

Guldenstadt's Redstarts bred in Ladakh in Osmaston's day, but he wrote (1925) that they were uncommon, being found between 13,00 and 16,000 feet. The three nests he found were all in the east, further east even than Tikse. Vaurie lists twenty-seven records from Ladakh, seventeen of these in the periods April/May and September/October. The six summer records are of birds taken in July and August, four around the Saser Pass and singles at Muglib and an unspecified location. This attractive species is clearly most conspicuous in Ladakh on migration, when at times we found the riverine scrub alive with them. Of all our records of Guldenstadt's Redstarts flying over, into or out of the plantation at Tikse (a total of about seventy birds) only two were flying in a southeasterly direction, all the rest heading northwest or north northwest, usually into the prevailing wind.

Little Forktail (Enicurus scouleri)

Suru : A pair of these neat little water birds were one of our most unexpected finds in the Suru Valley. We saw them at about 3,400 m. in the gorge we followed up to the Umba La from near Sanko on 23 July. They were in ideal habitat, feeding around a torrential boulder strewn stream flanked by grassy banks with occasional rose bushes.

The species has not been recorded in Ladakh before and is rare in the Vale of Kashmir but it is known to breed up to 3,300 m. and occasionally to 3,700 m. Presumably there is a controversial previous record for Tibet as Vaurie (1972) includes E.scouleri in a "hypothetical list" at the end of his book. Given our position only 25 kms or so from the peaks of the Main Himalayan Range in an area of atypically high rainfall for Ladakh, and given the suitable habitat available, the appearance of the species near Sanko made good ecological sense.

The only other species recorded in Ladakh which could possible be mistaken for a Little Forktail is the White Wagtail (Motacilla alba) but these two are easily distinguished by the Forktail's dumpier form, shorter tail, pale legs and different plumage pattern. The white rump together with the greater amount of white in the tail make the Little Forktail look more white and less black in flight and at rest the head-pattern - black except for a white patch from the top of the crown straight down to the eye and forward to the bill - is distinctive. All other possible forktail species are larger with longer, more cleft tails and differently pied plumage.

Stonechat (Saxicola torquata) (Collared Bush Chat)

Suru : The only Stonechats we found in the valley were a pair near Sanko which appeared to be holding a territory in an area of lush pasture with Hippophae bushes near the road a couple of kilometres north of the village centre. If we had realised at the time that this is the first mid-summer record for Ladakh we would not have treated this pair so casually. As it was we took little notice of them and sought no confirmation of breeding, becoming engrossed in the family of Pleschanka's Wheatears nearby.

Osmaston never saw Stonechats in Ladakh, though he mentions them as common and breeding up to 2,460 m. in Kashmir (Osmaston 1927). In fact the only records either we or Vaurie (1972) have found for Ladakh are Meinertzhagen's (1927) of four birds at Leh in early May - which he assumed to be migrants as none were present when he returned in July - and Koelz's (1940) three taken in Zanskar in late September. Koelz (1937) also took three Stonechats in nearby Spiti during September. Matthews (1941) does not record them from Baltistan There would thus appear to be more evidence for Stonechats being migrants in the northwest Himalayas north of the main range rather than a breeding species here, especially as Koelz's and Meinertzhagen's

collected specimens were identified as S.t.maura and S.t.przevalskii not S.t.indica the subspecies breeding along the Himalayas through Gilgit and Kashmir. Our pair, if they were breeding, were unusually high and far north for the species in India.

Upper Indus :

A single female/juvenile was present in the open area round our hut from 21 to 24 September. Our only other sighting was of a Stonechat which we think due to its slightly darker head was a different individual, in open scrub near the Indus at Tikse on 2 October. All these birds were, as expected, of the pale eastern subspecies-group but exactly which subspecies we do not know.

Isabelline Wheatear (Oenanthe isabellina) (Isabelline Chat)

Upper Indus :

This distinctive Wheatear, though previously unrecorded in Ladakh, turned up quite frequently on the short grassland by the Indus near Choglamsur Bridge. The dates of our records are : 20, 24, 26, August, 7 (2), 14, 18, 22 (3), 26 (3+ probably 4), 29 (2) September, and 3 October. (Sightings are of single birds where no numbers are mentioned).

The only Wheatears which could be confused with O.isabellina are females of O.deserti or O.oenanthe. The latter is previously unrecorded in Ladakh and less likely than Isabelline given that Pakistan and northwest India are on the extreme eastern edge of its migration route. In late September we had female Desert Wheatears to compare with the Isabelline's. Given the right view Desert is easily told from all other Wheatears by its distinctive tail pattern. O.isabellina is in any case noticeably larger, paler and sandier than other female Wheatears, particularly on the wings and ear coverts. The ear coverts were as pale as the breast on most birds, occasionally slightly darker. (Such slight variations in head pattern convinced us we were not seeing the same one or two birds over and over again). The rather large bill, long legs, short tail and upright stance gave the birds an unmistakeable "jizz". On some days, with their plumage sleeked down to give them a slim, elegant outline and their habitual running they reminded us of Wagtails but on others their fluffed out feathers made them appear almost spherical.

The nearest previous records for the Tibetan region given by Vaurie (1972) are far to the north and east but Ward (1906) states that the species has been found in Baltistan. In northern India and Pakistan, including Gilgit, the species is known fairly commonly as a winter visitor and passage migrant and has been found up to 3,000 m. in Afghanistan. Given that it breeds extensively to the north in the U.S.S.R. east to Lake Baikal and beyond its appearance on passage in Ladakh is not surprising. As with several other species we saw the lack of previous records probably just reflects poor coverage, particularly during the autumn passage period.

Desert Wheatear (Oenanthe deserti) (Desert Chat)

Upper Indus :

This was one of the few species which we found out in the desert between the road to Leh and the mountains just to the north. As we rarely covered this and other desert areas it may have been frequently overlooked. Our records are :

25.9 : 9+ (including at least 2 adult m., 2 first winter m. and 5 f.) desert between Stakmo and Tikse.
26.9 : 1 (adult m.) grassland near Chog. Bridge.
29.9 : 4 (1 first winter m., 3 f.) stony wasteland by roadside between Chog. Bridge and She.
3.10 : 1 roadside between Chog. Bridge and She.
5.10 : 1 (f.) desert between Stakmo and Tikse.
13.10 : 1 desert near Nimu.

Desert Wheatears are summer visitors to Ladakh and have been found breeding in some of the highest and most barren terrain in the region. Unlike O.pleschanka and O.picata which are commonest in Baltistan and western Ladakh, O.deserti is as common in Rupshu as anywhere else in the region (Meinertzhagen 1927, Osmaston 1925, Vaurie 1972) and also breeds in Tibet proper. From the dates of our records they were probably of migrants on their way out, though considering our poor coverage of the desert north of the fields they could have been breeding only a few kilometres away.

Eastern Pied Wheatear (Oenanthe picata) (Pied Chat, Pied Wheatear)

Suru : This species, though common in Baltistan (Meinertzhagen 1927, Matthews 1941) is on the edge of its range in Ladakh and is rare here. Though specimens have been collected as far east as Khalsi we know of no good evidence of breeding in Ladakh and felt we were off to a good start when we found a female feeding a juvenile on steep scree only 100 m. or so above Kargil the day after our arrival. The female and a second adult we saw briefly nearby were of the white-bellied "picata" phase. Hume's Wheatear (O.alboniger) is similarly patterned to this phase and Osmaston (1930) recorded it from the Wanla Nullah, a tributary of the Suru. Fortunately this species is unusual in having the female as glossy black and white as the male so that the dark slaty grey-brown wheatear we saw feeding young above Kargil must have been a female O.picata. Although Osmaston does not record O.picata from the Suru Valley, Meinertzhagen (1927) found a few just east of Kargil in mid-April.

Pleschanka's Wheatear (Oenanthe pleschanka) (Pleschanka's Chat or in some European books Pied Wheatear)

Suru : We found a family party of this species consisting of adult male, female and two juveniles as well as at least one extra female near the road about two kilometres north of the centre of Sanko. They were seen around the boundary between a meadow with nearby Hippophae bushes and a few small willows and the barren sand and scree slope above, where they had presumably nested.

The species might be confused with the white-crowned morph of O.picata but the male is fairly easily distinguished by the change from black to white on the bird's front being higher and black extending to about half way up the outer tail feathers (a field-mark shared by all plumages). The male we saw had brown on the wings which Alexander (1951) gives as a diagnostic feature but which Witherby (1938) states is only characteristic of first summer males. For anyone using Heinzel, Fitter and Parslow (1974) it is worth mentioning that the illustration of a female O.pleschanka in that book is very different from those we saw, which were much darker, with brown upperparts, a paler, greyer cap and brown throat. We think this apparent inaccuracy is simply due to females starting off pale after the autumn moult and becoming darker as the pale tips wear off their feathers as described in Witherby (1938). The juveniles, though a lot paler than the O.picata juvenile we had seen earlier, were also rather dark. They had very dark brown flight feathers, uniform dull brown back, head, throat and breast and a white belly.

Like the Eastern Pied Wheatear (O.picata) Pleschanka's Wheatear is common in Baltistan (Matthews 1941, Meinertzhagen 1927) and is not at all common in central and eastern Ladakh, though it does not seem to be as rare in western Ladakh and unlike O.picata has been recorded breeding in Rupshu (Ludlow 1920). Osmaston (1930) recorded Pleschanka's Wheatear breeding in areas we did not cover a little northeast of Kargil and also found a fledgling near Sanko on the same visit.

White-Capped Redstart (Chaimarrornis leucocephalus)

Suru : This handsome Redstart is another of those species which are really much more Himalayan than Tibetan in distribution and are thus a lot more common in western Ladakh, near the Main Himalayan Range, than in the east of the region. In the Suru Valley we saw them on most of the days we covered the appropriate habitat - fast flowing rocky streams. Places where we saw the species in July are :

i) 1, stream a little above Nanshor.
ii) 6+, (including adults carrying food and 2 juvs.) Challong Nullah in the first four or five kms. above Panikar.
iii) 8+, up stream from near Sanko leading up towards the Umba La; the species being found up to c.4,200 m.
iv) 4 - 5, gorge from near Trazpone to just below Safi (2,900 - 3,900 m.)
v) 3, the main Suru River near Sanko, a rather atypical habitat for this time of year.

When we returned to Kargil on 14 October there were at least four along the Wukka Chu just above its junction with the Suru.

Osmaston's (1926, 1930) records from the Suru Valley are surprisingly sparse and are restricted to the Parkachik to Panikar stretch. However, with his conversational diary-style one is sometimes unsure whether he is mentioning all his records of the more familiar species.

Upper Indus :

Our only record away from the Suru Valley was of a single White-capped Redstart by a roadside stream near Saspul on 13 October. Denby and Phillips (1977) had records from near Stok, Himis and Rumbak but during our brief visit to the Stok gorge in late August we saw none and like a number of other species White-capped Redstarts appeared to have already left this area after breeding. However with such superficial coverage one cannot be sure.

Blue Rock Thrush (Monticola solitarius)

Suru : This species was common enough in suitable habitat - boulder strewn areas and scree usually with scattered, low vegetation. We saw the species on twelve days and had day totals of five to ten on five of these. Though we did see at least two high in the mountains near the Safi La the birds are much more typical of rocky areas near the valley bottoms often just beyond irrigated farmland as Denby and Phillips found in their 1976 study area.

Upper Indus :

The only Blue Rock Thrushes we saw were a single bird at the edge of cultivation near She on 18 August and another half-way up the Stok gorge on 29 August. Our lack of records may be due to most Rock Thrushes having migrated out early but is more likely to be due to our not covering suitable habitat, as we concentrated on the flat land along the Indus and our brief visit to Stok was our only look at suitable rocky areas.

Whistling Thrush (Myiophonus caeruleus) (Blue Whistling Thrush)

Suru : Whistling Thrushes are largely restricted in Ladakh to the Dras and Suru River systems. Both Koelz (1940) and Osmaston (1926) found the species near Parkachik and though we did not cover this area the species was locally distributed along rocky tributary rivers and streams elsewhere. Whistling Thrushes were not found along streams running through the more arid mountain areas and seem to need some nearby bushes or trees.. We found them in the following places in July :

i) 3, gorge we followed from near Sanko towards the Umba La (c.3,200 - 4,100 m.)
ii) 2, Umba River a few kms above Sanko (c.3,200 m.)
iii) 1, up side valley a few kms from Kargil (c.2,800 m.)
iv) 3+ (including a pair whose anxious behaviour suggested they had young close by) tributary of the Wukka Chu between Fokarphoo and Shargol (c.3,400 m.)

In October we saw one on the Wukka Chu thirty kms from Kargil on the 13th and the following day two more on the same river at its junction with the Suru near Kargil.

The Himalayan subspecies M.c.temminckii can be distinguished in the field by the pale tips to the wing coverts.

Black-Throated Thrush (Turdus ruficollis)

Upper Indus :

The first we saw, a male still in summer plumage and a juvenile/female, arrived at Tikse on 6 September, an early date for the species in India. Weekly bird-day totals (Table I) show the steady increase in sightings subsequently, the birds being recorded every day or two until we left, though large flocks were never seen. In fact we had day totals of more than four on only two days - 7+ on 8 September and 14+ (probably over 20) on the following day. All were seen near or in the forestry plantation at Tikse where they tended to keep to areas of tall trees and Hippophae scrub along the northern edge. Like a number of other autumn arrivals they seemed to be using Hippophae berries as a major food source. Two were ringed, a first winter female on 2 October and an adult male in winter plumage on 9 October. All the birds seen well were T.r.atrogularis.

Suru : Nine Black-throated Thrushes were in the riverside plantation near Baru which we covered on 14 October. Another three were in poplars just across the river from Kargil later the same day.

These Thrushes are common winter visitors along the Himalayas and in the adjacent lowlands. Ali and Ripley (1968-74) show the Indus Valley around Leh as being on the edge of their wintering area but we suspect that most of those we saw were passing through Ladakh, or at least would leave the region when the heavy winter snowfalls arrived. Vaurie (1972) lists only one specimen from Ladakh, a Red-throated Thrush (T.r.ruficollis) taken in Rupshu, but this is patently just another example of the under-recording of passage migrants and winter visitors in the region.

Brown Dipper (Cinclus pallasii)

Suru : Our records are as follows :

23.7 : 6 (4 ad., 2 juv.) by the stream we followed from near Sanko towards the Umba La (seen between c.3,400 and 4,100 m.).

28.7 : 4+ by the stream we followed from Trazpone to Safi (seen between c.3,100 and 3,700 m.)

13.10: 1 by Wukka Chu c.20 kms from Kargil.

14.10: 3 Wukka Chu 1-2 kms from Kargil.

Our July sightings are rather high for this species, which generally prefers larger streams at lower altitudes and is usually replaced by the White-breasted Dipper (Cinclus cinclus) high in the mountains, though in Nepal it has been found at nearly 5,000 m. Unlike C.cinclus, C.pallasii is confined to the western parts of Ladakh. Several previous records exist for the Kargil area and the Dras Valley but records from central Ladakh are sparse.

Osmaston (1927) states that the species breeds very early in Kashmir, from February to May, but the two juveniles we saw on 23 July looked as if they had only recently left the nest, so there is probably a second brood.

Surprisingly we did not see a single White-breasted Dipper in Ladakh.

Robin Accentor (Prunella rubeculoides)

Suru : The Robin Accentor is one of the commonest species at Rungdum and we found them wherever there was dwarf Salix scrub, even when this was only thirty cms. or so high. Our day totals varied between 10 and 20+. Elsewhere in the valley we only saw two, the first in high pasture near the Umba La at c.4,200 m. and the second at the edge of cultivation above Fokarphoo at c.4,000 m. The species' status appears to be the same as in Osmaston's day.

Upper Indus :

Robin Accentors were seen up the Stok gorge in late August including nine around one group of stone huts at c.4,500 m. This party appeared to consist of two family groups and included both recently fledged and well grown juveniles. Juveniles of the species have a plumage quite different from the adults' and uncannily like a pipit's. As we also saw young being fed at Rungdum in mid-July the Stok fledglings were probably a second brood.

The species started arriving in the main Indus Valley in late September with the first four seen flying over south on the 26th. Three were seen on the 29th and in October they were noted on or near the netting area every day, usually in Hippophae scrub. Singles were also recorded in Tikse four times and in the Leh "suburbs" once. Our highest day total was 8+. A single bird was ringed on 9 October.

Brown Accentor (Prunella fulvescens)

Upper Indus :

Brown Accentors arrived at Tikse soon after the first Robin Accentor. A single bird was recorded on 3 October and after 5 October they were seen daily. Estimates of numbers in the forestry plantation varied from day to day between three and ten except for one day, 7 October, when loose parties totalling at least twenty were present. However all these estimates were probably too low as the birds were usually shy and kept to the thickest areas of Hippophae. Often their presence was only given away by their distinctive trilling call-note, rather similar to a Robin Accentor's. The only one seen outside the forestry plantation was out in the desert between Tikse and Stakmo on 5 October. Eight were ringed, four on 7 October and singles on 6, 8, 9 and 10 October. Measurements and plumage of these birds fit the expected nominate subspecies which breeds sparingly in Ladakh and in neighbouring regions west to Afghanistan and north to the Tien Shans.

In October Brown Accentors were commoner than Robin Accentors on the netting-site, despite being much rarer in Ladakh as a breeding species - Osmaston (1927) estimated the ratio as fifty Robin Accentors to one Brown. This strongly suggests that at least some of the Brown Accentors we were recording at Tikse were from outside Ladakh, rather than local altitudinal migrants.

Black-Throated Accentor (Prunella atrogularis)

Upper Indus :
A single Black-throated Accentor was caught at Tikse on 9 October. On the following day one was seen near the nets and a second was caught that evening.

Suru : At least one was present in the plantation between Kargil and Baru which we covered on 14 October.

The two birds caught at Tikse were in winter plumage - i.e. the black throat feathers were narrowly fringed white. Other distinguishing characters from Brown and other Accentors were the prominent peach coloured (not white) supercilia above the dark "mask", streaks on the flanks and more boldly marked upperparts. The two ringed were the expected Turkestan race P.a.huttoni. The species is previously unrecorded in Ladakh though a local winter visitor to Pakistan and northwest India, usually below 1,800 m. The only Tibetan specimens Vaurie (1972) records are one from Baltistan in January and another from the northern Chang Tang where, according to Kozlov, the species breeds.

Grey Tit (Parus major)

Suru : The Kashmir Grey Tit (P.major cashmiriensis)a more subtle version of the European Great Tit occurs commonly among willows and poplars. Although quite frequently seen we never found the species very abundant, our highest day total for July being 5+ around Sanko and most day totals being between one and three. Grey Tits were absent from the valley above Parkachik due to the lack of trees. On our return to Kargil in mid-October they seemed a lot more abundant than in mid-summer and we saw about twenty on the morning of the 14th.

Upper Indus :
Although common enough around Leh, Grey Tits came into the forestry plantation at Tikse relatively infrequently and when they did usually stayed near the taller trees by the monastery garden. We ringed eight, three juveniles on 25 August, single juveniles on 11 and 14 September and three adults (two males and a female) on 10 October.

Fire-Capped Tit (Cephalopyrus flammiceps)

Two were watched feeding high in tall poplars on the edge of Kargil on 31 July. The birds were difficult to identify because they gave a distinct impression of being warblers - small birds with olive green upperparts, whitish underparts with yellow on the breast, a double wingbar and very indistinct head pattern, feeding actively in the tops of trees and disappearing for long periods. The short cleft tail was the most tit-like character. We only identified them from our field notes after a careful look through Fleming et al (1976) and Ali and Ripley (1968-74) when back in England, the species being distinguished from all possible leaf-warblers by the combination of double wing bars and nearly no head pattern.

Records from Ladakh are scarce. Koelz (1940) reported a flock at the mouth of the Kangi Nulla in the Suru Valley in September 1931. He also found them in nearby Spiti and Lahul (Koelz 1937, 1939) again in September and considered that the species' regular migration route ran through these three districts.

Wall Creeper (Tichodroma muraria)

Suru : We had three records of single Wall Creepers, two of these on roadside cliffs and boulders a few kilometres from Parkachik at about 3,700 m. The third was collecting insects on steep scree on a mountainside a few kilometres northeast of Rungdum Gompa at about 4,300 m.

Upper Indus :

One was seen by the road near Nimu (c.3,400 m.) on our way back to Kargil on 13 October.

Previous records show the species to be generally distributed through Ladakh in suitable habitat though nowhere common.

Eurasian Tree Pipit (Anthus trivialis)

Suru : A single bird was seen between Zuildo and Shama Kurpo on the edge of the Rungdum swamp on 19 July. We cannot find many records outside migration times. Osmaston (1930) shot two just over the Zoji La on 23 May 1928, and found they were "common" on the Deosai Plains. Vaurie (1972) lists twenty Ladakh records, all but five in September. Interestingly one of the midsummer records is from the "Zaskar Valley near Ringdom Gompa".

Upper Indus :

Birds were migrating through the area from 28 August until we left on 11 October. At Tikse in the first week of September about half a dozen birds a day flew over calling. On 6 September, two birds were seen at rest at Tikse, and on 7 September birds were seen and heard almost continually. Small numbers were seen and heard daily until 13 September, when we estimated that there were fifteen

to twenty birds at the ringing site, and one trapped. Another was caught the next day, when we logged a similar number of birds as on the 13th. This mid-month peak culminated on 15 September with a flock of twenty in stubble north of the ringing site, and good numbers at the site itself. Between five and fifteen were seen on most days until the end of September, with rather fewer in October, daily totals for that month being between two and eight, with one trapped on the 3rd.

The race of the birds trapped was not ascertained certainly. The main difference between A.t.trivialis (European Tree Pipit) and A.t.haringtoni (Witherby's Tree Pipit) is wing formula, and all three of our birds had the fourth primary between two and three millimetres shorter than the third, which is within the range for A.t.trivialis given by both Witherby (1938) and Svensson (1975). All birds were also emarginated on the fourth primary. These and other measurements are nearer A.t.haringtoni than A.t.trivialis, but not extreme enough for us to be certain. "Numerous specimens" obtained by Koelz (1937) in Spiti in 1933 "all seemed to be of this race" (haringtoni), and Meinertzhagen (1927) noted "large flocks" of Witherby's Tree Pipits (i.e. A.t.haringtoni) between 2,800 and 3,400 metres in Gilgit in the first week of September 1926.

Rose-breasted Pipit (Anthus roseatus) (Hodgson's Pipit, Vinaceous-breasted Pipit)

Suru : On 18 July, four or five were watched between Zuildo and the Gompa in damp long grass near the edge of the desert zone. Very good views were obtained of a bird collecting food and acting anxiously as if near a nest. The next day seven were seen, four with a Tree Pipit near Zuildo and three a few kms further west near Shama Kurpo. This species has been reported by Osmaston (1930) and Meinertzhagen (1927) as one of the common birds of the Deosai Plains in Baltistan, and Osmaston (1926) found birds breeding at Donaza, off the Suru Valley, on 24 July. Vaurie (1972) lists three specimens from Ladakh.

Upper Indus :

An adult in the final stages of moulting into winter plumage was trapped at Tikse on 8 October, and one, almost certainly the same bird, was seen and heard on 9 and 10 October. The possibility of the bird being a Red-throated Pipit (A.cervinus) or Olive-backed Pipit (A.hodgsoni) was immediately eliminated on plumage characteristics, and Eurasian Tree Pipit (A.trivialis) on wing formula and hind claw length. However, the bird bore an uncanny resemblance even in wing formula to a Meadow Pipit, and its calls in the field were virtually identical to British Meadow Pipits. We have been unable to find a good in-depth comparison between winter plumage Rose-breasted and Meadow Pipits in the literature and it was only when we consulted the British Museum skin collection on our return from India that we realised our initial error in identifying the bird as an atypical Meadow Pipit - which would have been quite a

find so far to the east. Though the Rose-breasted Pipit's pink throat and breast make it a distinctive species in summer plumage, after the autumn moult its underparts closely resemble those of Meadow and Tree Pipits. A faint pink tinge was discernible on the underparts of some of the winter plumage A.roseatus skins we examined but was absent from many. Subtle differences in the streaking of the underparts, tone of the upperparts and colour of the bill can be picked out when a number of skins of each species are seen side by side but these characters are too variable to base a decision on, though they may be useful as supporting evidence.

Most Rose-breasted Pipits are larger than most Meadow Pipits, but our bird was a female, having a wing length of 83 mm, within the range of overlap with Meadow Pipit. The hind claw length - 9½ mm - is right at the bottom of the range given in Ali and Ripley for Meadow Pipit and smaller than that given by Svensson (1975). Twenty Rose-breasted Pipits at the British Museum had hind claws ranging in length from 8.5 to 11.6 mm, with a mean length of 9.9 mm, making our bird typical in this respect. Our bird was also rather stout-billed for a Meadow Pipit, having a bill depth of 4 mm and width of 4½ mm. The former measurement is 0.2 mm too large for Meadow Pipit, the latter 0.3 mm too large, according to Svensson.

Citrine Wagtail (Motacilla citreola) (Yellow-headed Wagtail)

Suru : One of the more regularly sighted species frequenting both agricultural areas and wilder grassy places such as Rungdum that were not too rugged. Typically between five and fifteen were seen on each day, but more than this were found on marshy grassland at Rungdum. Osmaston (1926) also noted how common this species was around Rungdum.

Upper Indus :

The species definitely bred at the ringing site at Tikse, and numbers of birds seen in August were in keeping with the presence on the site of a few pairs and their young. An interesting sighting was of a juvenile bird near the summer settlement at the top of the Stok Gorge (4,500 metres) at the end of August.

In September numbers built up, and birds were undoubtedly moving through the area, with 40+ at Choglamsur Bridge on 14 September being the largest number seen together. Before this, flocks of about thirty birds were seen together on the grazing marsh near She Gompa on 3, 7 and 11 September and on 13 September a flock of twenty to thirty flew southeast over Tikse at dusk with eighty alba Wagtails. By 20 September numbers had diminished, and between two and six were recorded daily at the ringing site until the end of the month, with ten seen at Choglamsur on 22 and fifteen on 29 September.

In October only one or two were seen on most days, with none on the 4th or 5th. The presence of races of the Yellow Wagtail (M.flava), in some of the flocks was to be expected, and it is possible that a few birds of this species could have been overlooked.

Grey Wagtail (Motacilla caspica) (M.cinerea)

Suru : Seen on four days in the Suru Valley and side valleys as follows :

12.7 1 male at Panikar bridge.
22.7 4 or 5 with White-capped Redstarts in a willow grove with fast flowing streams, west of the Suru 5 kms north of Sanko.
27.7 4, in river valley a few kms northwest of Kargil.
30.7 1, 1 km below Fokarphoo in valley east of Safi La leading down to Shargol.
14.10 1, possibly 2, heard in riverside plantation across the Suru from Kargil.

Osmaston (1930) only found one pair, in the lower Suru Valley, and noted that the species was nowhere very numerous in Ladakh.

Upper Indus :

Several were seen in Leh in the first week of August, and singles were seen there during one day visits on 17 September and 7 October. Singles flew over the ringing site at Tikse on 6 and 27 September. Most early writers refer to birds in Leh, but records from elsewhere are irregular, and Vaurie (1972) noted only seven Ladakh specimens. As Denby and Phillips noted in 1976 Grey Wagtails are absent from rocky streams at high altitudes where someone used to the species in Europe would expect to find them, and seem restricted to larger streams and rivers near the valley floors.

White Wagtail (Motacilla alba)

Suru : Slightly commoner than Citrine Wagtails in the middle and lower sections of the Suru Valley between Kargil and Panikar, with typically between ten and twenty recorded each day. In the upper Suru Valley, around the Rungdum marshes, the species was rather uncommon, with only one or two seen on each day we were there (14 -21 July). On 28 July six birds were seen at the top of the gorge leading to Safi at an altitude of 4,000 metres. No birds were identified of any race other than M.a.alboides (Hodgson's Pied Wagtail).

Hodgson's Pied Wagtail, though common enough around villages and in the fields is seen along stony river and stream sides more often than the Citrine Wagtail which is more a bird of open cereal fields and rough grass. Both species, but particularly the Citrine Wagtail, are a lot more abundant in the main Suru Valley than along tributary streams running into the mountains.

Upper Indus :

Good numbers were seen on most days and there was marked passage. Numbers built up steadily through August, with twenty seen between Choglamsur and She on 18 August. In September over twenty were seen on many days, and on 13th a flock of about eighty birds, together with twenty - thirty Citrine Wagtails, flew southeast over the Tikse ringing site at dusk. On the next day fifty were seen at Choglamsur, and numerous parties flew east to southeast the ringing site at dusk. After this, numbers tailed off, with fifteen seen at Choglamsur on 18 September, twenty on 22nd, thirty on 26th, twenty on 29th, and up to fifteen seen at Tikse. In October, twenty at Choglamsur on 3rd and a dozen or so at Tikse on 11th were the highest day totals.

Adult birds with the grey backs of winter plumage started to be seen on 20 August. By the second week of September the majority were in this plumage. In these birds the back colour varied from very dark slate grey to pale ashy grey like M.a.alba. It is quite likely that races other than M.a.alboides were present though on examining skins of the possible migrant races in the British Museum on our return to England, it became obvious that identification of the subspecies in winter plumage on back colour is impossible, they are much too variable. Though M.a.alboides in winter plumage is generally darker on the back than the most likely other race, the Masked Wagtail (M.a.personata), we found some skins of winter Hodgson's Pied Wagtail as pale as typical Masked Wagtails and the shade of the palest-backed alba wagtails we saw in Ladakh.

House Sparrow (Passer domesticus)

Suru & Upper Indus :

This was quite the commonest species of settlements and cultivated areas, even at high altitudes. Sparrows were never seen away from settled areas, and were scarce in the Upper Suru Valley around Rungdum presumably due to the poverty of the agriculture there with only a few seen around the houses at Zuildo, two near Tazi Tonazas and none anywhere else. During the harvest in the Upper Indus Valley large flocks numbering hundreds of birds spent their days in the cereal fields.

Adam's Snowfinch (Montifringilla adamsi) (Tibet Snowfinch)

Suru : Found only in the upper reaches of the Suru Valley around Rungdum, where small numbers (up to fifteen) were seen on each day of our stay. Rough grazing without scrub, and boulder-strewn slopes were the preferred habitats. On 29 July, ten birds were seen below the Safi La with Plain-coloured Mountain Finches at about 4,600 metres.

Upper Indus :

A few were seen around the summer settlements above Stok between 27 and 29 August. In the desert zone between Tikse and Stakmo, two birds probably of this species were seen far off, and their calls heard on 25 September, and there was a similar sighting of

three birds with two additional ones heard on 5 October in the same locality.

We would no doubt have seen more of this species had we spent more time at higher altitudes. Vaurie (1972) lists over sixty specimens collected from Ladakh, and Osmaston (1925) wrote that the species was "fairly common throughout Ladakh from about 12,500 feet to the snowline". This was still the case in 1976 (Denby & Phillips 1977).

Goldfinch (Carduelis carduelis)

Suru : Small numbers were seen between Kargil and Panikar on eleven dates. At Kargil four were seen on 7 July, five on 27 July and six on 14 October. During our stay at Panikar (9-12 July) pairs were seen by the Challong Nullah twice, once a kilometre or two beyond cultivation. The most seen in a day was six, between Panikar and Kochak on 9 July. At Sanko six were seen on the northern outskirts of the village on 22 July, and fewer than this were recorded on 24th and 25th. An interesting sighting was of two birds in dwarf willows in the gorge between Trazpone and Safi on 28 July at an altitude of about 3,100 metres several kilometres from the nearest cultivation. We found no Goldfinches in the Upper Indus area.

This fits Osmaston's (1925, 1927) observations that the species only nests west of Maulbekh, mainly in the Dras and Suru Valleys.

Gold-fronted Finch (Serinus pusillus) (Red-fronted Serin, Gold-fronted Serin)

Suru : Found locally in rather small numbers in most cultivated areas and in a few wilder places. In the Panikar area, birds were seen from 8-11 July with a small flock of up to six birds being seen daily in willows by the Challong Nullah on the edge of the village. On 9 July, seven flew low over willows east of Kochak, 4 kms upstream of Panikar, and five were seen between the two villages on 11 July. Around Rungdum the species was scarce, with two seen at the Gompa and two east of Zuildo on 16 July, and singles flying high over Shama Kurpo on 19th, and Zuildo on 20 July. At least twelve were present in a side valley north of Sanko on 22 July, and five were seen in Sanko itself on 25th. On 23 July, on a walk over the Umba La, we found at least five birds at 4,200 metres. In Safi at 4,000 m. on 29 July we noted 6+ Gold-fronted Finches, and the next day, over the Safi La, similar numbers were found near Fokarphoo and on the Wukka Chu.

Upper Indus :

Three were found about 2 kms up the Stok gorge on 27 August, with one bird higher up still, and on 29 August one was seen about halfway up the gorge. Apart from this the only records are of single

birds flying over the ringing site at Tikse on 2 September and 8 October.

A perusal of the relevant literature suggests that the species is less common in Ladakh than it used to be. Mrs M.L.Wathen (1923) describes Gold-fronted Serin as "one of the commonest birds between the Zoji La and Leh in July and August", and Osmaston (1927) describes them as "very common in west Ladakh (The Dras and Suru Valleys)". Osmaston also noted (1925) that the species was found between 2,900 and 5,200 metres throughout Ladakh, but in 1926 wrote "The Gold-fronted Finch is curiously local in these hills. They breed chiefly at an elevation of about 11,000 feet, and where they breed a good many nests may generally be found, but many apparently suitable places will be found unoccupied." We certainly found them local and on the face of it rather inconsistent in their choice of habitat, this ranging from the high arid 'alpine pasture' zone to willow and poplar groves in the bottoms of the main valleys. Cultivation with plenty of willows, poplars and patches of scrub and especially the boundary area between this irrigated land and dry, uncultivated, rough ground seem the most favoured habitats.

Plain-coloured Mountain Finch (Leucosticte nemoricola) (Hodgson's Rosy Finch, Stolickza's Mountain Finch)

Suru : Seen on most days in the Suru Valley normally in uncultivated areas away from settlements. The species was first identified up the Challong Nullah above Panikar on 11 July, where altogether sixteen birds were seen by the river and on the ridge above. These sightings confirmed our suspicion that three birds seen in a delta area just above Nanshor the previous day were of this species. Similar numbers were seen up the Challong Nullah on 12 July, and on the 13th at least five birds were seen on a small cliff above Parkachik, en route for Rungdum. Around Rungdum in the period 14-22 July the species was seen daily, with the highest day total being twenty on 20 July. Birds were found in small flocks by the roadsides, around the Gompa, and even in the settlement of Zuildo itself. Lower in the Suru Valley a single bird was found on 22 July up a side valley 6 km north of Sanko in an area with a lot of willows and poplars (c.3,100 m.). This was the only time we saw these finches near trees. In the gorge leading to the Umba La from the east, on 23 July this was the commonest species encountered to a height of 4,300 metres, at which altitude we stopped seeing them. On 27 July five were seen up the small valley west of Kargil (c.2,800 m). and on 28th, over twenty birds were seen in the gorge between Trazpone and Safi (c.2,800-3,700 m). The species was quite common on both sides of the Safi La on 29 July (c.3,900-5,100 m), and a few were seen near Fokarphoo, lower down the valley east of the Safi La on 30 July.

Upper Indus :

Only one bird was seen in this area, a juvenile up the Stok gorge on 29 August. Although Vaurie records two specimens from as far east as Rupshu, the literature agrees with our finding that this species mainly inhabits western Ladakh. Osmaston (1926) wrote that the species was common between 3,700 and 4,300 metres along the Great Himalaya Range, but did not penetrate far into Ladakh proper. He found small flocks in the Dras Valley in May, and as far east as Lamayuru, and wrote that they were common between Dras and Umba at 3,800 metres on 13 July 1925.

Brandt's Mountain Finch (Leucosticte brandti) (Brandt's Rosy Finch, Himalayan Mountain Finch)

Suru : First identified about 5 km upstream from Panikar on 6 July, about 50 metres above the village of Kochak, this species was seen mainly around Rungdum at the head of the Suru Valley. The first sighting involved six birds feeding on a lush grassy hillside by an overflowed irrigation channel at an altitude of 3,400 metres, and five birds were seen later in the day further north at similar altitude. Around Rungdum in the period 14-21 July up to twelve were seen on the slopes below the Gompa itself, and small flocks of two to fifteen birds were found by roadsides and on boulder-strewn grassy slopes as far east as Tazi Tonazas and as far west as Shama Kurpo, often in association with Plain-coloured Mountain Finches and Adam's Snowfinches. Birds were seen in the settlement of Zuildo itself on several occasions.

Upper Indus :

Our only record from this area was of seven seen in a hailstorm up the Stok Gorge, below Stok Kangri glacier at an altitude of 4,900 metres on 28 August. Since we only spent three days above 3,700 m. in this area it is not surprising that more were not seen. Osmaston (1925) described the species as common between 4,000 and 5,200 metres in south and east Ladakh and mentions their liking of wet ground. He also noted association with Adam's Snowfinches, but wrote that the species was rare in the upper portion of the Suru Valley. Meinertzhagen (1927) described these Mountain Finches as "birds of extreme elevation", and all his specimens were collected above 4,600 metres. Our records imply a reduction in the altitudinal limits of this species over the last fifty years, and it seems possible that the loss of willow and other scrub around Rungdum over this period has created habitat suited to these delightful birds.

Common Rose Finch (Carpodacus erythrinus) (Scarlet Grosbeak)

Suru : A common bird of settlements, scrub and cultivated places, this species was found everywhere in the main valley but was encountered with relative infrequency around Rungdum at 4,000 m. Here the most seen in a day was about fifteen on the boulder-strewn slopes along the north edge of the valley between Zuildo and Shama Kurpo. The species did also occur in the short dwarf Salix scrub on the valley

floor at Rungdum but only at low densities - our maximum day total for this habitat was six. In the mountains away from the main valley the species is uncommon and confined to less arid slopes, usually places with a few scattered bushes. However a few Common Rosefinches were recorded above 4,000 m. on our treks up to the Umba La and Safi La. On the latter trip the species was scattered up the gorge leading up to Safi, common around the village itself (c.4,000 m.) but absent on the arid slopes either side of the pass above c.4,400 m.

Osmaston (1926) did not find Rosefinches breeding further up the valley than Gulma Tongas, a village between Parkachik and Shama Kurpo, which suggests the species may have extended up the valley in the last half century. Our sightings of Rosefinches near the Umba La and Safi La are also rather high, Osmaston (1927) gives the species altitudinal zone in Ladakh as 2,800-3,700 m.

Upper Indus :

The species was common both in the Forestry Department plantation at Tikse and in surrounding cultivation and was the second most frequently netted species. Details of the catch are given in the separate ringing section. Common Rosefinches started decreasing earlier in the autumn than other summer visitors and there was a noticeable decline, reflected in daily catch totals, from early September onwards. Apart from a single juvenile on 30 September the last birds seen were four on 25 September. Strangely we did not see our first juvenile Rosefinch at Tikse until 22 August. Juveniles are less worn coloured than females at this time of year and easily told in the field, being much warmer brown above and buff below and with conspicuous pale wing bars - these are worn very thin on autumn females. Another interesting observation was that there were none seen during our brief visit to Stok in late August despite the species being common here in early August (Denby and Phillips 1977).

Eastern Great Rosefinch (Carpodacus rubicilloides) (Streaked Great Rosefinch)

Upper Indus :

This species was seen on altitudinal migration through the Upper Indus Valley from 27 September onwards. On that date two males were seen in tall Hippophae at the Tikse Forestry plantation as well as a party of five "probables" flying in from the east. After this the species was seen daily until we left, with day totals for the plantation varying from three to 15+. A small roost developed in dense, tall Hippophae in the northwest corner of the plantation in early October. Like Guldenstadt's Redstarts and the Accentors these Rosefinches kept to patches of Hippophae both in the plantation itself and in the surrounding farmland. Three were trapped, on 30 September and 5 and 7 October.

Meinertzhagen (1927) and Osmaston (1925, 1927) described Eastern Great Rosefinches as being very common on their breeding grounds in southern and eastern Ladakh (Rupshu) between 3,800 and 4,800 metres around the Tso Morari and Pangong Lakes.

At the top of the Stok Gorge (c.4,500 m) a single large male Rosefinch was seen near shepherds' huts. At the time we called this bird a Great Rosefinch (Carpodacus rubicilla) but in retrospect we have decided we cannot be sure of its identity as our view was not very close and we had had no previous experience of either C.rubicilla or C.rubicilloides. Similarly at Rungdum Gompa in the Suru Valley we saw a large Rosefinch which might have been either of these similar species or even the Red-breasted Rosefinch C.puniceus, a rare species in Ladakh but one which has been found around Rungdum by both Osmaston (1926) and Koelz (1940).

Rock Bunting (Emberiza cia) (Eastern Meadow Bunting)

Suru : Although common in the Suru Valley, no birds of this species were found in the Upper Indus study area. Around Panikar, birds were found scattered throughout most habitats, but were mostly seen on rocky slopes with a little cover often just beyond the limits of cultivation. About twenty were seen on each day spent in the area (8-12 July). Around Rungdum (14-21 July) the species was not so numerous, with no birds recorded on three days, and the most seen in a day being five birds by the roadside between Zuildo and Shama Kurpo on 20 July. In the Sanko area the species seemed a little less common than around Panikar, perhaps because of the greater extent of cultivation. On the walk over the Umba La west of Sanko on 23 July, three birds were seen at about 4,300 metres and a few were seen as high as 4,600 metres to the west of the Safi La on 29 July, when altogether fifteen were recorded. We also found between ten and fifteen east of the Safi La on 29 and 30 July. About twelve were found just west of Kargil on 27 July and on 14 October three were present in the forestry plantation between Kargil and Baru. The furthest east we saw this species was by the roadside a few kilometres east of Lamayuru on our return journey from Leh to Kargil on 13 October.

Previous visitors to Ladakh noted a similar distribution . Osmaston (1925) described Rock Buntings as rare being found in the Dras and Suru Valleys decreasing eastwards with one exceptional record as far east as Sabu, near Leh, on 25 June. Meinertzhagen (1927) wrote "It is curious that previous writers have found it so rare in Ladakh" as he found the species common between Dras and Khalatse (Khalsi) and a little beyond. Curiously Koelz (1940) also described the species as rare in the Suru Valley. Despite the paucity of previous records and our failure to see Rock Buntings around Tikse, She and Choglamsur the species does occur in the Upper Indus Valley this far east. Denby and Phillips (1977) write that the species was "fairly common in all the villages we investigated". As the villages

concerned include Tikse, She and Choglamsur we would argue about the accuracy of this statement and suggest that in this part of the Upper Indus Valley the species is more or less confined to villages like Stok, Sabu and Rumbak lying at the feet of the Ladakh or Zaskar Ranges and separated from the Indus by a stony desert zone. These settlements with their adjacent mountain slopes provide more suitable habitat than those along the Indus and it seems likely that Rock Buntings, which in the Suru Valley we found most abundant on rocky slopes with some shrubs or patchy herbaceous cover above cultivation, would occur around these villages despite being absent only a few kilometres away in the belt of cultivation along the Indus.

Addendum to Moorhen (Gallinula chloropus)

Since writing the section on the Moorhen we have been back to the British Museum to look at bill colour in G.ch.chloropus and G.ch.indicus but this visit in fact increased our uncertainty as to the subspecies of Moorhens we saw in Ladakh. The bills of the G.ch.chloropus and G.ch.indicus skins we looked at varied a lot in colour, probably largely due to differences in the age and treatment of the specimens. Both subspecies showed a range from green and greenish yellow through bright yellow to orange and we could see no difference in bill colour between the two. Neither does Ripley in "Rails of the World" (1977) mention bill colour as a distinguishing characteristic of G.ch.indicus but just states that it differs from the nominate subspecies in being smaller on average and having a relatively smaller bill. The measurements Ripley gives, like those already quoted, show a large degree of overlap between the two races and the dead Moorhen we found in Ladakh fits either.

TABLE I : WEEKLY 'BIRD-DAY' TOTALS FOR SOME SPECIES SEEN DURING THE UPPER INDUS VALLEY MIGRATION STUDY.

Each of the "weekly 'bird-day' totals" given below is the sum of the day totals for the week in question. Note that the last period (9 to 12 October) is only four days long, not a full week. The species included are those for which we were able to keep reasonably accurate day totals but have not listed all our sightings under the species' heading in the Systematic List. Totals for the more conspicuous birds like raptors and waders are accurate but those for smaller, less conspicuous species - particularly habitual skulkers like crakes and accentors - are doubtless underestimates of the numbers present. Totals for White and Citrine Wagtails are for the stretch of riverside grazing land from She to Choglamsur Bridge and do not include those seen on or over the ringing site and surrounding fields.

SPECIES	PERIOD									
	7.8 -13.8	14.8 -20.8	21.8 -27.8	28.8 - 3.9	4.9 -10.9	11.9 -17.9	18.9 -24.9	25.9 - 1.10	2.10 - 8.10	9.10 -12.10
Grey Heron	2	17	2	4+	3+	18+	2	6		
Pintail	2	2		18		20	5	28	11	1
Black Kite	2			1	1	22+	1		1	
Eurasian Sparrowhawk							2	4+	4+	2+
Marsh Harrier		5+	5	8+	12+	19+	8+	5+	6+	2+
Eurasian Hobby	1	4+	3	5	7	8+	5+	4+		1 ?
Kestrel	3	2	2	2	1	2	3	4	4+	2
Baillon's Crake					1		5+	6+		
Moorhen					1	2+	9+	13+	6+	
Greenshank	2	3	4+	4+	15+	10+	10+	6		
Green Sandpiper	13+	16+	6+	11+	18+	6+	7+	7+	5+	4+
Common Sandpiper	8+	11	3	4	9	2	1			
Temminck's Stint	21+	12+	7+	11+	5	7	1			
Ibis-Bill	4	2		6+	6	2	2	4	1	
Common Tern	20+	14+	8+	4+	5+	3	2	1	3	
Hill Pigeon							6	1	13	1
Swift	1	9	9+		1	2			40	3
Rufous-Backed Shrike	3		1	2	1	1	3	2	1	
Raven	1	2		4+	4	4	6	8+	10+	6+
Guldenstadt's Redstart							7	78+	174+	135+
Black-Throated Thrush					4	7+	6+	9+	18+	23+
Robin Accentor								8	23+	9+
Brown Accentor									35+	20+
Eurasian Tree Pipit				13	20	75+	30	40	25	4
Citrine Wagtail	16	5		30	30	70+	20	18	2	
White Wagtail	29	20		25	20	60+	35	50	23	
Eastern Great Rosefinch								20+	65+	35

RINGING REPORT

During our time at Tikse 964 birds were ringed, of which 241 were subsequently retrapped. Table II shows the species composition of our catch.

TABLE II : CATCH TOTALS FOR ALL THE SPECIES RINGED AT TIKSE

	Ringed	Retrapped
Mountain Chiffchaff	421	111
Common Rosefinch	183	52
Bluethroat	83	37
Guldenstadt's Redstart	82	1
Hume's Lesser Whitethroat	64	24
Citrine Wagtail	35	7
Hume's Short-toed Lark	18	3
Black Redstart	10	
Brown Accentor	8	
Grey Tit	8	2
White Wagtail	8	
Greenish Warbler	5	
House Sparrow	5	
Siberian Chiffchaff	4	
Eastern Great Rosefinch	4	
Lesser Whitethroat	3	1
Eurasian Tree Pipit	3	
Baillon's Crake	2	
Wryneck	2	
Hoopoe	2	1
Rufous-backed Shrike	2	1
Black-throated Thrush	2	
Black-throated Accentor	2	
Swallow	1	
Brahminy Mynah	1	
Magpie	1	
Great Reed Warbler	1	
Paddyfield Warbler	1	
Plain Leaf Warbler	1	
Robin Accentor	1	
Rose-breasted Pipit	1	1

This report is divided into two parts : first, a section on the seven species of which more than fifteen were caught, (the "top seven" species on Table II); second, a section on the remaining twenty-three species, for which less detailed analysis was possible because of the smaller sample sizes. Most graphs in the first section are quite simple, involving the plotting of variables - catch rate, mean weight, and moult score against time, and the plotting of wing length frequency distributions. The method of assessing moult was the now widely used one whereby each new feather is given a score from one (absent or in pin) to five (fully grown), and the scores of each feather in the tract being studied are added together to give an overall score for the tract. Virtually all passerines have ten primaries, so that

actively moulting individuals may have "primary scores" from one to forty-nine, whilst unmoulted birds will score zero and those with completely replaced primaries will score fifty.

"Wing formulae" of some of the birds caught are also summarised. For these the primary feathers are numbered from one to ten from the outside of the wing towards the body. For each primary the distance between the wing tip and the tip of the feather in question (when the wing is folded naturally) is given in millimetres. The only exception to this rule is the first primary which, being short, is measured relative to the longest primary covert.

As mentioned in the Introduction some one-way analyses of variance were performed to test whether there were significant changes in the weights or winglengths of particular age/sex categories of a species catch with time, analysing the catch by splitting it into five-day periods. In discussing these we have called differences between means for five-day periods "significant" if the probability value associated with the F ratio is 0.05 or less. In fact none of the analyses of variance on winglengths were significant at this level except for those done on the winglengths of adult Hume's Lesser Whitethroats (Sylvia curruca althaea) and Mountain Chiffchaffs (Phylloscopus sindianus). As the adults of both these species were moulting during our stay at Tikse the significant changes in winglength with time are easily explained - they simply reflect the replacement of old, worn feathers with unworn and therefore slightly longer ones.

Tables III and IV at the end of the first section summarise the weight and winglength data obtained from the seven most commonly caught species. The "99% Confidence Limits" given in these tables were calculated using the t-distribution. They give the range within which one would expect all but one bird in every hundred of the same age/sex category and from the same population as we were catching to lie. A more rigorous statistician would point out that one should not calculate confidence limits using the t-distribution if the variable one is dealing with is not normally distributed, and many of the winglengths and weights discussed below are not, being skewed or bimodal due to differences between the sexes. However in our view these confidence limits still provide useful indices of the variability of the data. For the species of which less than fifteen were caught weights (in grammes) and measurements (in millimetres) for individual birds are listed. Bill measurements are to the angle at the front of the skull unless stated otherwise.

Note that in this section, as in the Systematic List, we are keeping to Williamson's (1967) classification of Phylloscopus warblers and thus treat the Mountain Chiffchaff (P.sindianus) as a distinct species, not a race of the Chiffchaff (P.collybita). Similarly we have kept to Williamson's (1968) classification of Sylvia warblers, treating Hume's Lesser Whitethroat as a race of Lesser Whitethroat (Sylvia curruca). However, both in the table of catch totals and in the report below we separate our Hume's Lesser Whitethroat (S.c.althaea) catch from the three S.c.blythi/margelanica we ringed. For details of species and subspecies identification of the birds we ringed

the reader should refer to the Systematic List section, and background information on the habitat around our nets and the routine processing of trapped birds is given in the 'Introduction and Outline of Fieldwork'.

SECTION I : Species of which more than fifteen were trapped.

Mountain Chiffchaff (Phylloscopus sindianus)

Ageing and sexing

It was found possible to age and sex the majority of birds. Birds in moult could safely be aged as adults, as could adults prior to their moult, their plumage being extremely abraded. Once they had completed their moult adults were extremely difficult to separate from first year birds, but many birds of the year could be separated from newly moulted adults by the presence of fault bars (see Introduction), and by tail abrasion. Many fledgeling passerines wear the tips of their tails by abrasion when in the nest. The abrasion is seldom very marked, appearing in Mountain Chiffchaffs as small angular indentations in the tip of each feather. Newly moulted adults on the other hand normally have tail tips which are very fresh and rounded. The differences are subtle and it is possible that some newly moulted adults were wrongly aged as juveniles. We were perhaps a little over-confident with our ageing, and only six birds were put down as age category 2 (age unknown). A look at the graph of primary moult against time (fig. 7) shows that it is unlikely that any adults would have completed their moult before about 12 September, so that all birds would have been aged correctly in the first thirty-five days of our stay at Tikse. In this period we caught 67½% of our chiffchaffs, and we can confidently state that virtually all these birds were aged correctly. The 32½% of our chiffchaffs caught after 12 September had a ratio of 3:1 first year birds to each adult, whilst for those caught before 12 September the ratio was 2.9 : 1. The difference is negligible and would support a hypothesis that our ageing remained quite accurate, as does an analysis of retrap data.

The majority of birds - even first years - could be sexed according to their winglength. Figures 1 and 2 show the frequency distribution of winglength of adults and juveniles respectively. Both are strongly bimodal because of the difference in winglength between males and females. Ticehurst (1938) working from skins states that females range in winglength from 51.5 to 57 mm, and males from 57 to 63. Williamson (1967) gives a range of 51 mm to 62 mm, but does not mention sexual dimorphism. Figure 1 agrees quite closely with Ticehurst, the overall range in winglength being slightly lower, with females starting at 50 mm, and males only going up to 62 mm. When looking at Figure 1 it must be remembered that our measurements spanned the period of moult, so that for example the eight females with winglengths below 52 mm were all trapped before they started moulting, whilst ten of the eleven males with winglengths above 60 mm were trapped when they had completed moulting and their feathers were fresh.

There must have been similar abnormally abraded and short-winged pre-moult males, and long-winged fresh, post-moult females, but these are obscured, being in the middle of the graph. First-year birds also show a marked bimodal distribution of winglength frequency (Figure 2), but since all birds had not long completed the growth of their first set of feathers, the sample comprised all fresh birds and consequently exhibits a smaller range of winglengths in keeping with the smaller variation in feather wear, and an even more clear-cut bimodal distribution. There would appear to be a tendency for first-year birds to be smaller than adults, but the complication of moult in adults makes comparison difficult.

Catching Patterns

Figures 3 and 4 show how the number of Mountain Chiffchaffs caught per ten net-foot-hours varied in successive five-day periods. The pattern shown is broadly similar for both adults and first-year birds, consisting of an initial peak followed by a steady dwindling in numbers until September, when numbers caught again rose (although only slightly in the case of adults).

The August pattern can be explained in terms of a "mopping up" operation of local birds. In August the plantations at Tikse supported a large population of post-breeding Mountain Chiffchaffs, many of which we trapped in the first five days of our stay (9th - 13th). Each successive five-day period in August left fewer birds on the site that had not already been trapped and ringed, so that our retrap rate increased as August progressed.
The overall dwindling in the number of birds trapped in successive August five-day periods (catching periods 1 - 4) was probably due to trap-shyness (birds learning the sites of nets and avoiding them, making the chances of recapture lower than those of initial capture) and probably also to birds migrating out of the area.

Catching rates increased in early and mid-September (Figures 3 and 4) indicating movement of migrants into the Tikse plantations. The catching rate of unringed first-year birds nearly doubled in catching period 6 (3 - 7 September) when compared with catching period 5 (29 August - 2 September) and the proportion of retraps in the catch decreased markedly, indicating a considerable dilution of the birds which were present in August with newly arrived birds from elsewhere. The only sign of a similar influx of adults in catching period 6 was a decrease in the proportion of retraps, but the number of birds involved was really too small for this to be significant. Catching periods 7 - 9 (8 - 22 September) showed successive increases in the catch rate of first-year birds indicating that influxes of birds into the Tikse plantation in the middle two weeks of September outweighed departures. Changes in the numbers of adults caught in September were, by contrast, small. From the last week of September (catching period 10) onwards the catching rate of first-year birds declined markedly, halving between catching periods 9 and 10, whilst that of adults showed a decline followed by a minor peak in early October.

There is no way of knowing the origins and destinations of these arrivals and departures of Mountain Chiffchaffs affecting Tikse. Ticehurst (1937) states that birds arrive in Gilgit (N.W. of Ladakh) between the third week of September and the end of October, and in the Kashmir Valley in October. Birds at Tikse were building up in number two weeks earlier than this time of arrival in Gilgit, and the sharpest reduction in our catching rate occurred in the third week of September, when birds start arriving in Gilgit. It is possible that birds move out of Ladakh and into Gilgit in the third week of September, following the corridor of the Indus Valley in a north-westerly direction, then turning south to winter in the Kashmir Valley and adjoining lowlands, but it seems more likely that birds in the eastern part of the species' range (such as those we were catching at Tikse) migrate rather earlier than those in the west (such as those studied by Ticehurst), with factors like the more continental climate further east accounting for the discrepancy between the migration time of the different populations. These hypotheses are only speculation, and a great deal more study is required before the nature of migration of Mountain Chiffchaffs and other passerines through the Western Himalayan region can be fully understood.

Weight Studies

Figures 5 and 6 show the mean weights of adult and first-year Mountain Chiffchaffs for each successive five-day period of our stay at Tikse. The results of carrying out one-way analysis of variance on the data collected from juveniles showed the differences between the mean weight of each five-day period to be insignificant ($p = 0.170$). The graph shows that the mean weight of juveniles fluctuated insignificantly around 6.5 grammes. One way analysis of variance carried out on mean adult weights showed that differences in mean weights between the five-day periods were significant ($p = 0.040$). One way analysis of variance was also carried out on mean catching time for each five-day period, and for reasons probably more to do with our catching regime than anything else, the mean catching times were found to vary significantly also ($p = 0.015$). When mean catching time is plotted alongside mean weight for each five-day period (Figure 5) a very striking correlation between the two can be seen. Thus the significant differences in adult weights from catching period to catching period reflected diurnal weight changes, with birds getting heavier throughout the day as they made up their overnight weight loss. Overnight weight loss was measured for six adult and seven first-year Mountain Chiffchaffs caught at dusk and roosted overnight in cotton bird bags. The mean overnight weight loss for adults was found to be 0.91 gms and for birds of the year 0.86 gms. These figures are high, and show that each autumn night Mountain Chiffchaffs lose between 15% and 20% of their body weight.

Wing Formulae

Wing formula was measured on forty-three birds selected at random from the catch and a "mean wing formula" derived from these figures is given below :

Primary	Secs.	10	9	8	7	6	5	4	3	2	1
Mean	8.5	7.2	5.8	4.2	2.6	0.6	0	0.1	1.1	7.4	+ 7.5
Range	7½-10	6-8	5-7½	3½-6	1½-4½	0-2½	0	0-1	0-2	5½-9	+5½-9

Moult

We obtained quite a detailed picture of the post-nuptial moult of Mountain Chiffchaffs at Tikse, and our data is summarised in figures 7 to 11.

Altogether sixty-seven birds in primary moult were trapped, and there were a further twenty handlings of retraps. Figure 7 shows the progress of primary moult of these birds. Extrapolation of lines between date of initial capture and date of recapture of individuals indicate a range in the duration of moult of between fifty-one and sixty-five days. On Figure 7, nine mean dates were calculated for nine successive groups of primary scores (5 - 9, 10 - 15, 16 - 20, etc) and the line thus obtained indicates a mean duration of moult of between fifty-five and sixty days. The median date of onset of moult, estimated by eye from Figure 7, is the end of the first week of August, and the estimated median date of completion of moult is the end of September. The scatter diagram shows the spread of onset of moult to be about five weeks, from the end of the third week in July to early in the first week of September, and the spread of completion of moult is from the middle of September until the last week of October. There was thus a period from early to mid-September when all birds were in moult. The number of primaries in active replacement was most often two or three, but ranged from one to five, and had a mean of 2.7.

Thirty-eight birds were trapped with moulting secondaries, and a further fourteen were retrapped. Only three of these retraps were moulting at both captures and even these were of limited value since the longest interval between capture and recapture was only four days. Figure 8 indicates an average duration of secondary moult of thirty - forty days from about the end of August to the beginning of October. Two retraps imply a much faster rate of fifteen - twenty-five days, but both were rather short term and in the early stages of secondary moult. It may well be that secondary moult is rapid in its early stages and slows down as it progresses. The third retrap is atypical, the secondary score remaining the same due to accidental loss of a moulting feather between initial capture and retrapping. Figure 9 shows each bird's secondary score plotted against its primary score. It can be seen that the secondaries usually start moulting between primary score eighteen and twenty-five, although some birds with relatively low secondary scores compared to their primary scores may have started to moult them at a later stage of primary growth. There is no definite way of knowing whether these birds were growing their secondaries abnormally slowly, or starting to moult them relatively late, but the lack of birds with a secondary score of zero beyond primary score twenty supports the former hypothesis.

It would appear that many birds - probably the majority - complete their secondary moult shortly after their primary moult, for example two typical looking individuals on Figure 9 have secondary scores of twenty-seven (with two and three secondaries still growing) with the full primary score of fifty.

Of fifty-three handlings of birds with moulting tails seven were retraps in moult at both handlings. Figure 10 shows that the pattern of tail growth is variable. Two of the long-term retraps indicate durations of tail moult of only twenty days and twenty-three days when extrapolated, yet the longest term retrap of all implies an average duration of tail moult of forty-three days. The remaining five retraps were all short-term, but were more in agreement with this relatively slow growth rate than with the other two long-term retraps. These two fast-growing retraps were the only two which spanned the middle period of tail moult, the short-term ones all occurring at relatively early or late stages. Thus a pattern emerges where the tail is growing considerably faster in the middle period of its moult than at the beginning or end periods, giving a strongly sigmoidal growth curve. The longest term retrap spans both slow and fast-growing periods, so that the overall trend is disguised. Figure 11 brings out this pattern quite strongly : the tail grows slowly relative to primaries until primary score is about fifteen, then tail growth accelerates sharply between primary score twenty and thirty, before slowing down again thereafter, with tail growth typically being completed between primary scores forty and fifty. Half of the birds trapped in tail moult were actively replacing all twelve feathers at once, and the mean number of feathers in growth was 9.1.

Common Rosefinch (Carpodacus erythrinus)

Ageing and Sexing

Ageing Common Rosefinches was quite straightforward, since adults do not moult until they reach winter quarters, so that adults were in dull, abraded plumage, whilst first-year birds were bright, fresh and "soft". Males in their third-year or older were easy to distinguish, being mainly bright red in colouration. Figure 12 shows the winglength distribution of all adult Rosefinches trapped, and also the winglength distribution of birds with broodpatches (often growing over) and of red males. There was a marked tendency for old males to be at the longer-winged end of the range, and for birds with broodpatches to be short-winged, and this would support a hypothesis that the apparent slight bimodality of winglength distribution is genuine, with females being slightly shorter winged than males, and more likely to have broodpatches.

Age Ratios

Out of 183 birds caught, no fewer than 147 were adults, thirty of them males in their third-year or older. The reasons for birds of the year comprising only 19.7% of our catch are unclear, but we think it extremely unlikely that 1977 was a disastrous breeding season for Common Rosefinches in Ladakh. Ten or a dozen pairs of this

species nested in our netting area, and several times we saw newly fledged young birds being tended by adults and we think it very probable that most of the first-year birds we caught were from this immediate source. This implies that the Tikse plantation was some sort of gathering ground where adult Rosefinches assembled in the weeks prior to migration, whilst young birds moved elsewhere. The proportion of birds caught showing signs of a broodpatch rules out the possibility of there having been sizeable numbers of non-breeding birds at Tikse. Common Rosefinches have a relatively late breeding season in Ladakh, and Osmaston (1927) found many birds still incubating at the end of July. The first young at Tikse did not fledge until the second half of August - a date in keeping with Osmaston's findings - so that for the first ten days of our stay we caught only adults. The expected rush of first-year birds from late August onwards never materialised, and we can only conclude that most young birds must separate from adults quite soon after fledging, and move to different areas.

Catching Patterns

Figures 13 and 14 show how the numbers of Common Rosefinches caught changed in successive five-day periods. Following an initial peak, adults were caught at a fairly steady rate in August, and the catch rate declined until the third week of September after which none were caught. The most first-year birds were caught immediately after local birds fledged, and after a minor early September peak, birds stopped being caught at much the same time as the adults. The adult peak in period 4 (24 - 28 August) was perhaps associated with increased activity amongst adults whose young had just fledged - the high retrap rate would support this. The peak could also be interpreted as an influx of adults from elsewhere, and this would help explain the high proportion of adults in our catch.

Weight Studies

Figures 15 and 16 show how the mean weight of first-year and adult Common Rosefinches changed as time progressed. One-way analysis of variance showed that mean adult weights changed significantly from five-day period to five-day period ($p = 0.005$), whilst first-year weights did not ($p = 0.509$). First-year weights, whilst not significantly different, followed a pattern which could be interpreted as a rise in weight to a mean of 22.5 gms immediately following fledging, followed by a decline as young birds learned to fend for themselves. Mean adult weights fluctuated between 21 and 21.5 grammes until period 7 (8 - 12 September) when a marked rise to over 23 grammes occurred. Figure 16 shows that mean catching time in period 7 was rather late so that an element of this increase can be explained in terms of diurnal weight change. However, period 8 shows a mean adult weight of nearly 22 grammes, despite a reversion of mean catching time to former, earlier levels, and the main reason for this significant increase in mean adult weight in the last ten days of their presence at Tikse was probably a buildup of subcutaneous fat prior to migration.

Bluethroat (Erithacus svecicus)

Ageing and Sexing

We found surprising difficulty in sexing young Bluethroats reliably, and may possibly have mis-aged a few. Our ratio of only twelve adults to seventy-one first-year birds seems rather low, but it is difficult to see where we could have gone wrong. Nearly all first year birds at Tikse had some blue on the breast and so, according to Svensson (1975) were males. A lot of young females were clearly overlooked. The most likely explanation for this is that we were dealing with very different populations of birds (of both red and white spotted forms) in which Svensson's sexing characters do not hold true for first-year birds.

Figure 17 shows the frequency distribution of winglengths of all Bluethroats caught at Tikse. There would appear to be slight bimodality in the distribution, with peaks at 71 and 73 mm, and the majority of birds falling in the overlap embraced by the two peaks.

Catching Patterns

Figures 18 and 19 illustrate how the catch-rate of adult and first-year Bluethroats varied in successive five-day periods. The small numbers of adults caught make generalisation difficult (Figure 18), but they were clearly mainly caught in two distinct phases. One - probably involving local birds - was from 9 - 23 August, and the other was from 13 September till the beginning of October, and possibly represented migrants coming in to the Indus Valley from elsewhere.

The catching pattern of first-year birds was quite different, involving a build-up to a peak of nineteen birds in catching period 3 (19 - 23 August). This peak represented an influx either of newly fledged young birds from the surrounding district, or of genuine migrants from further afield, or perhaps both. The high retrap rate during the subsequent three catching periods (24 August - 7 September) involved seventeen handlings of eight birds, all except one of which were initially trapped between 18 and 24 August (catching period 3). This strongly suggests that birds caught in this period stayed at Tikse for about a further two to three weeks before moving elsewhere. After catching period 6 retrap rates declined considerably, and only two of the twenty-five first-year Bluethroats caught after 4 September were subsequently retrapped. This suggests that birds caught at Tikse after early September were spending a relatively short time at the site before moving elsewhere perhaps using the site as a resting and feeding site during their migration. There was a distinct lull in catching rates in catching period 10 (23 - 27 September) but the end of September and early October saw a revival which continued until we left Tikse on 12 October. Figure 21 illustrates many of the points made about retrapping patterns of first-year birds in this section.

Weight Studies

Figures 20 and 21 show the actual weights of all adult and first-year Bluethroats trapped plotted against the date of capture. Although only twelve adults were caught, a very useful series of retraps shows the marked tendency of adults to increase in weight through August and the first half of September. The only two decreases in weight to be seen on Figure 20 involve birds caught at dawn which had made up none of their overnight weight loss. These decreases give a false illusion that birds lose weight in September. Figure 21 shows that juvenile Bluethroats probably do not change significantly in weight as the autumn progresses. Many of the changes in weight shown by the retrap birds of the year can be attributed to diurnal weight change. Since adult Bluethroats put on weight in the autumn, and first-year birds do not, at least not to the same extent, the weight increase is unlikely to be related to migration, since the migration regimes of adults and first-year birds are likely to be the same. Adult weights, however, never seem to increase to significantly above those of first-year birds (unlike the situation with Hume's Lesser Whitethroats). As the increase in adult Bluethroat weights, which brings them up to the weight of first-year birds, occurs while their moult is still in full swing it would seem to be more related to an improvement in condition due to breeding birds being relieved of the rigours of rearing young than to an improvement associated with the completion of moult.

Moult

Only eight birds were trapped in active primary moult, but retraps help to give quite a clear picture. Figure 22 indicates that primary moult takes about fifty days, typically starting at the end of the first week of August, and finishing in the fourth week of September. The spread in onset of moult implied by Figure 22 is about three weeks, with different individuals starting to moult between the end of July and the middle of August, and moult is completed over a similar period between the third week of September and the end of the first week of October. The number of primaries in active replacement ranged from one to five, having a mean of 3.1.

Figures 23 and 24 indicate that moult of the secondaries is quite rapid, starting in the second half of August and finishing in the second half of September. Figure 24 implies that secondary moult starts between primary scores fifteen and thirty and finishes at about the same time or a little later than the primaries.

Tail moult is also rapid, and Figure 25 shows that onset of tail moult is typically in the first half of August and completion in the first half of September. Figure 26 indicates that some individuals may start moulting their tails at the same time as their primaries, but most do so between primary scores zero and ten, and complete their tail growth between primary scores thirty and forty.

Guldenstadt's Redstart (Phoenicurus erythrogaster)

Ageing and Sexing

It was found impossible to age most birds caught, since juveniles undergo a post-juvenile moult at or near their breeding grounds (Ali and Ripley 1968 - 74) making them indistinguishable from the adults, which have undergone post-nuptial moult at the same time. All birds could, however, be sexed with ease, the males having a superb plumage of black, orange, grey and white, and females being brown with rufous tails. Figure 27 shows the winglength distribution of all birds caught, the overall range in winglength being 98 to 112 mm, with females ranging from 98 to 107, and males from 103 to 112. The distribution of female winglengths is extremely unusual, and we can think of no reason for this, whilst male winglength is positively skewed, peaking at 107 mm.

Catching Patterns

Figure 28 shows how the number of male and female Guldenstadt's Redstarts trapped increased as time progressed. Males were first seen at Tikse on 20 September, the first were caught on 26 September, and numbers built up steadily over the next three weeks. The discrepancy between the number of males and number of females caught appears to be due to the fact that females migrate later. The proportion of females in the catch increased in every five-day period, and in our last five days at Tikse we caught exactly equal numbers - twenty-four males and twenty-four females. Out of eighty-two birds ringed only one was subsequently retrapped, implying that birds were moving through Tikse in large numbers and not staying for very long. The one retrap was caught on 1 September and retrapped on the 3rd. The low retrap rate can also probably be attributed in part to trap shyness, and to the sheer numbers of birds present at the site.

Weight Studies

The changes in weight with time were negligible, means and standard errors are given in Table III at the end of this section.

Moult

The only sign of moult found on any individual was a male caught on 10 October with both innermost secondaries and its left outermost pair of tail feathers still not quite fully grown.

Hume's Lesser Whitethraot (Sylvia curruca althaea)

Ageing and Sexing

Birds proved impossible to sex, but all were aged using characteristics given in Svensson (1975) and Williamson (1968). Twenty of the twenty-four adults caught were in moult, as were nine out of ten adults subsequently retrapped. Figure 29 shows the frequency distribution of winglength of both adults and first-year birds, which is nearly normal, giving no clues as to the sex of birds handled, and very similar for both adults and birds of the year.

Race Characteristics

One thing that emerges from Figure 29 is the large size of birds we were handling. Williamson (1968) gives a range in winglength of 63 - 71 mm, with a theoretical range of 62 - 74. One of our birds - a first-year - was a millimetre larger than even the theoretical maximum, and the shortest winged birds measured had winglengths a full 4 mm above the low and of the range given by Williamson. This strongly implies that birds we were trapping at Tikse were a particularly large form of the race. Seventeen wing formulae taken at random also differ slightly from the 'typical formula' given by Williamson :

Primary	10	9	8	7	6	5	4	3	2	1 (from pc)
Mean	9.5	7.9	6.0	3.7	1.4	0.1	0	0.3	5.6	+3.9
Range	8½-11½	7-9	5-7½	2-6	½-3½	0-1½	0	0-1½	4-6½	+2-6½

Nine birds were emarginated on 3rd - 5th primaries, and five on 3rd - 6th.

Birds measured by Williamson were generally more pointed in the wing than those we found in Ladakh.

Catching Patterns

Figures 30 and 31 show how the number of Hume's Lesser Whitethroats caught per ten net-foot-hours varied in successive five-day periods. Altogether twenty-four adults and forty birds of the year were trapped, with ten of the adults and fourteen of the first-year birds being subsequently retrapped. The number of adults caught were really too small for any significance to be attatched to the number of birds caught in any one five-day period. First-year birds were caught at a regular, very slightly dwindling rate, with a peak in period 2 (14 - 18 August) perhaps representing an influx. No first-years were caught after the middle of September, indicating that this was probably when most birds moved out of the area. Adults apparently stayed a little later, although the only one trapped after 20 September was a retrap, possibly behind schedule with its moult. It seems likely that adults were tending to stay at Tikse longer than first-year birds in order to complete their moult, and the more regular catching pattern of first-year birds supports the view that they were moving through the area at a regular rate. Adults also had a slightly higher retrap rate of 42%, compared to the first-year bird retrap rate of 35%.

Weight Studies

Figures 32 and 33 show how the mean weight of first-year and adult Hume's Lesser Whitethroats varied in successive five-day periods. Birds of the year showed remarkable similarity in mean weight for each period, fluctuating very closely around 13.75 grammes in every period except period 3 (19 - 23 August) when the mean rose to 14.25 grammes This was the period following the mid-August peak of first-year birds, and also the period with the highest ratio of retraps to new birds, but a look at individual retraps shows no relationship between these facts.

Differences in mean adult weight between five-day periods were found to be significant ($p = 0.0157$) when one-way analysis of variance was carried out. Figure 16 shows that until period 6 (3 - 7 September) mean catch time was an important determinant of mean weight, and thereafter weight fluctuated independently of catching time, increasing on average. Throughout September mean adult weight was higher than mean juvenile weight, and the reason for this was possibly to do with their moult. If this weight increase in adults was due to the deposition of subcutaneous fat prior to migration, it would be reasonable to expect the same trend in the weights of first-year birds, but apart from the slight increase in period 3 already mentioned, first-year weights remained remarkably stable. Newton (1966) suggested that some birds put on weight during moult to compensate for loss of insulation brought about by feather loss. It is possible that the weight increases noted in Hume's Lesser Whitethroats at Tikse were of this nature, but if so, they occurred rather late in the moult. Nisbet (1967) showed that Pallas's Grasshopper Warblers put on weight during the latter part of their moult in Malaya, relating the increase to premigratory fat deposition, and it seems possible that our Hume's Lesser Whitethroats were putting on weight in preparation for migration. If this was the case, first year birds would appear to have a different migratory regime. An alternative explanation is that adult Hume's Lesser Whitethroats are normally heavier than first-year birds so that the increase in adult weights as moult slows down and finishes represents a regaining of their "normal" weight after the moult period - during which they may well have lost condition due to a reduction in feeding efficiency and an increased energy requirement associated with the replacement of their plumage.

Moult

Eighteen birds in primary moult were caught and seven were subsequently retrapped. Figure 34 indicates that the duration of primary moult is probably very variable, durations obtained from extrapolating long-term retraps varying from forty-six days to seventy-eight days. Unfortunately we arrived at Tikse some time after birds started moulting and caught none with a primary score of less than nine, so that we have no picture of the early stages of primary moult. The overall trend of the graph indicates an average duration of moult of about sixty-five days, and a median date of completion of moult in mid-September. The number of primaries being actively replaced was most often three, but varied from one to five and had a mean of 3.2.

We obtained a clearer overall picture of the moult of the secondaries, since they moult late relative to the primaries. Figure 35 indicates that onset of secondary moult is also spread over quite a long period, probably from early August to early September, and that the duration of secondary moult is about forty to forty-five days. Figure 36 shows how late the secondaries moult relative to the primaries, probably seldom starting until after primary score twenty, and apparently sometimes not finishing until well after the primaries have finished moulting, although most would appear to finish moulting both tracts at much the same time.

Tail moult follows a very similar pattern to primary moult in this species, and the similarity between Figures 34 and 37 is very striking. Duration of tail moult is about fifty to sixty-five days on average, and tail growth is apparently at a fairly uniform rate, although the retraps show a slight sigmoidal tendency. Figure 38 clearly shows the closeness of the relationship between primary moult and tail, most birds probably start moulting their tails between primary scores zero and ten, and complete moulting both tracts at much the same time.

Citrine Wagtail (Motacilla citreola)

Ageing and Sexing

Of twenty-five adults caught, three were birds nesting at Tikse and twenty-one were birds in wing moult of unknown origin. Eight juveniles caught between 14 and 28 September were in distinctive juvenile plumage, and two probable first-years caught in September could not be certainly aged, since after the post-juvenile moult first-year birds cannot be told from many adults. The remaining bird, trapped on 19 September, had moulted its inner four greater coverts which is a strategy of post-juvenile moult, enabling the bird to be aged as a first-year. Figure 39 shows that the frequency distribution of winglength is bimodal, with peaks for females at 81 and males at 84 mm. Our samples were, however, rather small and this could account for the abnormalities in the distribution pattern. It is interesting to note from the graph that four birds tentatively

sexed by us as males on plumage characteristics were in fact probably females on winglength, so that the sex ratio of adults caught was probably fourteen males to eleven females. From the graph, the sex ratio of juveniles caught was six males to five females.

Catching Patterns

Birds were caught rather spasmodically, and we do not consider that the rate at which we caught this species was indicative of the level of its presence either at the ringing site or in the wider area of the Indus Valley. There were days when quite large flocks were seen on riverside grass at Choglamsur and She, and flying over Tikse, when none were caught at the ringing site. The last bird was trapped on 28 September.

Weight

No significant changes in weight occurred as time progressed, but overall mean weights with standard errors are given in Table III at the end of this section.

Moult

Twenty Citrine Wagtails moulting their primaries were trapped, and one was subsequently retrapped. Figure 40 indicates a duration of moult of around fifty days if the retrap is extrapolated, and perhaps a little longer, fifty to sixty days, if the overall pattern of points is scrutinised. The graph indicates a considerable spread in onset of moult of about forty-five days from the third week in July until nearly two weeks into September, although all birds bar one - the one which was retrapped - had probably started moulting by the end of the third week in August, and if this bird is disregarded, the spread in onset of moult is reduced to about a month, and the average date of onset of moult can be put back to the second week in August. From this, a typical average date of completion of moult would be the third week in September. The number of feathers being actively replaced varied from one to five, and had a mean of 3.1.

Figures 41 and 42 show the pattern of moult in the ten birds caught that were actively moulting their secondaries. Figure 41, with the one late exception already noted, indicates that secondary moult is late and rapid, probably having a duration of about thirty days on average, from the end of August to the end of September. The lateness of secondary moult relative to primary moult is brought out in Figure 42, which implies that secondary moult normally starts between primary score twenty and thirty-five, and that both tracts stop growing at much the same time.

Eighteen Citrine Wagtails were caught that were moulting their tails. From Figure 43, the duration of tail moult would appear to be forty to fifty days, although the retrap implies a slightly shorter period of thirty-five to forty days. Figure 44 indicates that tail moult generally begins between primary scores zero and twenty, and finishes at about the same time.

Hume's Short-Toed Lark (Calandrella acutirostris)

Identification, Ageing and Sexing

A discussion of the problems we encountered in separating Short-Toed Larks (C.cinerea) from Hume's Short-Toed Larks (C.acutirostris) appears in the main Systematic List. Out of the eighteen birds trapped nine could not be specifically identified because primary feathers whose formula is crucial to identification were in moult; of the remaining nine, five were Hume's Short-Toed Larks, and four still could not be identified, having wing formulae intermediate between the two species. All birds except one were aged, since although Short-Toed Larks are amongst the minority of species where both adults and first-year birds undergo full moult of rectrices and remiges in the autumn, the state of wear of unmoulted feathers is very diagnostic, adults being worn and first-years fresh. In addition first-year birds in early stages of their post-juvenile moult have the feathers of the upperparts broadly edged buffish white. Eight adults and nine first-year birds were caught.

Catching Patterns

Only one bird was caught after early September because at that time we were forced to move our nets from the areas frequented by this species, since they were also frequented by livestock which caused untold damage to the nets. Too few birds were caught for significant trends in biometric data to be elucidated, although we did get some idea of moult strategy.

Moult

In the month or so when we were catching this species eighteen birds in active primary moult were trapped and three were subsequently retrapped. Figure 45 shows that we only obtained a picture of the middle portion of the moult, birds being caught with primary scores between nine and forty-three, so that it is impossible to tell whether primary growth followed a sigmoidal pattern. Assuming that it did not, the retraps indicate a duration of primary moult of forty-five to fifty days. The earliest onset of moult was probably mid-July, but nothing can be said about the spread in onset of moult because some birds were still in relatively early stages of moult when we stopped catching the species.

We obtained an incomplete picture of secondary moult, Figure 46 shows that only one bird was over half way through its secondary moult when caught. Most of the birds caught were in the early stages of secondary moult, and one of the retraps in Figure 46 advanced only three points in thirteen days. Figure 47 shows that some birds start moulting at quite an early stage of primary moult - mainly between scores twelve and twenty-five and then moult very slowly to begin with. The two birds caught beyond secondary score seven indicate an acceleration in secondary moult after the initial stages. Growth of the secondaries thus appears to be sigmoidal in pattern, at least to begin with.

TABLE III : SUMMARY OF WEIGHT DATA (IN GRAMMES) FOR THE COMMONEST SPECIES CAUGHT

Age/Sex Category	Mean	Standard Deviation	99% Confidence Limits Min.	99% Confidence Limits Max.	Actual Range Min.	Actual Range Max.	Sample Size
MOUNTAIN CHIFFCHAFF							
Total Catch	6.58	0.545	5.2	8.0	5.1	8.0	524
Adults	6.66	0.620	5.0	8.3	5.1	8.0	139
First-years	6.54	0.508	5.2	7.9	5.1	7.8	373
COMMON ROSEFINCH							
Total catch	21.52	1.418	17.8	25.2	18.7	26.7	232
Males third-year and over	21.71	1.346	18.1	25.3	19.3	24.3	37
Adult females & second-year males	21.35	1.423	17.6	25.1	18.7	26.7	151
First-years	21.95	1.383	18.2	25.7	19.4	25.1	44
BLUETHROAT							
Total catch	15.52	1.125	12.6	18.5	12.5	(19.9)	117
Adults	15.07	1.201	11.7	18.4	12.9	16.8	24
First-years	15.64	1.079	12.8	18.5	12.5	(19.9)	93
GULDENSTADT'S REDSTART							
Total catch	24.21	1.524	20.2	28.3	21.0	27.3	83
Males	25.04	1.166	21.9	28.2	22.5	27.3	49
Females	23.02	1.139	19.9	26.2	21.0	25.0	34
HUME'S LESSER WHITETHROAT							
Total catch	13.92	0.915	11.5	16.4	11.8	16.3	85
Adults	14.13	0.962	11.5	16.8	12.0	16.1	32
First-years	13.80	0.871	11.5	16.1	11.8	16.3	53
CITRINE WAGTAIL							
Total catch	17.87	1.320	14.3	21.4	14.8	20.6	40
Adults	17.74	1.239	14.3	21.2	14.8	20.5	29
First-years	18.20	1.579	12.9	23.5	15.7	20.6	9
HUME'S SHORT-TOED LARK							
Total catch	18.99	1.044	16.0	22.0	17.5	20.7	20
Adults	19.06	1.220	14.8	23.3	17.5	20.7	8
First-years	18.83	0.934	15.9	21.8	17.9	20.5	11

(The largest first-year Bluethroat weight (19.9 gms) is suspiciously high and may be incorrect. The next heaviest bird weighed 18.2 gms.)

TABLE IV : SUMMARY OF WINGLENGTH DATA (IN MMS) FOR THE COMMONEST SPECIES CAUGHT

Age/Sex Category	Mean	Standard Deviation	99% Confidence Limits Min.	Max.	Actual Range Min.	Max.	Sample Size
MOUNTAIN CHIFFCHAFF							
Total catch	56.2	2.618	49	63	50	62	406
Adults	56.4	3.267	48	65	50	62	104
First-years	56.1	2.359	50	62	52	61	296
COMMON ROSEFINCH							
Total catch	83.7	2.767	76	91	77	91	173
Males third-year and over	87.2	1.730	82	92	84	91	30
Adult females & second-year males	83.0	2.263	77	89	77	88	117
First-years	83.0	2.800	75	91	78	89	26
BLUETHROAT							
Total catch	72.0	2.077	67	78	67	77	83
Adults	72.1	3.029	63	81	67	75	12
First-years	72.0	1.900	67	77	68	77	70
GULDENSTADT'S REDSTART							
Total catch	104.8	3.849	95	115	98	112	82
Males	107.5	2.083	102	113	103	112	47
Females	101.2	2.545	94	108	98	107	35
HUME'S LESSER WHITETHROAT							
Total catch	70.0	1.741	65	75	67	75	61
Adults	70.3	1.880	65	76	67	74	21
First-years	69.9	1.667	65	74	67	75	40
CITRINE WAGTAIL							
Total catch	82.9	3.067	75	91	78	91	35
Adults	83.2	3.092	75	92	79	91	24
First-years	82.4	3.283	71	93	78	86	9
HUME'S SHORT-TOED LARK							
Total catch	90.3	3.982	79	102	84	99	18
Adults	91.1	3.758	78	104	85	98	8
First-years	89.6	4.475	75	105	84	99	9

Tail moult appears to be very rapid, the long term retrap in Figure 48 suggests a duration of moult of only about twenty-five days, despite being initially captured before the tail started moulting. Figure 49 indicates that moult of the tail starts between primary score twenty and twenty-five, and finishes before the primaries, between scores forty and forty-five.

SECTION II : Species of which few were ringed

Baillon's Crake (Porzana pusilla)

On 23 September we set two simple wire-mesh walk-in traps, and within minutes caught a Baillon's Crake. Another was trapped at dusk the same day, but none subsequently. The traps continued catching Bluethroats and the odd Tree Pipit (and on one occasion an enraged weasel). Both Crakes were juveniles. Measurements were taken as follows :

Wing	Bill (To Feathers)	Tarsus	Tail	Weight
90	18.5	21.	45	40.5
92				38.5

Wryneck (Jynx torquilla)

Two of these superb birds were mist.netted, one on 9 September and one on 7 October. Neither could be aged. The following measurements were taken :

Date	Wing	Bill	Tarsus	Tail	Weight
9.9	89	10 (to feathers)		67	
7.10	89	15 (to skull)	21.	67	32

Hoopoe (Upupa epops epops)

Two were trapped together in a mist-net on 12 August. Both were juveniles still growing their remiges and retrices, so that wing measurements are given in brackets.

Wing	Bill (to feathers)	Weight
(151)	45	59.5
(151)	55	69.5

The first was retrapped on 15 August with weight and measurements virtually unchanged.

Swallow (Hirundo rustica rustica)

One, a juvenile was mist-netted on the evening of 2 September.

Wing	Tarsus	Tail	Weight
126	11.5	74	17.8

The measurements show the bird to have been of the western race.

Rufous-Backed Shrike (Lanius schach erythronotus)

An adult netted on 11 August was retrapped on 3 September, and a juvenile was caught on 13 September.

The adult was commencing its moult when first trapped, having the inner two primaries on both wings at stage two of growth and the central pair of tail feathers in pin. It also had a brood patch. When retrapped it appeared to have arrested its moult, having shed no more remiges but grown the inner two primaries on both wings to stage five. The tail on retrap had the central three pairs and second outermost pair still growing, the remainder of the tail comprising four old feathers. The bird was retrapped under revealing circumstances, there being a dying toad agamid lizard beside it in the net, which it had presumably caught just before flying into the net.

	Date	Age	Wing	Bill	Tarsus	Tail	Weight
	11.8	Adult	92	18	22.5	108	
(retrap)	3.9	Adult	92				39.5
	13.9	Juv.	91				37.5

Brahminy Mynah (Sturnus pagodarum)

A vociferous adult was unexpectedly netted on 11 September. It had a wing of 107 mm and a weight of 48.5 grammes.

Magpie (Pica pica bactriana)

One was mist-netted on 15 August. It was probably a juvenile as it had a black rump, and adult Kashmir Magpies (P.p.bactriana) have white rumps. The winglength was 191 mm, and weight 122.5 grammes.

Great Reed Warbler (Acrocephalus arundinaceus)

An abraded adult caught on 16 August had the following measurements :

Wing	Bill	Tarsus	Tail	Weight
91	22	32	72	25.1

Its wing formula is given below :

Wing-point 2nd = 3rd; 4th, 1½; 5th, 5; 6th, 9; 7th 12½; 8th 16; 9th 19; 10th, 23; Secondaries, 25; 1st pp -9 from primary coverts. Emarginated on 3rd. Notch on 2nd 17.5.

Paddyfield Warbler (Acrocephalus agricola)

A juvenile was caught at dawn on 5 October and the following measurements were taken :

Wing	Bill	Tarsus	Tail	Weight
58	15	22	52	8.8
			Tail difference 8½	

The bird's wing formula is given below :

Wing-point 3rd = 4th; 5th, 1; 6th, 4; 7th, 6; 8th, 7½; 9th, 9; 10th, 10½; Secondaries, 12. 2nd, 4½; 1st -½ from primary covs. Emarginated 3rd 4th 5th. Notch on 2nd, 12½.

Lesser Whitethroat (Sylvia curruca blythi/margelanica)

Three were trapped, all juveniles and details were taken as follows :

Date	Wing	Bill	Tarsus	Tail	Weight
13.9	65	12	21.5	58	10.7
14.9	68	12.5	22.5	62	11.5
17.9	66				10.8

The first bird was retrapped at 8.00 a.m. on 14 September when it weighted 10.4 grammes. The wing formulae for these birds are given below :

	Primary Number									
Date	10	9	8	7	6	5	4	3	2	1 (from PC)
13.9	10	9	7½	5½	2½	½	WP	WP	4	+4
14.9	11	9	7½	6	3	½	WP	WP	5	+4
17.9	11	9½	8	5½	3	½	WP	WP	4½	+1½

All were emarginated on 3rd to 5th primaries.

Chiffchaff (Phylloscopus collybita tristis)

Four were trapped, and measurements were taken as follows :

Date	Age	Wing	Weight
30.9	3	62	7.6
1.10	3	57	6.2
5.10	2	63	7.7
10.10	3	61	6.7

The first bird also had bill (to skull) 11, tarsus 20½, tail 49. Wing formulae of these birds were as follows :

	Primary Number									
Date	10	9	8	7	6	5	4	3	2	1 (from PC)
30.9	9½	8½	6½	4	1	WP	WP	WP	6½	+6
1.10	9	7½	6	3½	1	WP	WP	½	7	+5½
5.10	2 = 7/8			WP = 345						
10.10	2 = 7/8			WP = 345						

All were emarginated on the 6th primary.

Plain Leaf Warbler (Phylloscopus neglectus)

A very abraded adult was trapped on 12 August. Its measurements were :

Wing	Bill	Tarsus	Tail	Weight
50	9½	17½	38	5.7

Greenish Warbler (Phylloscopus trochiloides viridanus)

Altogether five were trapped, with details as follows :

Date	Age/Sex	Wing	Bill	Tarsus	Tail	Weight
21.8	3 ♂	66	12.5	19.5	48	-
	3 ♀	59	12.5	20	41½	6.7
26.8	3	62	12.5	21	45	7.1
29.8	3	62	12	20	42	7.5
14.9	3	60				7.6

Date	Notch on 2nd PP	SS	Primary Number 10	9	8	7	6	5	5	3	2	1	
21.8	9	12	11½	9	8	5½	2½	WP	WP	WP	7½	+6	(from PC)
21.8	14½	14	12	11½	10½	7½	4	½	WP	WP	9	+6	" "
26.8	8	10	10	9½	8	6	3	½	WP	½	7	+7	
29.8		12½	12½	11½	10	7½	3½	½	WP	½	7½	+7	
14.9			10	9½	8	6	2½	½	WP	½	7	+6½	

All were emarginated on primaries 3 to 6.

Black Redstart (Phoenicurus ochruros)

Ten were trapped details of which are given below.

Date	Age	Wing	Weight
15.8	1st yr	80	14.6
29.8	1st yr	81	15.0
9.9	?	82	15.5
11.9	1st yr	85	15.8
17.9	1st yr	84	14.8
17.9	?	82	13.1
20.9	?	82	15.7
22.9	?	89	16.1
1.10	1st yr	85	15.5
2.10	?	89	17.8

Birds were aged as juveniles using a combination of the presence of fault bars and of tail abrasion. There was a tendency for birds caught later in the season to have relatively long wings. A possible explanation for this is that they were from a non-local population of larger birds migrating through. However, given sex differences and the small size of the catch this is only a tentative suggestion.

Black-Throated Thrush (Turdus ruficollis atrogularis)

Two of these handsome thrushes were netted in October, on 2nd and 9th. Measurements were taken as follows :

Date	Age/Sex	Wing	Bill	Tarsus	Tail	Weight
2.10	1st yr.(f)	132	24	32	90	65.5
9.10	Adult (m)	138	25	32	96	78.0

Robin Accentor (Prunella rubeculoides)

One trapped on 9 October had a wing of 74 mm and a weight of 20.1 grammes.

Brown Accentor (Prunella fulvescens)

Another altitudinal migrant, this species was caught only during the last eight days of our stay. None could be aged with certainty and the birds showed very little variability in measurements or weights. Winglengths and weights are given below. The first, for which we took full measurements, had Bill 14½ mm, Tarsus 21½mm, and Tail 58 mm.

Date	Wing	Weight
6.10	75	15.7
7.10	75	16.6
7.10	76	16.7
7.10	76	17.1
7.10	77	16.2
9.10	75	15.1
10.10	74	16.2
11.10	78	16.5

Black-Throated Accentor (Prunella atrogularis huttoni)

One was netted on 9 and one on 10 October. Measurements are given below.

Date	Age	Wing	Bill	Tarsus	Tail	Weight
9.10	1st yr	75	14½	21	61	18.7
10.10	1st yr.?	75	14	21	62½	19.9

Grey Tit (Parus major cashmiriensis)

Eight were caught altogether, details of which are given below.

Date	Age/Sex	Wing	Weight
25.8	1st yr	75	13.8
25.8	1st yr	77	15.1
25.8	1st yr	74	15.0
11.9	1st yr	74	16.7
14.9	1st yr	72	15.6
10.10	Adult (m)	78	15.7
10.10	Adult (m)	77	16.9
10.10	Adult (f)	77	15.6

The three adults caught on 10 October were all completing their tail moult having already finished moulting their remiges. The third juvenile caught on 25 August was retrapped on the 28th weighing 15.5 grammes and the one caught on 11 September was retrapped on 14 September weighing 16.4 grammes.

Eurasian Tree Pipit (Anthus trivialis)

Altogether two were mist netted and one caught in a rail trap. Biometric details are given below.

Date	Wing	Bill	Tarsus	Weight	Hind claw
13.9	91	15	23	21.8	7½
14.9	86	14½	21½	23.0	8
3.10	87	-	-	21.2	7½

Wing formulae.

	Primary Number									
Date	10	9	8	7	6	5	4	3	2	1 (from PC)
13.9	24	22	20	16½	11½	3	WP	½	1	-7
14.9	22½	20½	18½	15½	10	2	WP	WP	1½	-10
3.10	27	24	21	17	12½	3	WP	WP	½	-7

All were emarginated on primaries 3, 4 and 5. None of these birds could be aged with certainity.

Rose-Breasted Pipit (Anthus roseatus)

An adult female trapped on 8 October was retrapped on 10th. The plumage was virtually identical to a Meadow Pipit but some of the measurements differed.

Wing 83, bill to skull 15, bill depth 4, bill width 4½, tarsus 22, hindclaw 9½, tail 57, weight 19.6.
Wing formula : Emarginated 345. 1st and 2nd primaries moulting on both wings (at feather growth stage 4). Wing-point 4th = 5th; 6th, 8½; 7th, 12½; 8th, 14; 9th, 17; 10th, 19; and 3rd, 2.

The rather stout bill, and hindclaw intermediate between Meadow and Tree Pipit are diagnostic.

Hodgson's Pied Wagtail (Motacilla alba alboides)

Of eight birds trapped five were adults in moult. Biometric data are given below.

Date	Age/Sex	Wing	Weight
10.8	Adult (m?)	96	23.0
20.8	Adult (m)	97	24.0
29.8	Adult (m?)	95	22.4
30.8	Adult (m?)	93	24.1
2.9	1st yr	92	19.6
2.9	1st yr	89	21.1
14.9	Adult	92	19.2
17.9	1st yr ?	98	24.4

All the adult had at least some black in the mantle and thus were M.a.alboides rather than M.a.personata or M.a.dukhunensis. The first year birds however may not have been M.a.alboides.

Moult

Graphs of the progress of moult (Figures 50 - 52) yield little information because only five birds in moult were trapped. Figure 51 shows that the secondaries probably start to moult between primary score twenty and thirty-five, and finish before or roughly at the same time as the primaries. The tail appears to start moult at an earlier stage of primary moult, and to take longer to complete its moult than the secondaries (Figure 52).

House Sparrow (Passer domesticus)

Only five were ringed, although more than this were caught. This was because we were short of size AB rings and decided to use them on Common Rosefinches rather than Sparrows. It was only towards the end of the expedition that we realised that size A, the next size down, would fit most Sparrows, and those Sparrows that we ringed were fitted with this size ring. All the birds caught had completed their moult except for two, which still had the outer two primaries growing. As first-year Sparrows undergo a complete post-juvenile moult these birds could not be aged.

Date	Sex	Wing	Weight	
1.10	m.	84	28.7	(moulting)
4.10	m.	83	25.7	
10.10	f.	78	24.2	
10.10	m.	80	26.7	(moulting)
10.10	m.	78	22.8	

Eastern Great Rosefinch (Carpodacus rubicilloides)

Four of these enormous finches were trapped, all in the last ten days of our stay at Tikse. Measurements were as follows :

Date	Wing	Bill	Tarsus	Tail	Weight
30.9	109	16	26½	94	40.5
3.10	105				39.0
7.10	106				48.0
10.10	108				36.5

All of these birds were in the streaked grey plumage of females or immature males. Their feathers were new and unworn.

SECTION III : Figures

The fifty-two graphs form the basis of the preceding discussion. Most of the graphs show how variables changed with time, which is often expressed in terms of five day catching periods. The time we spent at Tikse was split into thirteen catching periods as follows :

Period 1, 9 - 13 August; 2, 14 - 18 August; 3, 19 - 23 August; 4, 24 - 28 August; 5, 29 August - 2 September; 6, 3 - 7 September; 7, 8 - 12 September; 8, 13 - 17 September; 9, 18 - 22 September; 10, 23 - 27 September; 11, 28 September - 2 October; 12, 3 - 7 October; 13, 8 - 12 October.

All winglengths are expressed in millimetres, and all weights in grammes. The weight graphs show each mean weight as a point, with a bar representing one Standard Deviation extending above and below. On the graphs of moult, lines connect retraps with the point of initial capture, and in one or two cases pecked lines have been used to show that a bird was not in moult at one of the captures, or to show that an abnormality occurred between initial capture and retrapping.

MOUNTAIN CHIFFCHAFF WINGLENGTH

Figure 1 Adults

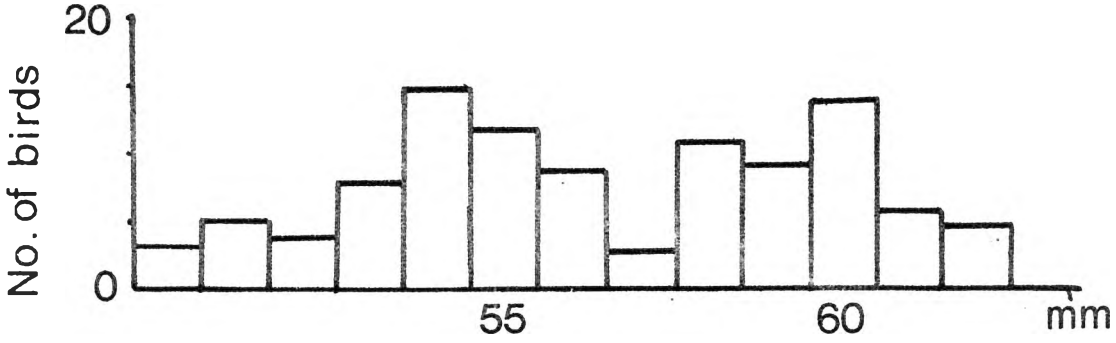
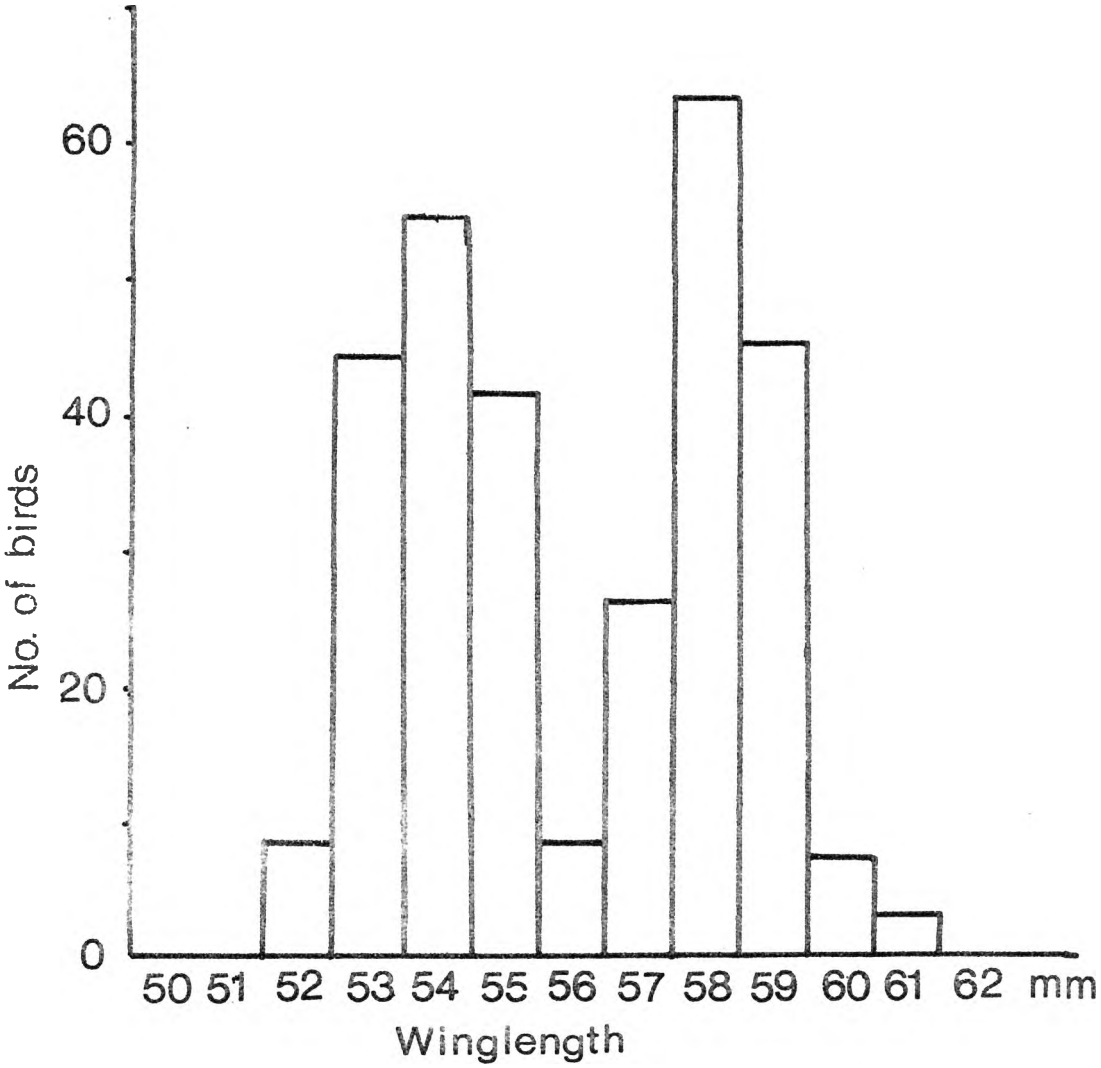


Figure 2 First years



MOUNTAIN CHIFFCHAFF CATCH RATE

Figure 3 Adults

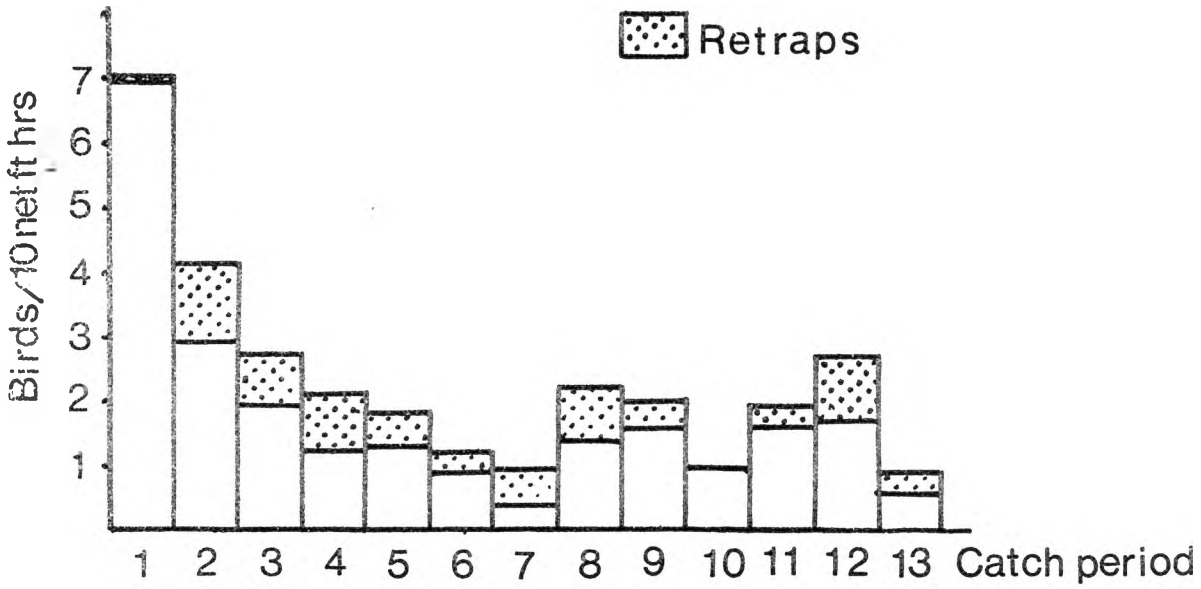
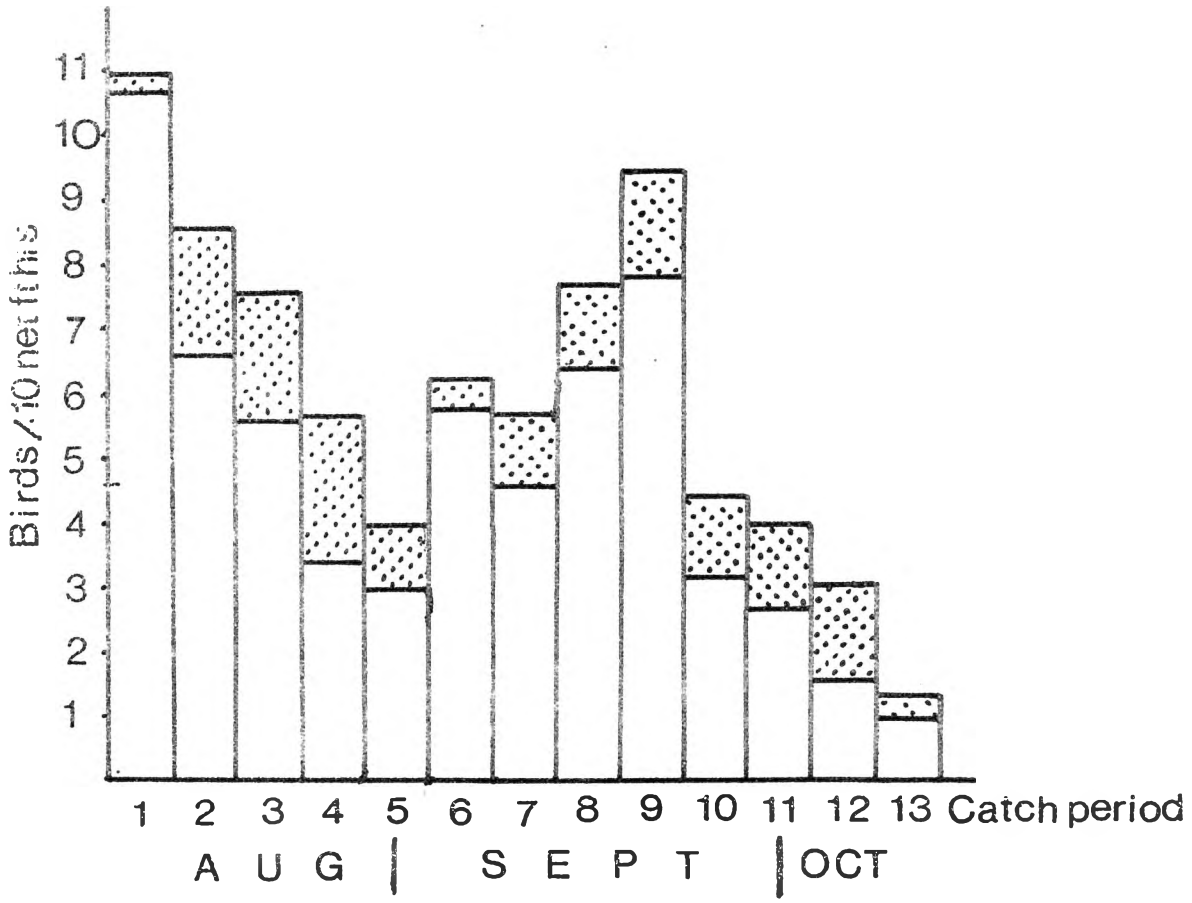


Figure 4 First years



MOUNTAIN CHIFFCHAFF MEAN WEIGHT

Figure 5 Adults

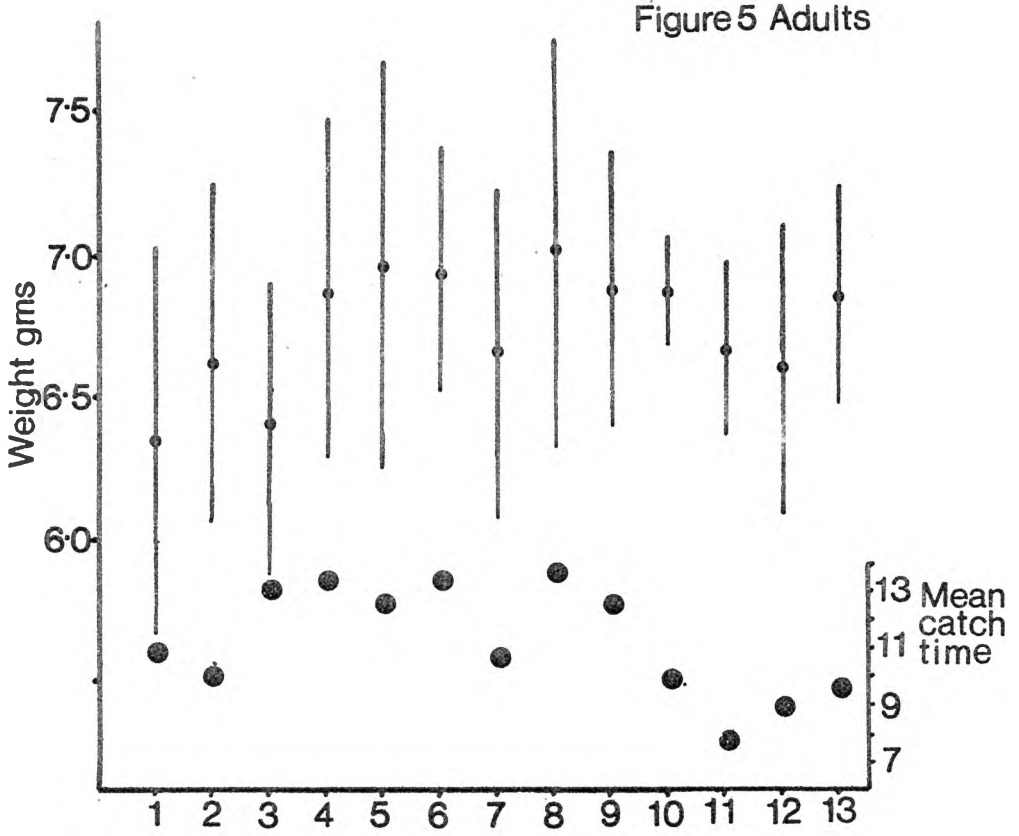
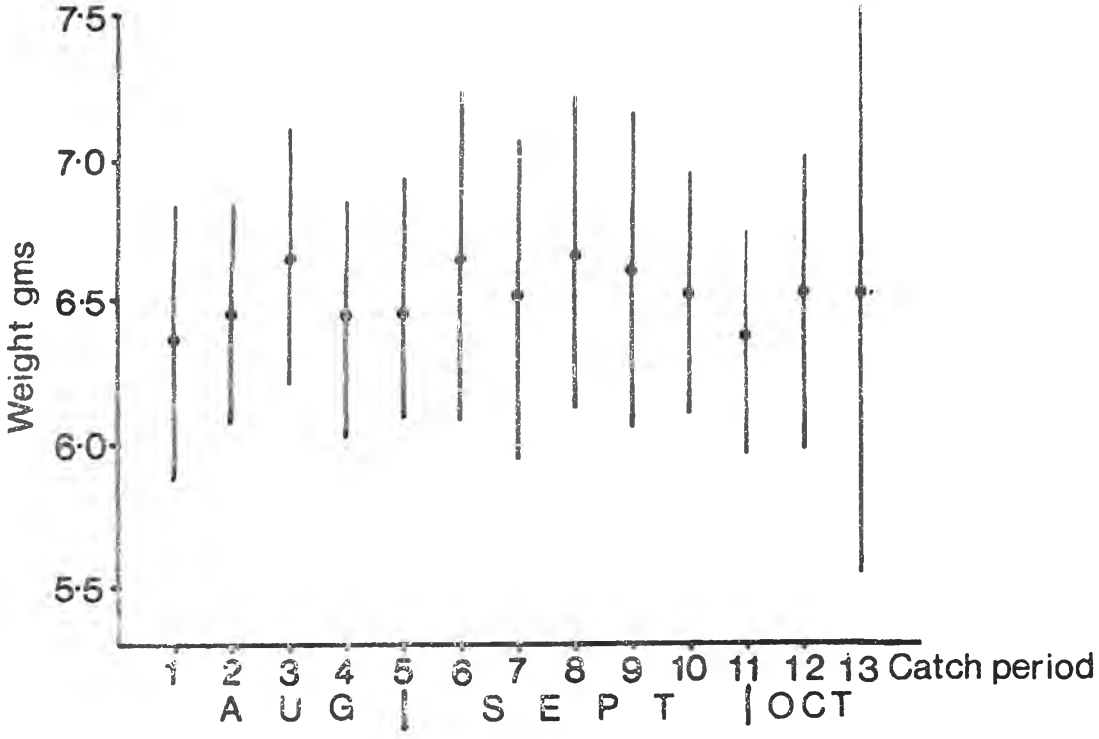
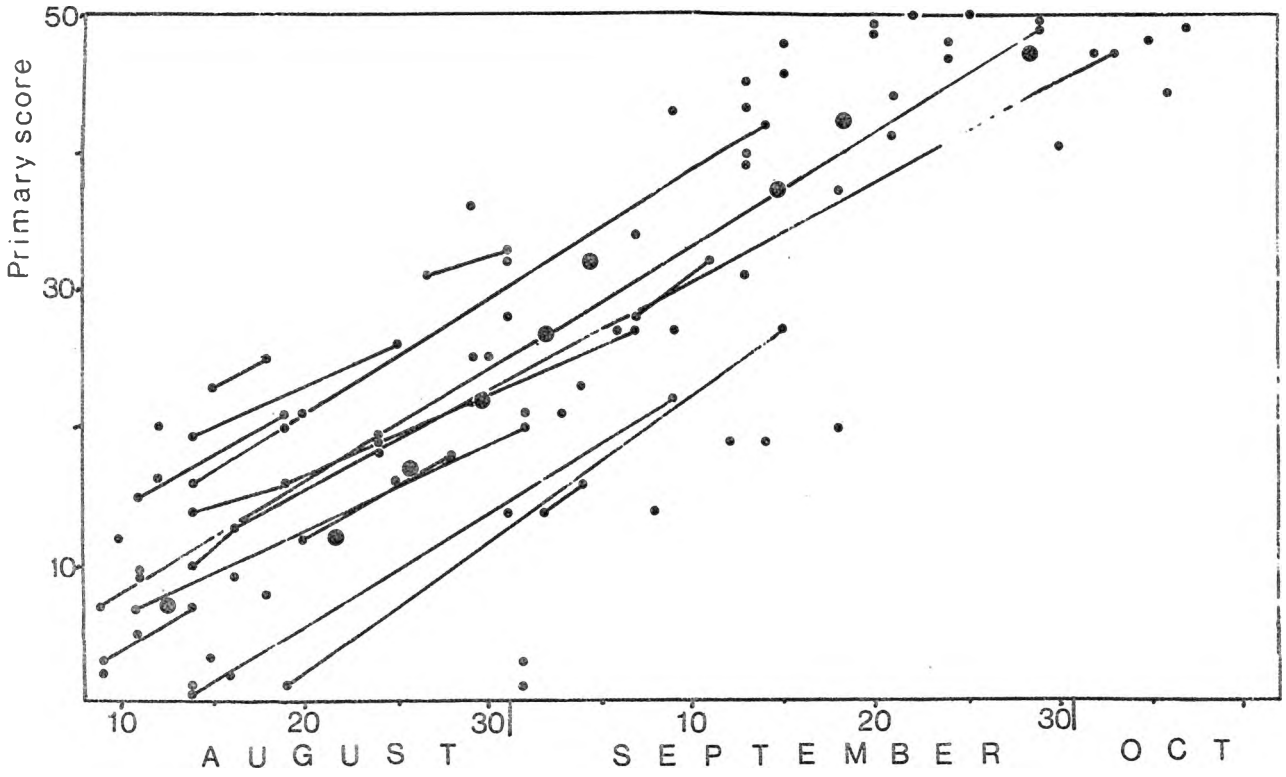


Figure 6 First years



MOUNTAIN CHIFFCHAFF MOULT Figure 7



MOUNTAIN CHIFFCHAFF MOULT

Figure 8

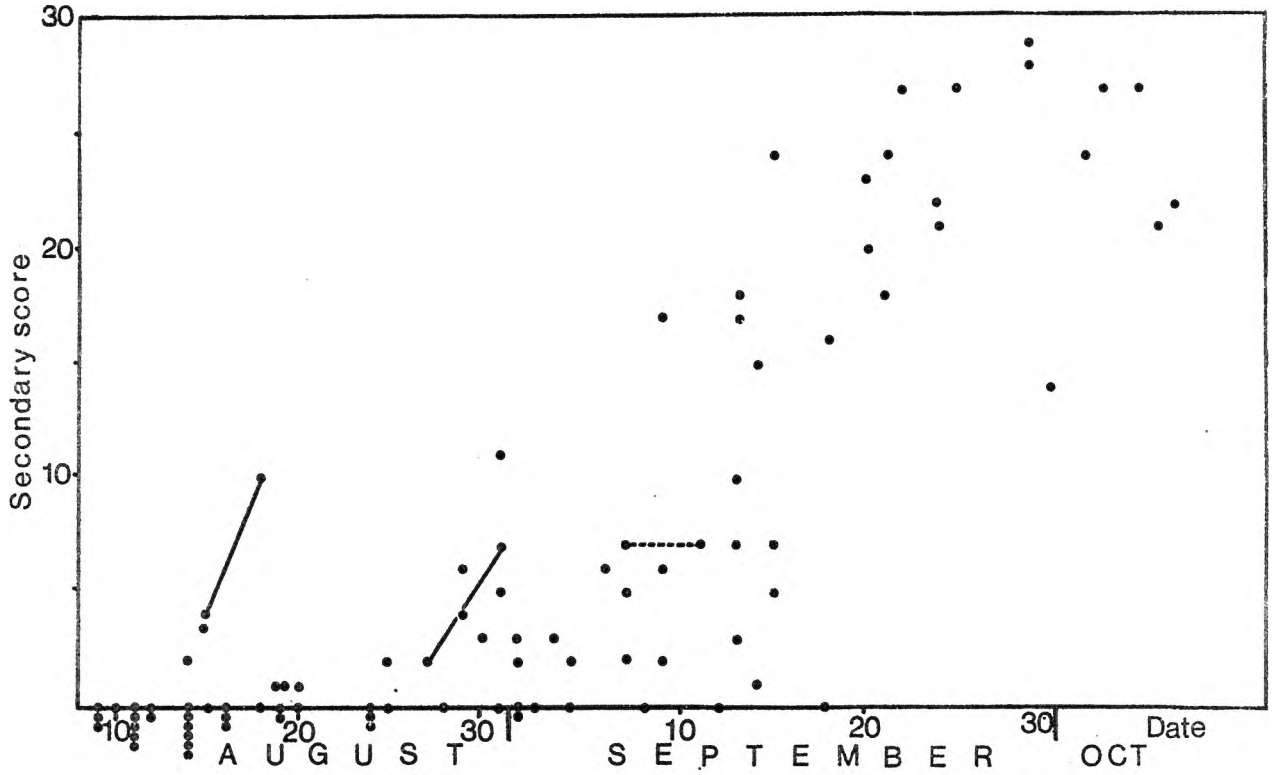
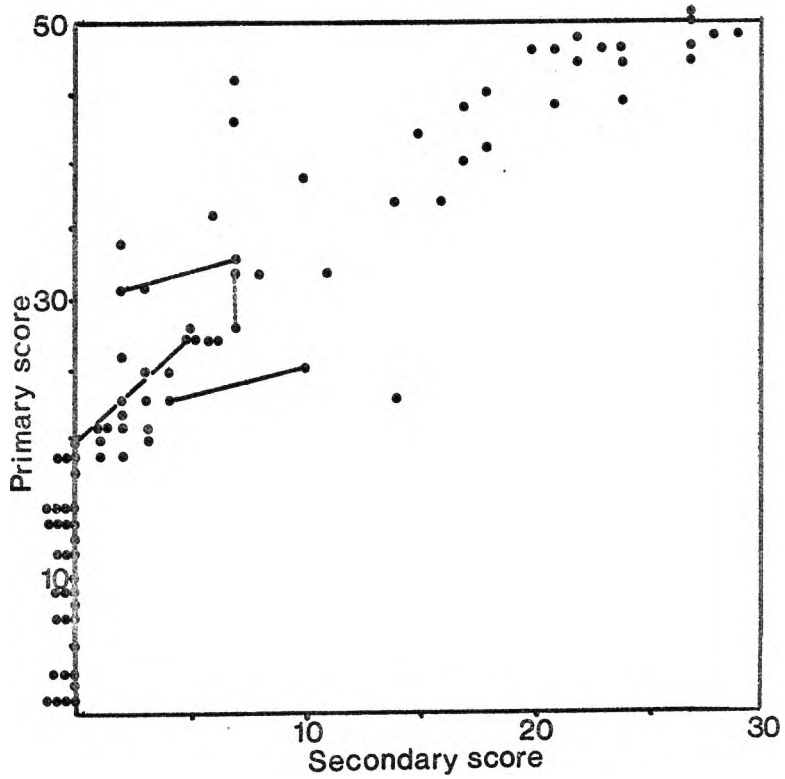


Figure 9



MOUNTAIN CHIFFCHAFF MOULT

Figure 10

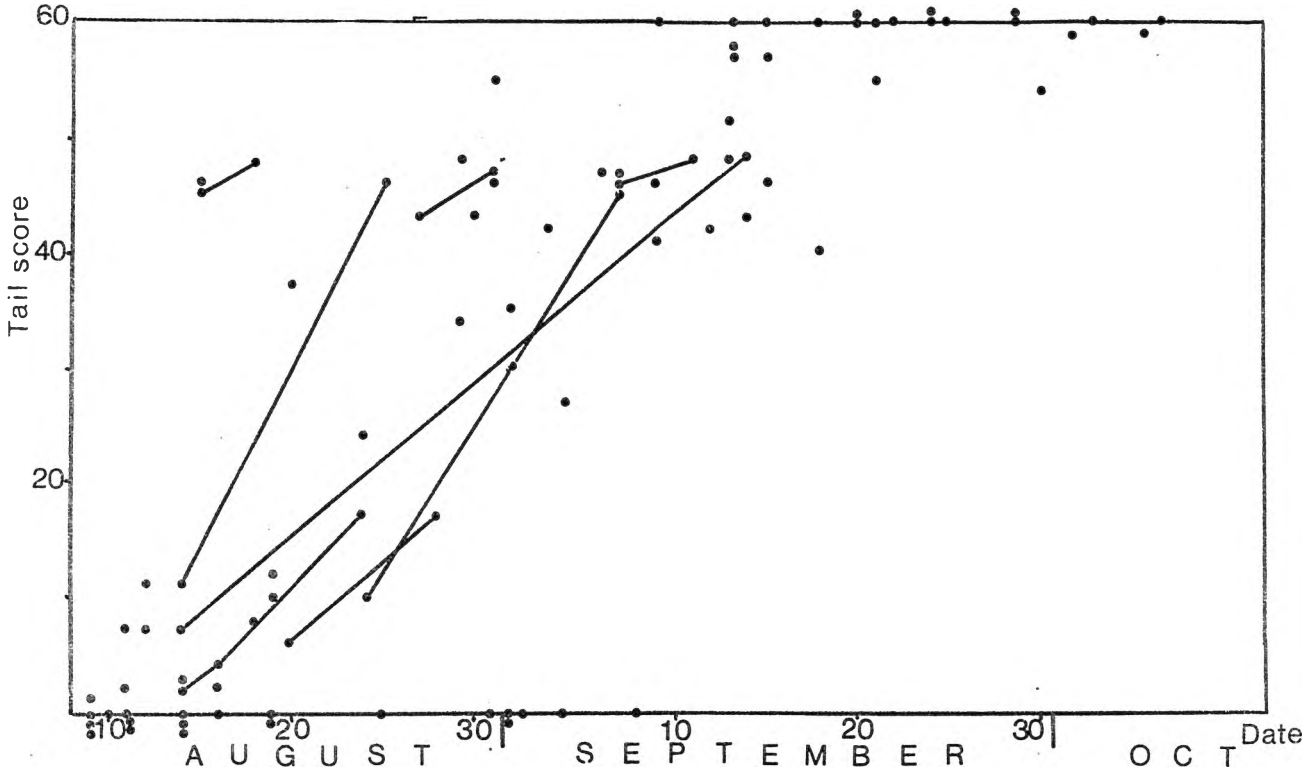
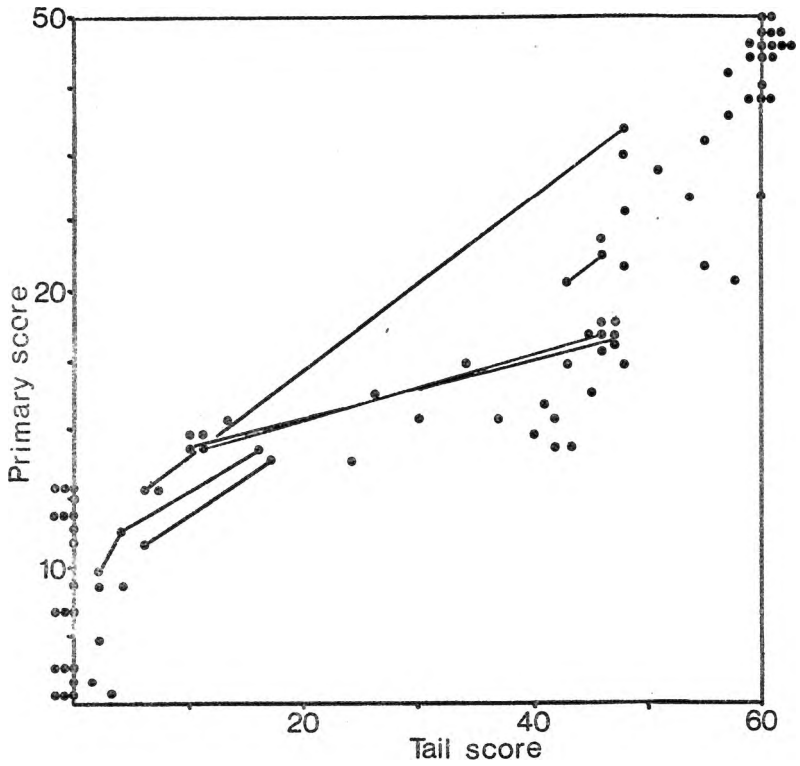
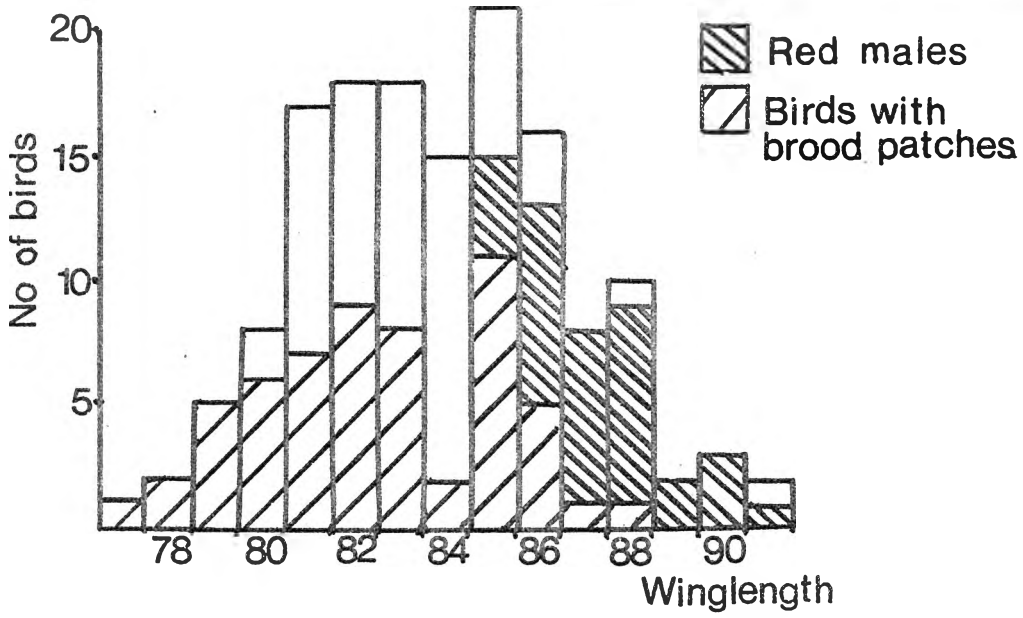


Figure 11



COMMON ROSEFINCH

Figure 12 Adult winglength



Catch Rates

Figure13 Adults

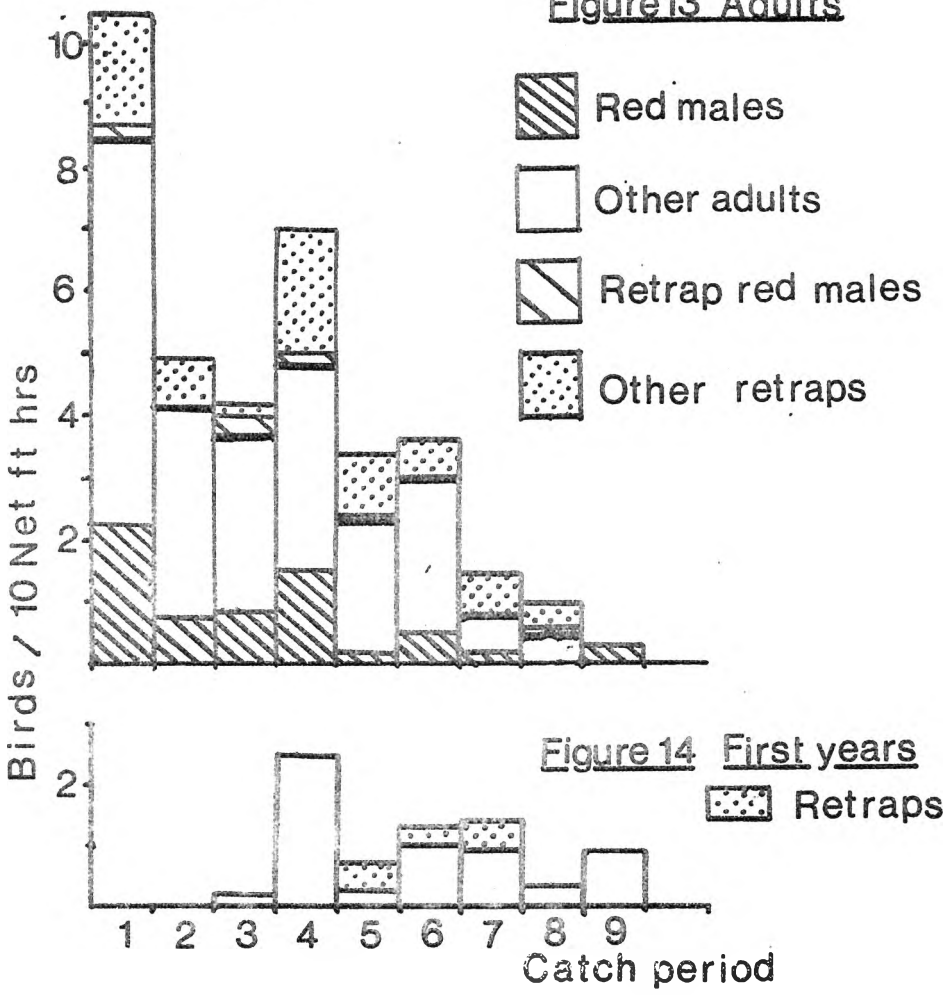


Figure 14 First years

COMMON ROSEFINCH MEAN WEIGHT

Figure 15 First years

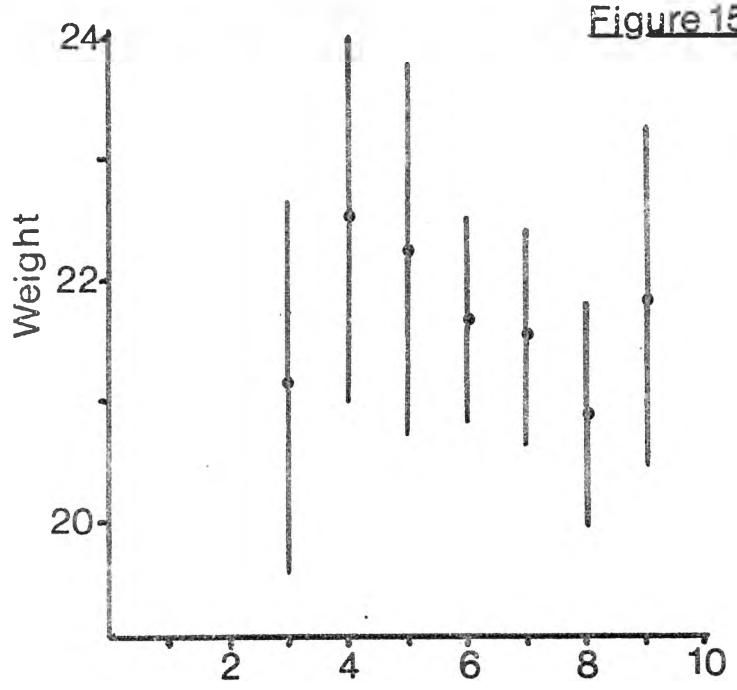
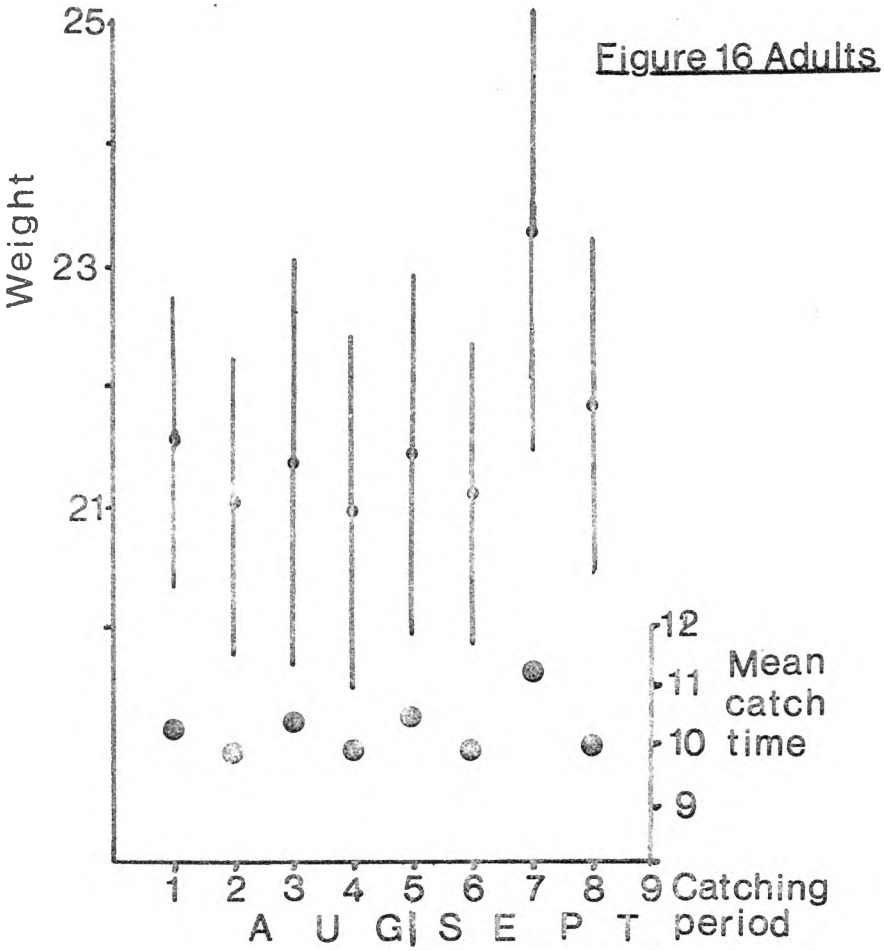
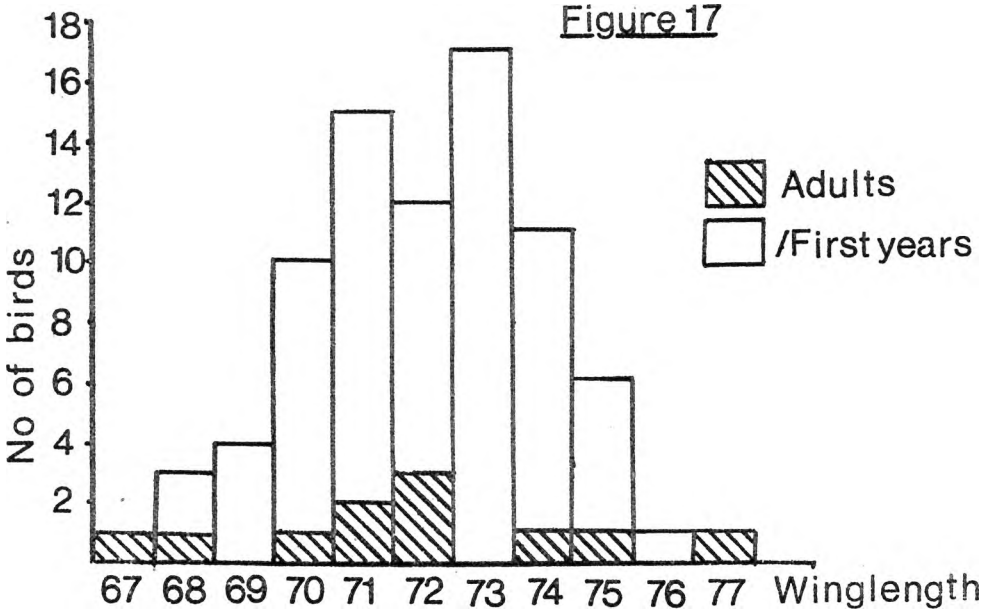


Figure 16 Adults



BLUETHROAT

Figure 17



Catch rates

Figure 18 Adults

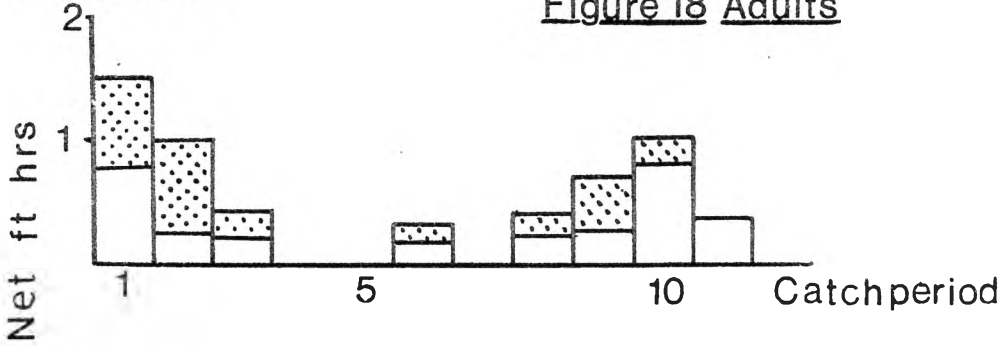
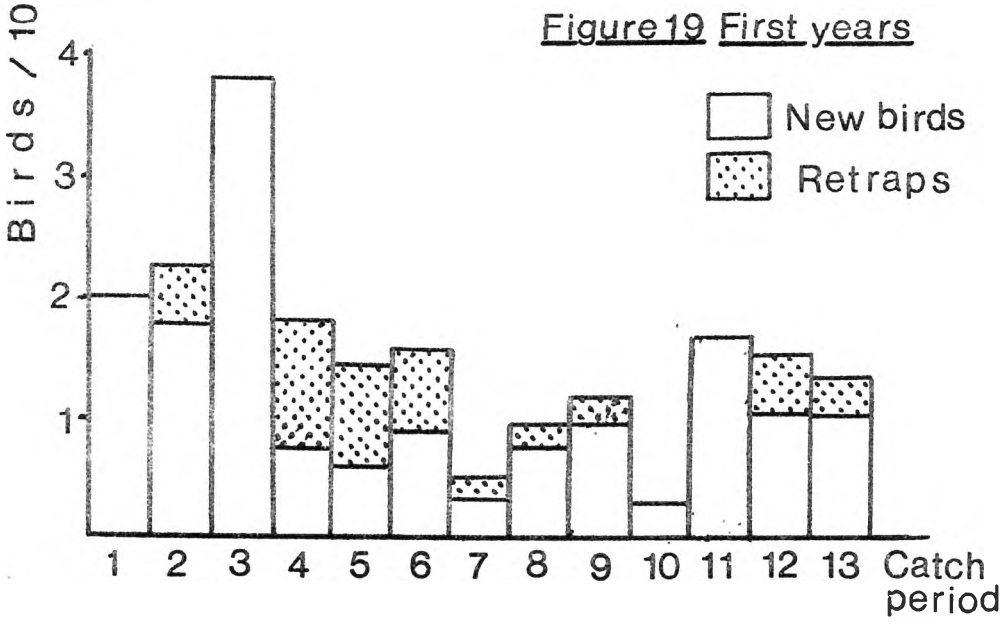


Figure 19 First years



BLUETHROAT WEIGHT

Figure 20 Adults

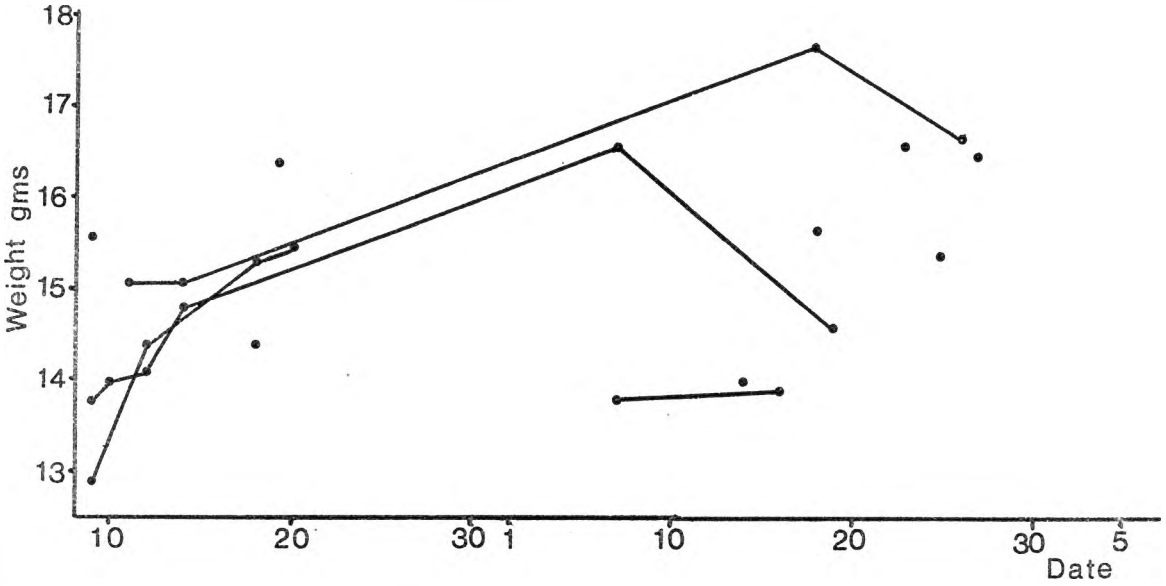
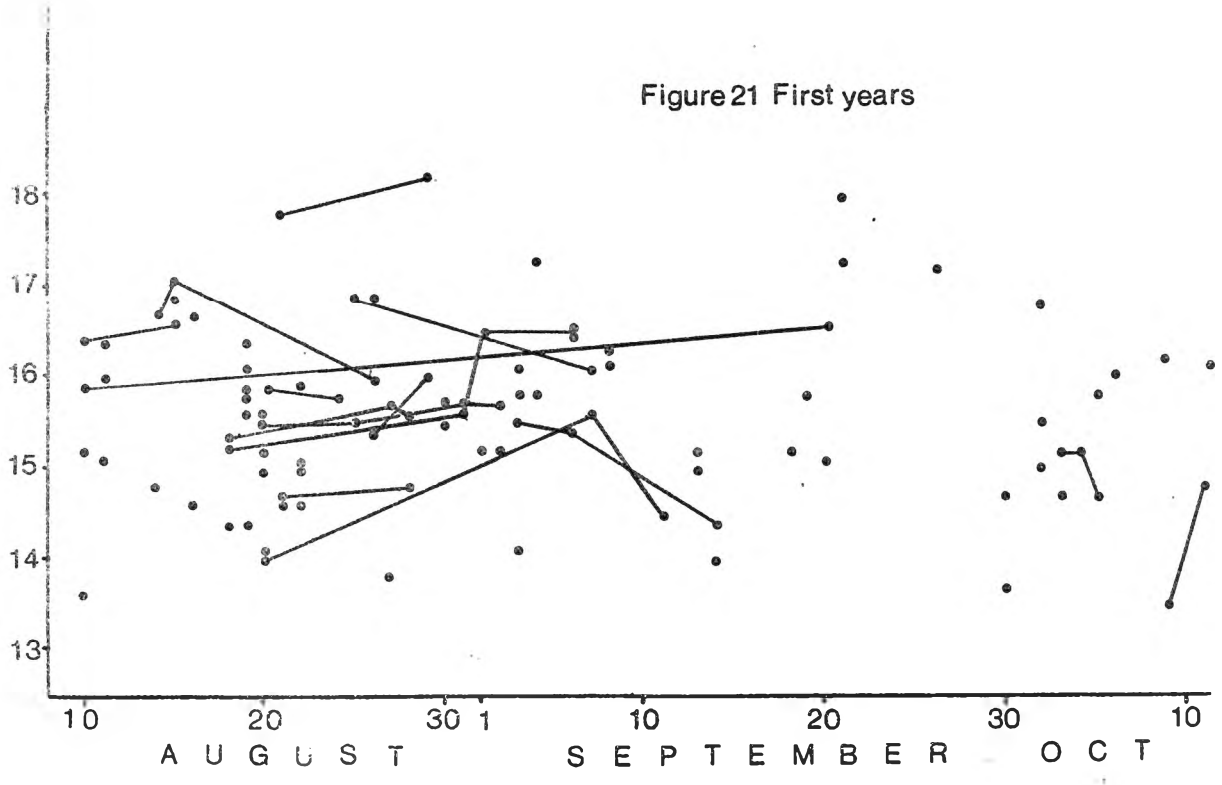


Figure 21 First years



BLUETHROAT MOULT

Figure 22

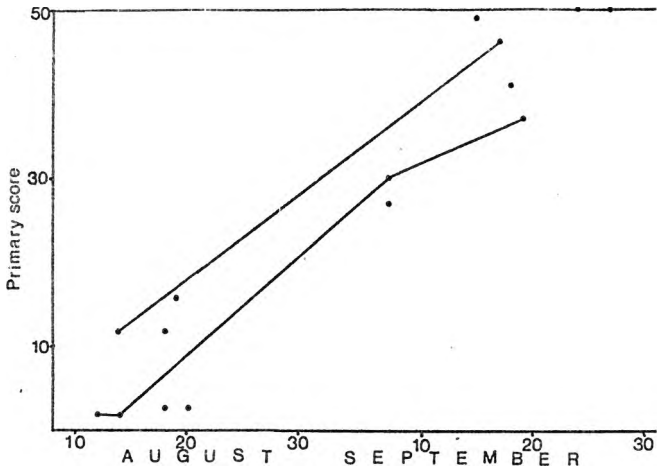


Figure 23

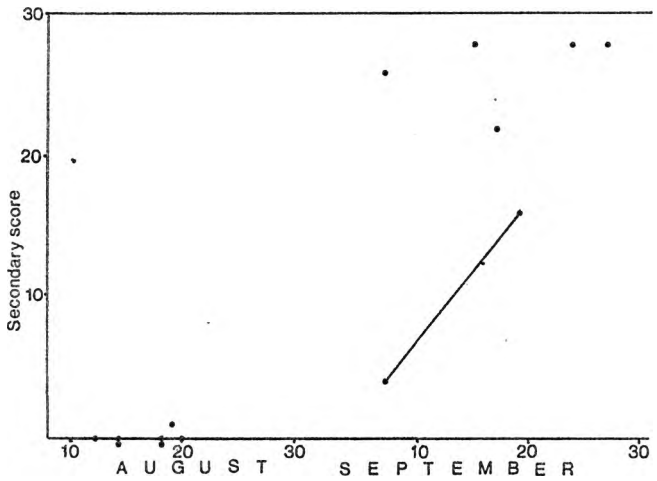


Figure 24

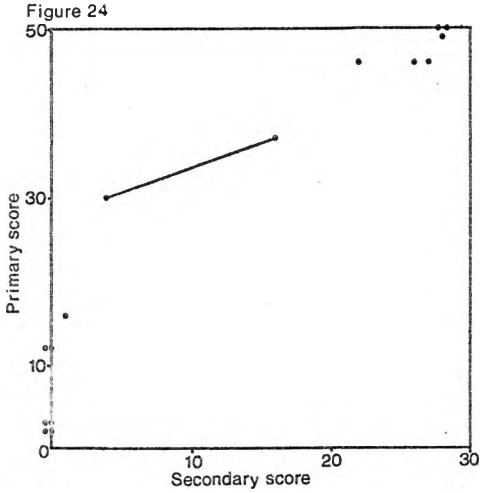


Figure 25

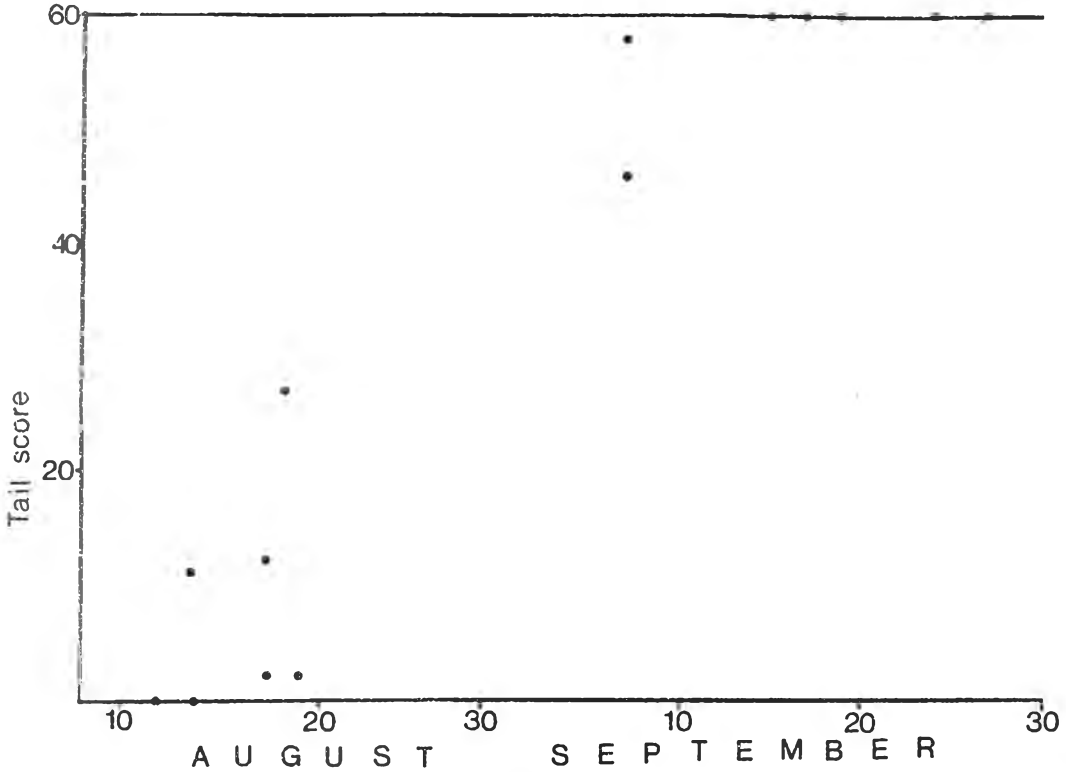
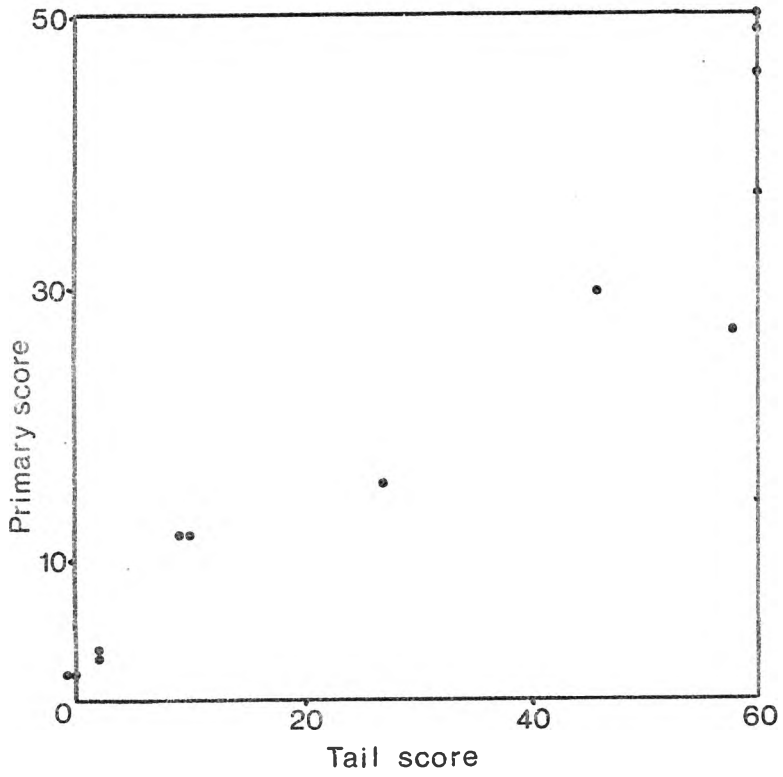


Figure 26



GULDENSTÄDT'S REDSTART

Figure 27 Winglength

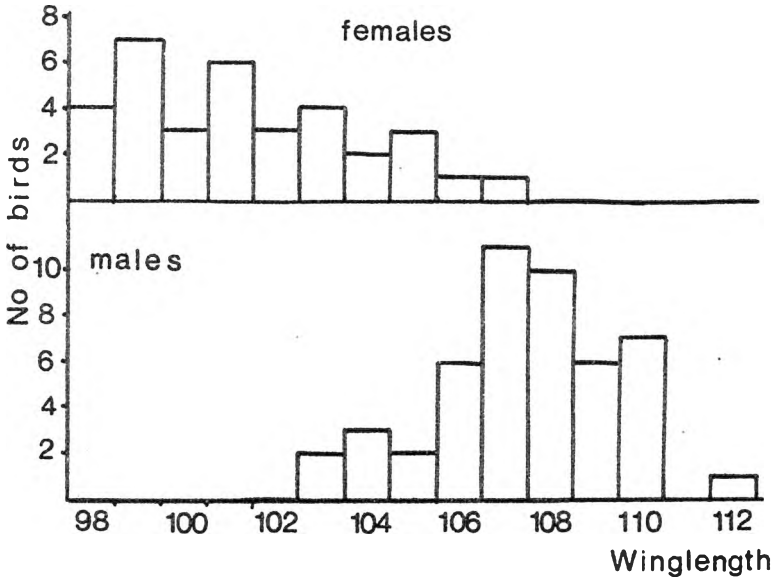
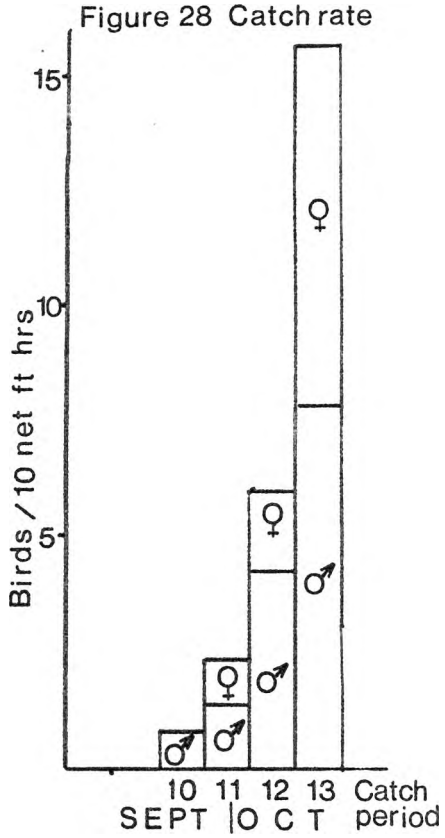
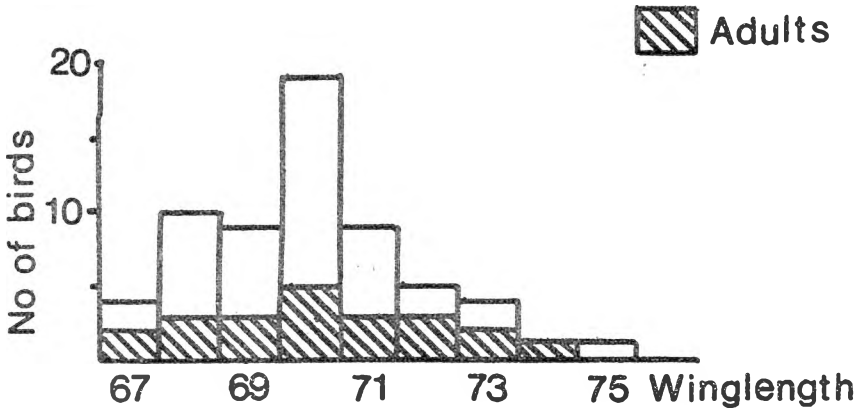


Figure 28 Catch rate



HUME'S LESSER WHITETHROAT

Figure 29 Winglength



Catch rates

Figure 30 Adults

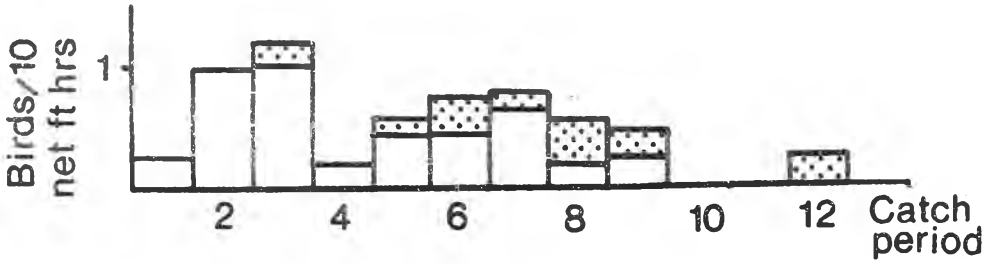
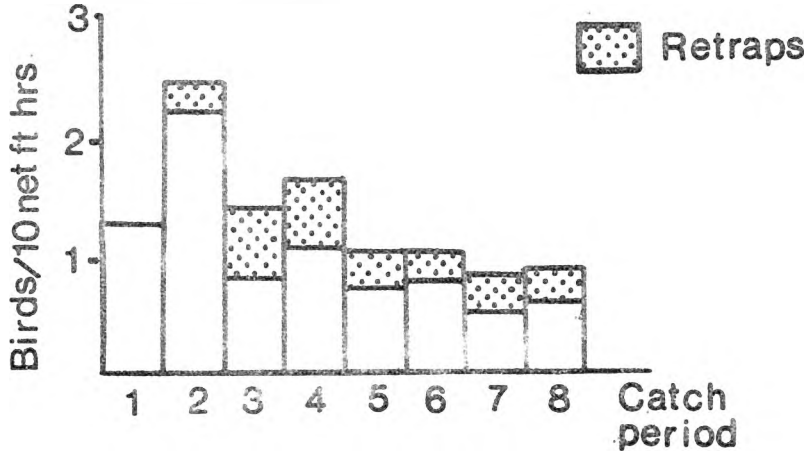


Figure 31 First years



HUME'S LESSER WHITETHROAT

MEAN WEIGHT

Figure 32 First years

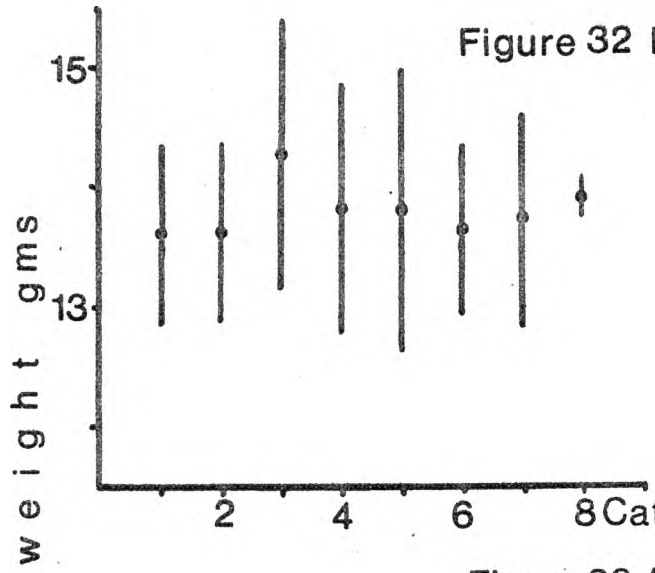


Figure 33 Adults

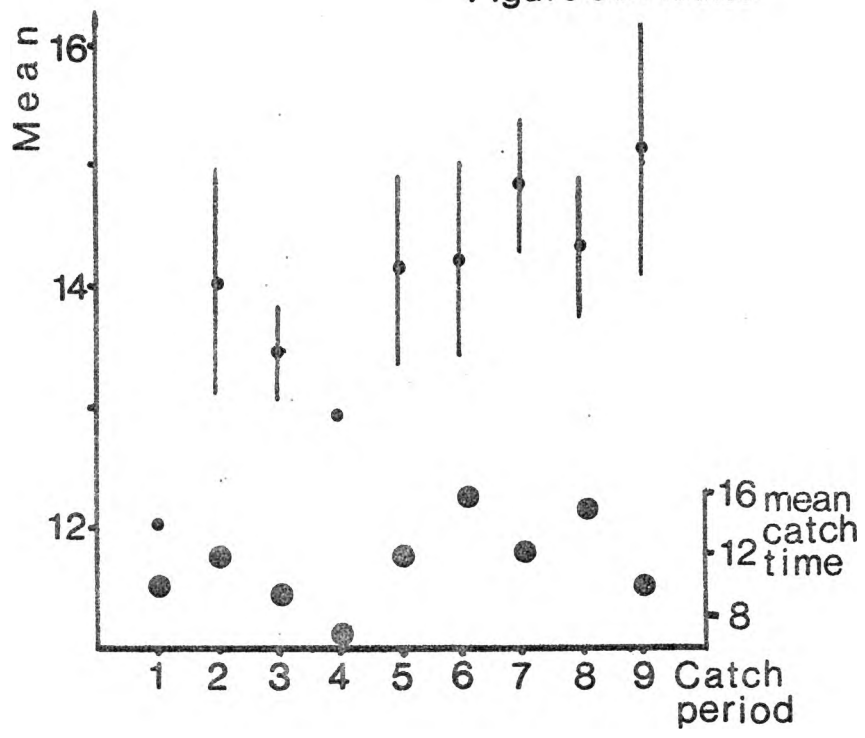


Figure 34 HUME'S LESSER WHITETHROAT MOULT

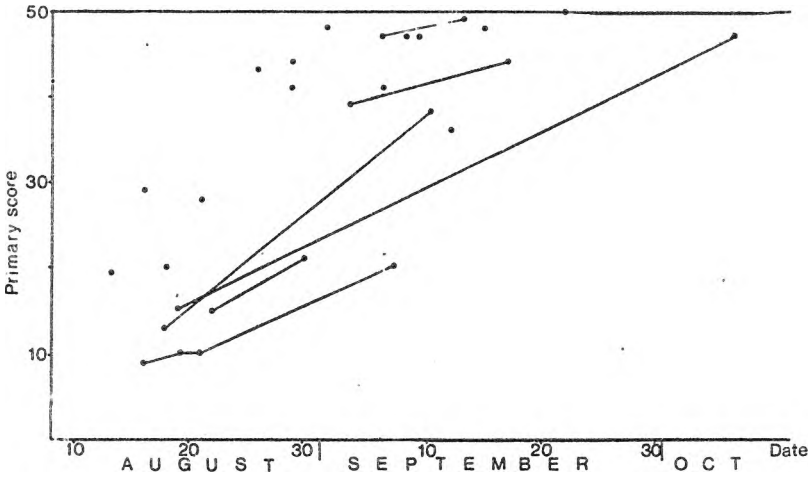


Figure 35

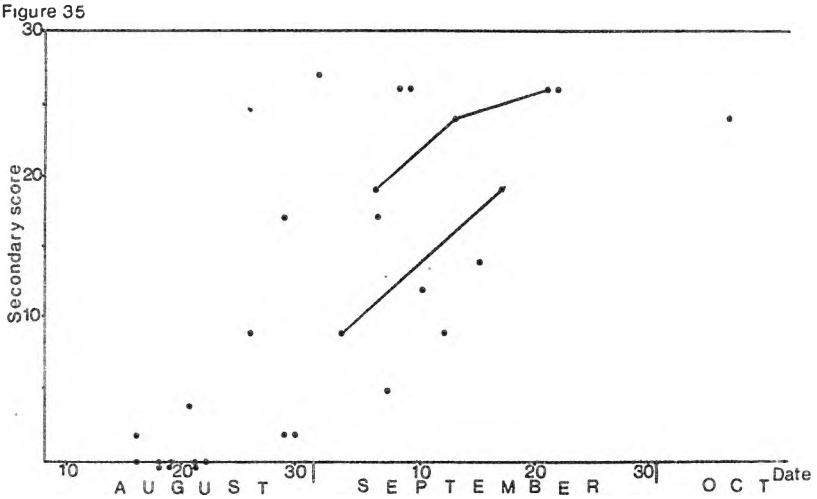


Figure 36

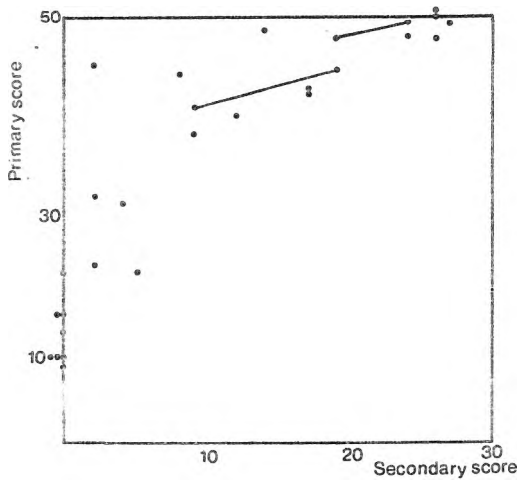


Figure 37

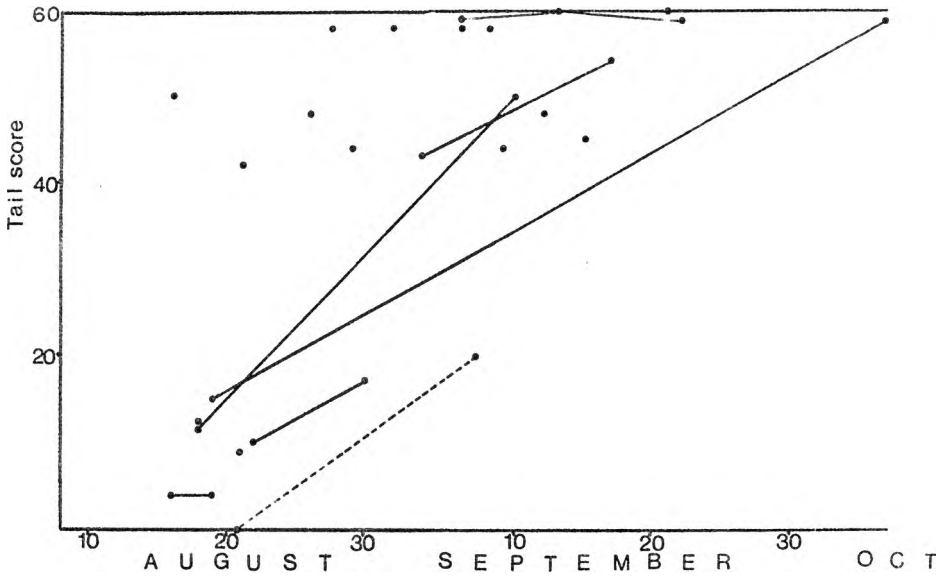


Figure 38

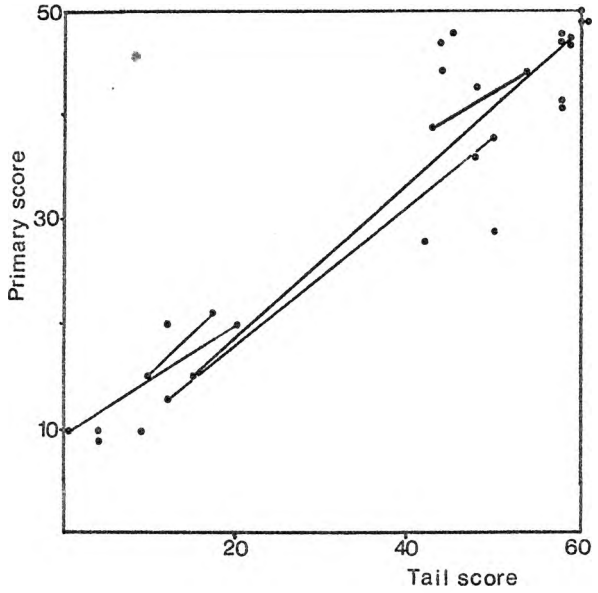


Figure 39 CITRINE WAGTAIL WINGLENGTH

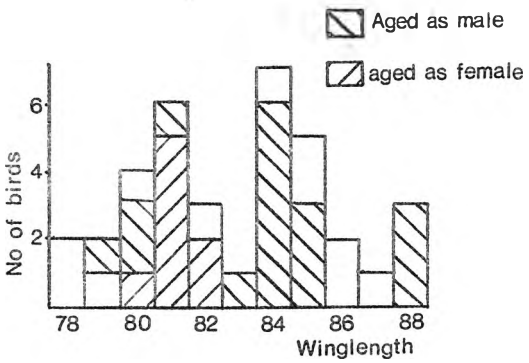


Figure 40

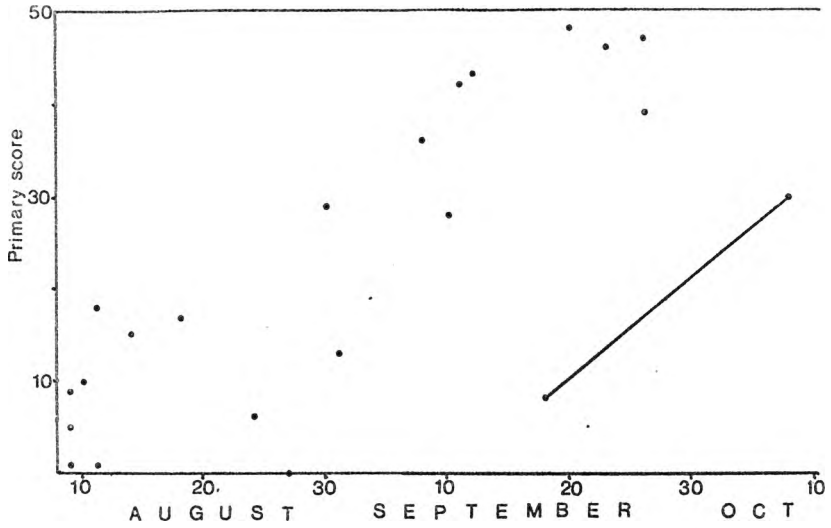


Figure 41

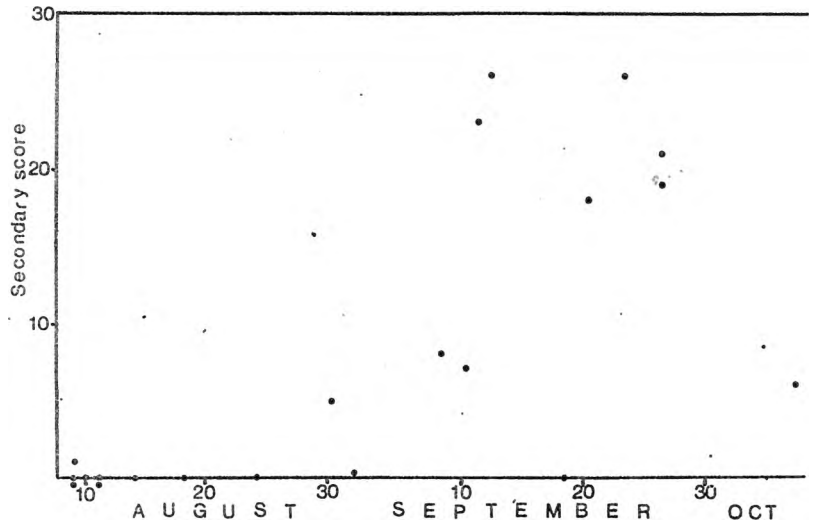


Figure 42

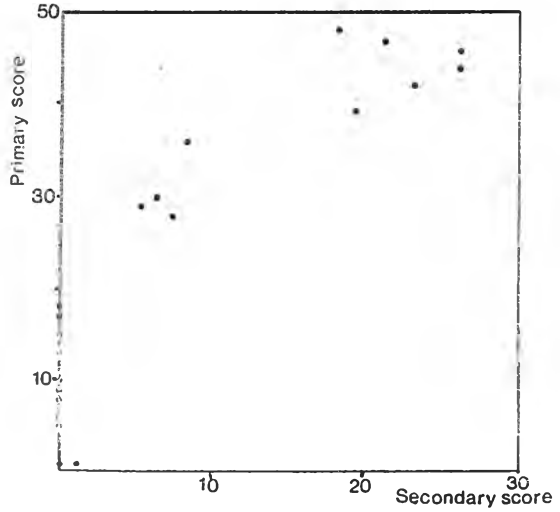


Figure 43

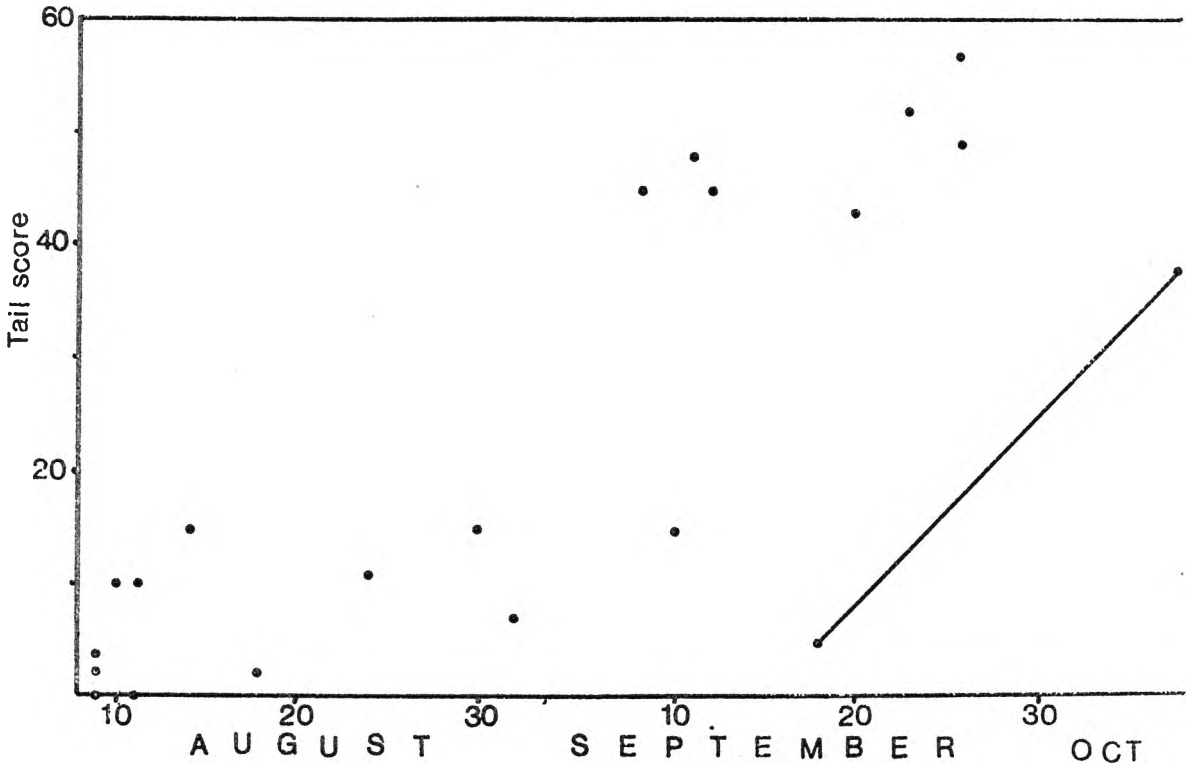
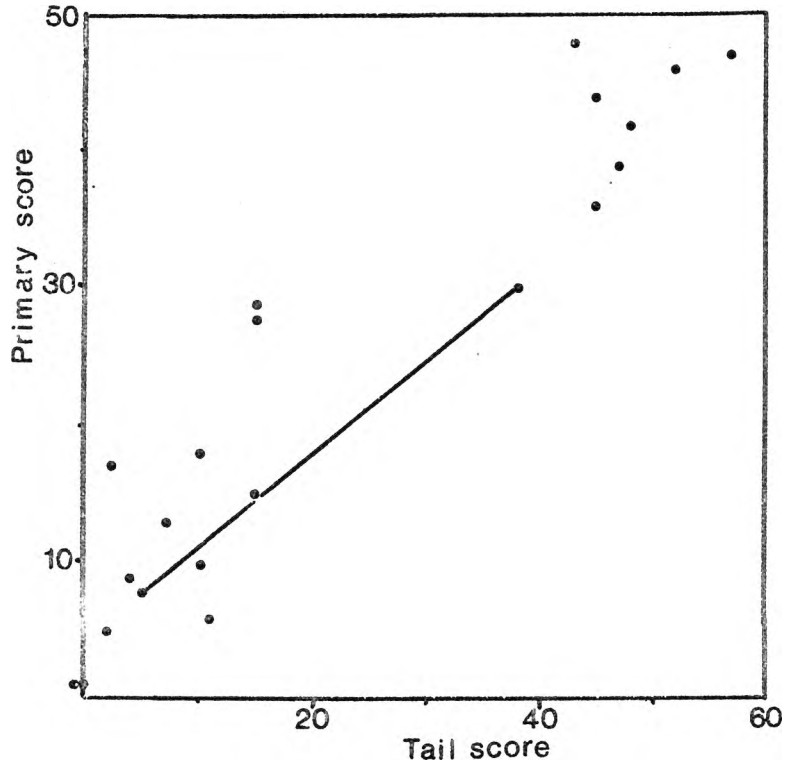


Figure 44



HUME'S SHORT-TOED LARK MOULT

Figure 45

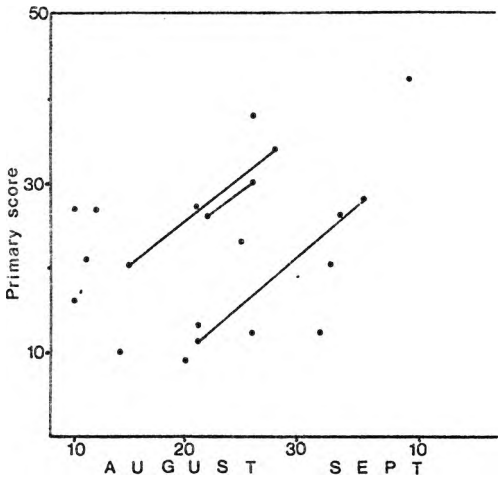


Figure 46

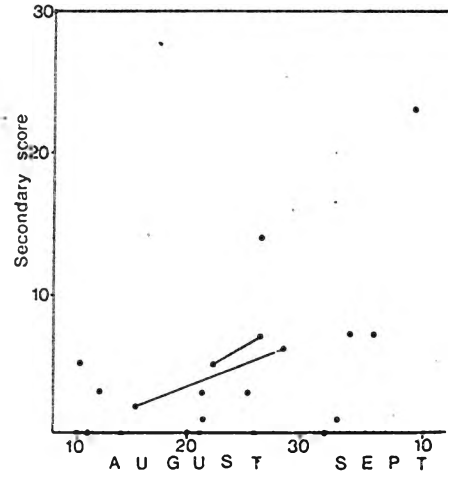


Figure 47

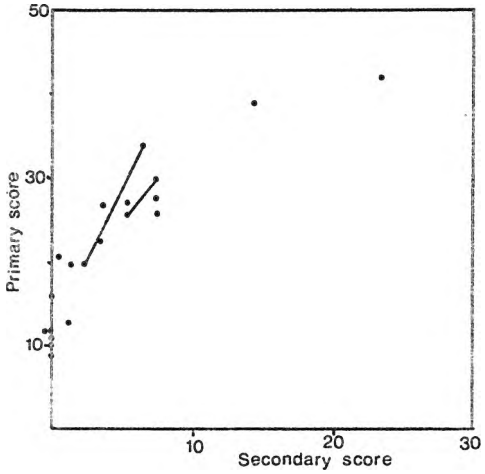


Figure 48

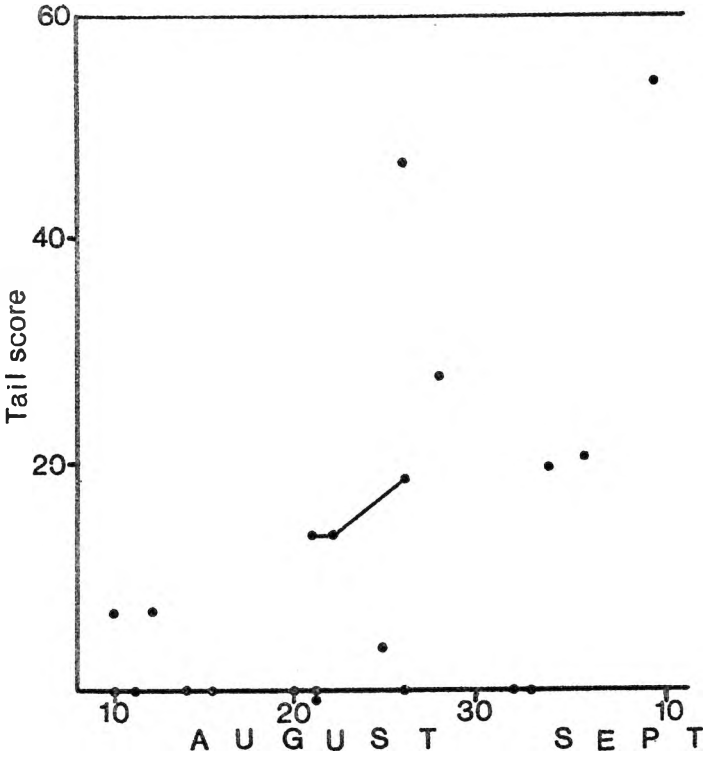
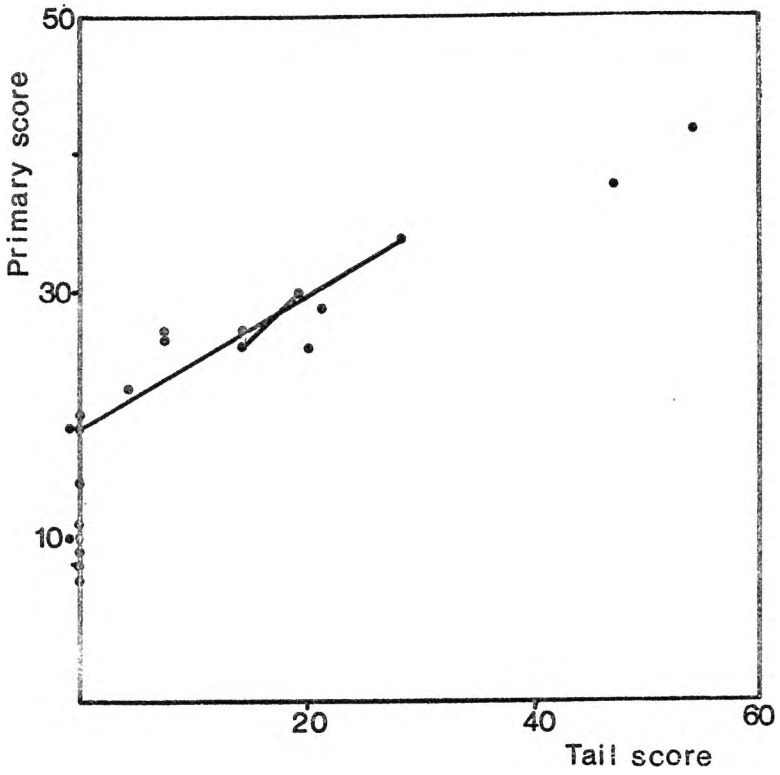


Figure 49



WHITE WAGTAIL MOULT

Figure 50

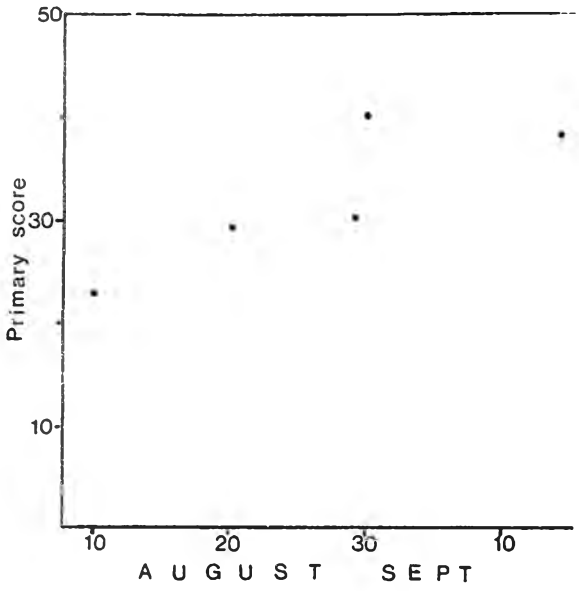


Figure 51

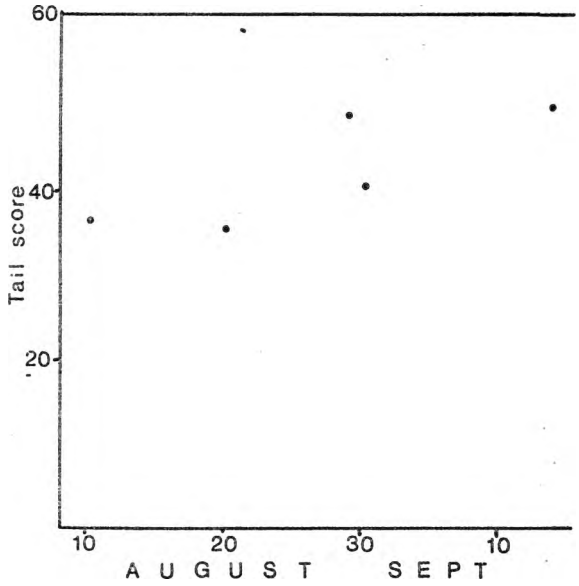
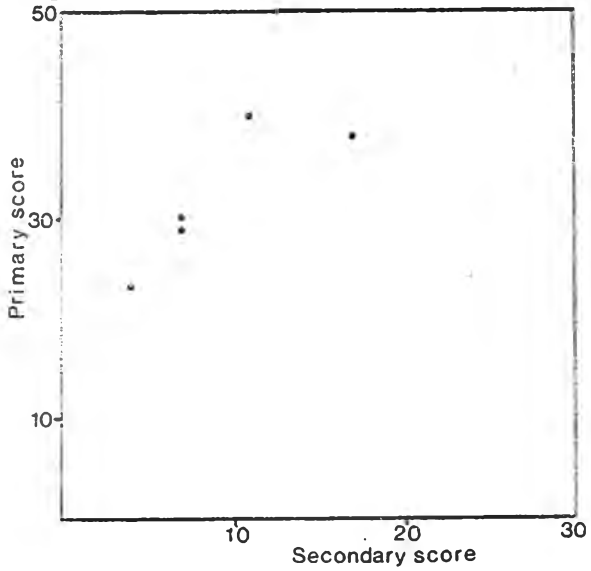


Figure 52



APPENDIX D

ACCOUNTS

The job of expedition treasurer is a thankless one at the best of times. How it fell on a Mechanical Engineering Undergraduate when one member of the party was a trainee Chartered Accountant is not clear. However, be that as it may, the accounts of an expedition, where the treasurer desperately tries to 'balance the books' often makes for interesting reading - particularly to the reader in the future who may be considering launching a similar venture himself. Fund raising in 1977 followed the same general lines as in 1976 and some general notes are included in last year's report. The only significant difference was that we were able to improve the 'yield' on letter writing by being more selective (e.g: fewer firms and no local emphasis). Also, Mike Ritchie, no longer a member of the University, was supported by a donation from his father to the expedition which considerably simplified arrangements.

The accounts should be self-explanatary with the notes given below.

Income

	£
Surplus from Ladakh 1976 account	19.76
British Mountaineering Council	100.00
Frederick Soddy Charitable Trust	300.00
Albert Reckitt Charitable Trust	300.00
Mr. J. W. Ritchie	300.00
Mount Everest Foundation	275.00
Gilchrist Educational Trust	50.00
Ladakh 1976 report sales and lectures	25.00
Inchcape & Co.Ltd.	25.00
University of Southampton	
Advanced Studies Committee	180.00
Students' Union	100.00
Mechanical Engineering Department	25.00
Archaeology Department	15.00
Biology Department	25.00
Geography Department	25.00
a. Miscellaneous	30.00
b. Personal contributions (5 x £150)	750.00
	2,544.76

Expenditure

c. Airfares (5 x £215 + tax)	1,092.20
d. Insurance	135.00
e. Hire of horses (July-September)	300.00
f. Marka Valley porterage and supplies (October)	60.00
g. Food (purchased in England)	71.77
h. Miscellaneous	71.57
i. Altimeter (loss on resale)	22.00
j. Bird rings	15.00
k. Medicines	15.00
1. Food and travel in India	750.00
Balance (net surplus)	12.22
	2,544.76

Notes

a. Miscellaneous income was largely profit from the sale of equipment and film in India. Future expeditions could possibly consider such trading as a source of income.

b. Personal contributions paid for all food, travel and accommodation expenses in India (see 1.). The figure of about £1.50 per day per person is approximate and varied between individuals. This money (and item 1.) was never part of the expedition account but is included here for completeness.

c. We flew London-Delhi return with Ariana Afghan Airlines which proved extremely satisfactory.

d. Insurance was arranged through a British Mountaineering Council scheme with Stenhouse Reed Shaw Ltd. Apart from difficulties arranging third party cover (which was inexplicably omitted from the original policy) this proved satisfactory, albeit expensive. The only claim was for damage to an ornitholigical mist net caused by wandering horses and by an Army unit who 'borrowed' it for fishing !

e. Four horses and two 'wallahs' were hired from Darcha (see Appendix A) for three months at 60 rupees per day - considerably cheaper than comparable rates in Ladakh.

f. Fraser incurred additional porterage costs during his return to the Marka valley in October (see Appendix A)

g. The food was mainly dehydrated meat (see Appendix E)

h. £13.23 was spent on 'gifts' in India either at strategic checkposts or in the name of expedition 'public relations'. Wristwatches were particularly popular. Other expenses were : Water bottles £4.34, Photographs, stationery, telephone, local travel expenses - £54.00.

i. The altimeter was made by Thommen of Switzerland (obtained through Robert Lawrie, London): it gave good service.

j. Bird rings were bought from the Bombay Natural History Society.

k. See Appendix G.

l. See note b.

APPENDIX E

FOOD

The diet was considerably improved by our experience of 1976. The aim was to have food that was both simple and nutritious; it was based broadly on the following list compiled by E.E.Shipton (see 'Upon That Mountain') :

Food for five men for six weeks (Shipton)	lbs	Our diet	lbs
Flour	210	Wheat flour	70
Rice	60	Barley flour	40
Ghee	40	Rice	30
Cheese	30	Vegetable fat	8
Pemmican	10	Dried Stews	40
Sugar	40	Sugar	45
Lentils	30	Lentils	30
		Vegetables (fresh)	60
		Milk powder	25
		Tea	6
		Salt	5
	420 (2 lbs per man-day)		359

This simple fare is palatable and more varied than one would suppose. Shipton's diet was supplemented by tea, salt and spices. Our flour quantity (both wheat and tsampa) was half of Shipton's 210 lb, and we did not feel an undue craving for more flour.

Most of the food consumed was bought in the four major settlements through which we passed : London, Manali, Padam and Leh. Pemmican (virtually unobtainable) was replaced to advantage with Batchelors dried meat products : Savoury mince, beef strogonoff, farmhouse stew etc. Instead of ghee (clarified butter) which is very expensive, we used vegetable oil, available in large tins. Large bazaars such as Leh have a good selection of fruit and vegetables but in remote villages turnip leaves may be all that is available until later in the summer when peas, turnips and potatoes can sometimes be obtained. On one journey the flour was found to be slightly contaminated by weevils but the taste was not unduly affected. The basic victuals were supplemented by a small larder of luxuries : Whitworths raisins (donation), Quaker oats (donation), beans, dried peas, dried coconut, garlic, peanuts, condensed milk, tinned cheese, spaghetti, spices and peppers, dried fruit, custard powder, jam, coffee, Bournvita, glucose biscuits, macaroni, and salami (from some Germans). Other foods tried from time to time included, powdered rice, powdered dried apricots, complan, home-made fudge, home-made jam and bread, Nutri-nuggets (soya protein) and peanut butter.

During the course of the expedition, progressively more time was spent fantasising about food. Fraser salivated like Pavlov's dog at the mere mention of strawberry cheesecake or bacon sandwiches, whilst Dravers and Ritchie dreamed of steaks, pies and joints of meat, a topic which persistently dominated their camp smalltalk. The ornithologists fared better in this respect because living at Tikse enabled them to buy fresh supplies regularly in Leh. Their food was similar to that of the others, though there was possibly more of it, the weight factor not being critical.

Due to the weight limit of 44 lbs on the flight to India, the food we imported was only as much as we could carry as hand luggage. This included dried stews as mentioned, Kendal Mint Cake bars, Mars Bars, Apple Dice, sauce mix, fruit drinks, and six large packs of dried soup (Batchelors). The sauces were not much use since

chilli powder is the only thing that dal seems to respond to. The dried soups were much more useful for flavouring and went that much further than if we had prepared them as soup. The Mint Cake was good at high altitude and the Mars Bars (unwrapped and packed in a tupperware box) were a luxury second to none, normally reserved as summit rations. (The motivation to continue up some interminable ice-field was considerably increased by the knowledge that a couple of Mars Bars would be the reward for such execrable labour). Similarly, packets of Kelloggs 'Rise and Shine', which when added to water provided delicious drinks of grapefruit or orange juice, were particularly appreciated after a long climb or march.

The locally available food includes tsampa (more or less ad lib.) dried cheese, yogurt (excellent), butter milk, native liquor (chang and arak) and salt. Villages should not be relied upon as a source of food. The native diet is plain but nutritious and after several months, it is very easy to thrive on it without particularly yearning for the variety and sweetness of western cuisine. Visits to Leh demonstrated spectacularly 'the wild vicissitudes of taste'. More than one member of the expedition devoured entire jars of peanut butter and condensed milk at one sitting. After a serious eating session, some were seen to be virtually immobilised, whilst Delany nearly passed out in a small Tibetan restaurant. The moral is that the Himalayas stimulate a healthy appetite but moderation should be exercised when up in town or on return to the beaten track until the more extreme cravings have been sated.

To give some indication of costs, in 1977/78 the following could be bought in Leh, per kg : Rice Rs. 2.50, Sugar Rs. 6, Flour Rs. 2, Tsampa Rs. 3.50, Lentils Rs. 4, Vegetable Oil Rs. 14.

Finally, miscellaneous expendable supplies include torch batteries, candles, matches, fuel containers, and kerosene (1 litre per 15 man-days).

APPENDIX F

EQUIPMENT

The following notes supplement the comments made in Appendix C of the 1976 report of the Ladakh Expedition.

General

As previously stated, the main difference between the 1976 and 1977 expeditions was that the latter started from south of the main Himalayan watershed and used pack animals to transport the equipment. We were not, therefore, so weight conscious with food and equipment for the march in, and could afford the following luxuries :

- more local food (see Appendix E)
- a five litre pressure cooker (purchased in India for £12 and strongly recommended)
- a large Indian paraffin cooker (spares and repairs available in Leh)
- light walking boots (eg. Indian Army canvas boots - £2)

Anyone considering a similar journey without pack animals or porters should note that one can manage to cook without paraffin even in the most desolate parts of Zanskar by collecting suitable root plants and dung along the way. Also, it should be re-emphasised that one should not rely on being able to obtain supplies in remote villages (away from the Indus valley and Padum) and travellers should be discouraged from trying to do so.

Mountaineering

The usual weight restrictions applied to the mountaineering equipment and we equipped ourselves with the same, typically Alpine, assortment of paraphernalia as last year. The only significant change was the tent, where the Vango MkIV was replaced by a new model made by Ultimate Equipment called modestly 'The Tent'. It seemed equally strong at half the weight, although against this it must be said that the price is weighty enough, and it is not clear how much longer the proofing will last given further exposure to high altitude sunlight and/or Scottish winters.

We made more use of the ropes this year and another 150' (of 8 mm.), would have been useful for abseiling, river crossing, bridge building etc. Anyone considering venturing onto Lakakhi rock should be warned that the quality is generally poor and crash helmets are advisable, if not essential. An adequate supply of pitons are useful as belays, but should be applied cautiously if mountain and climber are to remain intact. The snow is generally a safer bet given an Alpine start in the morning. One should be wary of 'sugar-snow' avalanches when descending in the afternoon, and also of breaking through into hidden melt-water streams on apparently innocent glaciers.

One final point concerns winter conditions, since it is now possible to over-winter in Ladakh. The weather is generally good with modest falls of snow but the temperature falls dramatically. The expedition leader reported paraffin jellifying in Markha in October

and J. P. Crowden experienced temperatures as low as -35°C during his stay in Zangskar (winter 1976/77) which suggests Arctic rather than Alpine equipment would be appropriate. Skis may be useful, but only in areas close to the main Himalayan watershed.

Miscellaneous

The ornithologists at relatively low altitude in the Suru and Indus valleys did not require any unusual equipment except for items associated with their ornithological work.

Finally, a note on equipment taken for 'trading'. Anyone who has been to India will know that the very heavy import duties imposed on Western goods means that there are significant gains to be made from the sale of such items as wristwatches, calculators, cameras etc., on the 'black market'. Similarly in the other direction, there is a ready market for antique curios and works of art from areas such as Ladakh. Such 'trade', as well as being illegal, is particularly irresponsible and destructive in Ladakh. There is no sense in off-loading Western 'junk' in remote parts of the Himalaya when an insatiable demand for it already exists on the plains. Nor is there sense in robbing an area of its cultural heritage when there is an adequate supply of so-called handicrafts which find no less ready a demand in the West. The same considerations apply to items taken as gifts or for bartering in remote villages. Newcomers to Leh may be surprised to hear the children begging for "one pen" instead of the "baksheesh" which is more usual on the subcontinent. This follows the reputed wholesale distribution of ball-point pens by an early French expedition to the area. Sugar, rice and tea make far more appropriate gifts in remote areas: the present expedition took vegetable seeds. The rest will follow surely enough, but one would hope that individual visitors felt a responsibility not to exacerbate the process.

APPENDIX G

MEDICAL

In view of the remoteness of the country through which we proposed to travel, the decision to go without a 'medic' in the team (unlike 1976) was not taken lightly. A casualty could have taken a full week to reach any sort of medical assistance from many parts of the route. Against a medic's superior diagnostic skills we weighed the increased size of the party and the fact that there wasn't a lot that he or she could do that we could't do - given the right drugs and an instruction manual. So it was that we equipped ourselves with the array of drugs listed below (based on invaluable advice from Drs Fuller and Maxwell in Southampton and Dr Rosedale), together with an excellent book (Medicine for Mountain Climbers by Peter Steele) and set off into the wilds of Zanskar. That no one succumbed to any serious illness is, of course, no reflection on the wisdom or otherwise, of our decision and it would be rash indeed to attempt to draw conclusions or offer advice to future expeditions.

However the expedition was not entirely without medical incident. Delany got bitten by a bat while trying to extricate it from a bird catching 'mist-net' and suffered the ordeal of a course of anti-rabies injections into the stomach. He was also the worst affected by the 'runs' and seemed all but immune to our remedies. Ritchie was similarly afflicted with the runs towards the end of the summer until Amoebic Dysentery was diagnosed and effectively treated with Flagyl. Several members suffered a recurrence of the 'flu-like' symptoms experienced in 1976, which our amateur diagnosis put down variously to poor diet, exhaustion and a viral inflection. On a less serious note, the climbing party was badly affected by what came to be known as the 'burp-fart syndrome' the symptoms of which are self-explanatory. The affliction was particularly anti-social in a closed tent, and may have had something to do with our diet, since matters improved when beans were eliminated from the menu. Other digestive curiosities were that Dravers could not eat anything containing fat during the second month, and that Fraser reacted violently to garlic-flavoured chupatties.

Finally, mention should be made of treatment given to locals since this is something which should be considered when planning a medical kit. The most common complaints were eye infections, septic cuts and headaches. Plenty of eye ointment, antiseptic cream and elastoplast should be taken. We were very cautious about dispensing drugs and tended instead to prescribe sleep - particularly for hang-overs. According to the Kashmiri doctor stationed in Padum, the most common complaint among Zangskaris was 'hyper-tension', which sounded a bit unlikely to us in a Buddhist area, but apparently it has something to do with an excess of salt from drinking too much Tibetan tea !

List of drugs :

Chloromycetin eye ointment (2 tubes)	- eye infections
Lomotil (200 tablets)	- diarrhoea
Aluminium Hydroxide B.P. (100 tablets)	- indigestion
Flagyl (200 tablets)	- amoebic dyssentry
Septrin (200 tablets)	- antibiotic
Penicillin (100 tablets)	- throat/ear infections
Amoxyl (100 tablets)	- antibiotic
Fortral (100 tablets)	- severe pain
Paracetamol (150 tablets)	- pain-killer
Aspirin (200 tablets)	- headaches and colds
Frusemide (50 tablets)	- pulmonary oedema
Daraprin (100 tablets)	- malarial prophylaxis
Strepsils (250 tablets)	- sore throats

Other items : A large assortment of sticking plasters, sterile dressings, gauze and crepe bandages were taken as well as scissors, forceps, Insect Repellant and Sting Relief creams, Savlon, Lipsil, Glacier Cream, Plurivite-M Vitamin tablets and Sterotab water-sterilising tablets. This kit was split into two so that ornithologists and human geographers could go their separate ways. The latter, because of their mountaineering and trekking, took a proportionally greater amount of the Fortral and Frusemide tablets as well as an inflatable splint and a greater variety of bandages and dressings.

APPENDIX H

LANGUAGE

The lingua franca of Ladakh and Zangskar is a Tibetan dialect. The Lhasa dialect of Tibet, the accepted 'pure' form of Tibetan is considerably different. If one estimated that 50% of the words are different, one would not be far wrong. However, knowledge of classical Tibetan grammar would be the most suitable basis upon which to learn Ladakhi. Urdu is also widely understood throughout the area, and English suffices in Leh.

In order profitably to spend an extended period in the villages of Ladakh, it is well worth an attempt to learn Ladakhi. Even a few words are a great help and in a period of as little as one month, prolonged contact with native speakers enables even the most mediocre linguist to make worthwhile progress. A substantial vocabulary may soon be aquired, by comprising one's own notebook-dictionary, but grammar is the real stumbling block. English speaking natives or Tibetan speaking Europeans, and books on Tibetan grammar provide essential guidelines. A basic grasp of Ladakhi can thus be attained with no exceptional effort and is perfectly satisfactory for the amateur mountain traveller. We were assisted by the presence of two Lahuli horse wallahs who spoke only Lahuli and Urdu.

Mastery of the Tibetan language demands many years of serious study but the amateur may consult various books on the subject most of them not easily obtainable, but available in appropriate libraries. The most suitable are probably the two by Sir Charles Bell, a dictionary, and a grammar of colloquial Tibetan. The grammar covers most conversational topics, but times have changed and one comes across such surprising phrases as "Our government has no aim other than the maintenance of the status quo". Nevertheless, these are two really useful volumes for any traveller to Tibetan-speaking regions. Most other publications are suitable only for the serious student.

APPENDIX I

ORGANISATION AND LOGISTICS

1. Expedition Administration

Administration in England was done by the expedition members, and on an official level by Mr Eric Gordon who liaised between the expedition and the University authorities, and represented the expedition during its absence in the Himalayas.

Administration in India was done solely by expedition members and involved dealing with various officials of one kind or another, making all arrangements for transport and logistics, conducting the ornithological and geographical fieldwork, carrying out exploratory mountaineering, and the general day to day running of the expedition's affairs.

2. Transport

The expedition flew from London to Delhi, travelled by train across the plains, by bus into the hills, and thence on foot. Ariana Afghan Airlines provide cheap, satisfactory flights to India. Indian trains are reasonably reliable, comfortable, very cheap and usually very

crowded but nevertheless the best way (other than by air) to travel long distances in the Subcontinent. Bus travel is chaotic, very cramped and fairly cheap. The buses negotiate spectacular and very mountainous country, crashing only infrequently.

Some Indian train and bus fares :

Train (Second class)

Delhi - Jammu Rs. 26
Delhi - Chandigarh Rs. 13.50
(Berth - Rs. 5.50 extra)

Bus ('B' class - 'A' class is about 35% extra)

Chandigarh	- Manali	Rs. 24.25
Manali	- Darcha	Rs. 14.50
Manali	- Delhi	Rs. 41.75
Jammu	- Srinagar	Rs. 15.00
Srinagar	- Leh	Rs. 31.50

The only difference between First and Second class transport in India is that the first is slightly less overcrowded than the other, and the seats are generally more comfortable.

The pack animals hired for the Zangskar journeys proved a most satisfactory transport arrangement, as has been remarked elsewhere. Guides, animal handlers and porters are not easily available in Ladakh. It is far better to contract pack animals and horse wallahs for a specific period or journey than to rely on picking up porters or pack animals on the way. The most suitable places are Manali (or Darcha), Kargil (at least twice as expensive as Manali), and Leh (considerable difficulty can be expected). The other method, that of carrying all the baggage (food and equipment etc) on one's back is a strenuous and execrable labour in rugged, high altitude terrain where considerable distances have to be covered. A mountaineering party, with equipment and several weeks food has no option but to hire porters or pack animals, either to shift the baggage from the roadhead to base camp, or to accompany a small party for a long period and thus extend the range and flexibility of travel. The only possible objection to pack animals contracted for a long period is the expense, a burden that is quite tolerable when divided between several people, assuming that a reasonable daily rate can be negotiated.

Costs of pack animal hire :

Darcha : Rs. 10 - 15 per day per animal, (depending on difficulty of the route)

Kargil : Rs. 25 per day per animal (at least, Rs. 90 per animal per day is not unknown). Rs. 10 extra per man per day.

The hire of only one or two pack animals inevitably inflates the rate per animal. Four animals are suitable for a small party, i.e. 2 - 4 foreigners, and one or two horse wallahs. It must be emphasised again that porters or pack animals are generally unobtainable in the villages of Zangskar and Ladakh. Mr J.W.Banon, was our contact in Manali and travellers to the region should write to him in advance to enquire about similar transport arrangements.

3. Base camp arrangements

The ornithologists made various camps in the Suru valley before establishing a long term base (not a camp however) in the Foresters Hut at Thikse, supplies being regularly replenished in Leh. From this self-contained base, the bulk of the ornithological fieldwork was carried out, independently of the other party in the expedition.

The mountaineering party, with the pack animals and horse wallahs, was essentially 'mobile', in that long journeys were covered with intermittent base camps being established. The only true base camp was on the Nimaling Plain during the exploration of Kang Yisay. This camp, and similar short-term mountain base camps were situated on suitable grazing grounds below the glaciers, and were permanently occupied by the two horse wallahs, two horses and two mules. The mules were used to carry equipment to over 17,000 ft for the glacier camps from where the major peaks were climbed (see Appendix A). In camp, although food was shared between the 'wallahs' and the 'sahibs', both parties tended to retain individual quirks and habits and the wallahs' position always remained that of employees. The intimacy that might have been established with climbing companions (e.g. with Sherpas) was not attained. Camp chores were shared, but loading, driving, and looking after the pack animals was more exclusively left to the wallahs. The town of Leh was our general base for mail, provisions, changing money etc.

4. Diplomatic Clearance

This was not required. The area south and west of the Srinagar - Leh road, and the Leh - Bara Lacha La track, is open to foreigners. To go beyond this "Inner Line" is strictly forbidden by the Government of India. Only in exceptional circumstances are foreigners permitted to visit the interesting country beyond the Inner Line. Expeditions do not usually constitute exceptional circumstances so rather than waste a lot of time communicating with the appropriate authorities, it is better to confine oneself to the accessible areas of Lahul, Zangskar and Ladakh. This is an extensive area and it would take many years of wandering to become tolerably familiar with its numerous valleys and mountain ranges.

5. Maps

Bartholomew	:	Indian Subcontinent	1 : 4,000,600.
Survey of India	:	Kashmir	1 : 1,000,000.
Survey of India	:	Leh Sheet (Indus Valley)	1 : 250,000.
Survey of India	:	Martselang Sheet (Zangskar)	1 : 250,000.

For general purposes the 1 : 250,000 maps are the best available (a 1 :50,000 map exists but for practical purposes is completely restricted). The Leh sheet is available at Stanfords, Long Acre, London WC1. The Martselang sheet is not available for purchase but may be consulted at the Royal Geographic Society map room. The 1 : 1,000,000 Kashmir map is of limited use and may be obtained at the Survey of India Office in New Delhi. The 1 : 250,000 maps are restricted in India and should therefore be hidden from official eyes. Some aerial photographs and air navigation charts available in America, are of interest but little practical use to travellers.

6. Currency exchange

Foreign currency and travellers cheques can be changed in Manali, Srinagar and Leh. The exchange rate is approximately Rs. 15.5 to £1 Sterling.

7. Weather limitations on access

Ladahl is an area of low rainfall, with great extremes of temperature. Summer days are very hot in the sun, with cool nights. Winter temperatures drop to -30° C. The summer months, particularly in recent years, can be affected by the monsoon, and there may be prolonged periods of poor weather, with rain and low cloud. The rainfall increases considerably towards the Himalayan watershed where there are heavy winter snowfalls. The roads into the Himalayan foothills (to Kashmir, the Zoji La to Ladakh, and the road to Kulu - Manali) are often blocked by landslides in the monsoon season (June - September). The Zoji La is blocked by snow usually from November to April. The highest passes across the Himalayas are only open from June till October, although high passes in Ladakh proper are open for most of the year on account of low snowfall (this is not the case in Zangskar however). In summer time, rivers are the main problem and major rivers are not fordable from June to October due to melting snow and glaciers.

In general, the weather is fine, and often ideal for mountaineering. High peaks tend to attract any bad weather however, and we had several hailstorms. No extreme weather conditions, the usual fare of high mountains, were encountered in 1976 or 1977.

8. Summary

a) Due to the conditions that travellers can expect to encounter in the mountains of Ladakh and Zangskar, it is essential to be as self-sufficient as possible by travelling light and either hiring pack animals for the duration of a journey, or adapting to native methods of diet and travel, the latter being particularly suitable for solo journeys. Lahuli horse wallahs are to be recommended for reliability and cheap animal hire.

b) Fitness and acclimatisation are essential for high level routes and mountaineering.

c) Villages cannot be relied upon as sources of food and provisions.

d) Knowledge of Urdu or Tibetan is an advantage.

e) Various valleys and passes are inaccessible at certain times of the year due to winter snowfall or rivers in spate during the summer.

f) Ladakh, Zangskar and Lahul comprise one of the most extensive areas in the Himalayas where foreigners may indulge in their enjoyment of wild country and unfrequented mountains, free from bureaucratic and diplomatic restrictions.

g) The region is one of considerable cultural and ethnological interest and there is enormous scope for research in these fields as well as in natural history. Much remains to be accomplished.

APPENDIX J

ACKNOWLEDGEMENTS

University expeditions are traditionally a curious mixture of the amateur and the professional. Amateur in a quaint, almost comic way which, as Evelyn Waugh would have it, is also 'intensely English'. Professional, according to Tom Patey's definition of the 'expedition opportunist',. in that they invariably rely on other peoples' charity for their existence. As a result of the latter aspect, expedition reports usually contain a long list of acknowledgements to those 'without whose support the expedition could not have taken place'. The routine nature of such lists easily masks the very real sincerity of the thanks being offered to those concerned. The present expedition is no exception to the rule. Financial support came from various sources (as detailed in Appendix D) and invaluable help and advice from individuals too numerous to refer to individually. In the interests of brevity we must - like our predecessors - risk the impersonality of a list and thank the following for their generous support :

The following gave us grants :

The Albert Reckitt Charitable Trust
The British Mountaineering Council
The Frederick Soddy Trust
The Gilchrist Educational Trust
Inchcape & Company Limited
The Mount Everest Foundation
Mr J. W. Ritchie
The University of Southampton
Advanced Studies Committee
Department of Archaeology
Department of Biology
Department of Geography
Department of Mechanical Engineering
Students' Union

The Royal Geographical Soceity approved the expedition and lent us equipment.

The following firms generously supplied us with food :

Quaker Oats Limited, P.O.Box 13, Bridge Road, Southall, Middlesex, UB2 4AG
Whitworths Holdings Limited, Victoria Mills, Wellingborough, Northants NN8 2DT

The following firms kindly supplied us with goods at a discount :

Alpine Sports Limited, 5 - 12, Holborn, London E.C.1
Kodak Limited, P.O.Box 33, Swallowdale Lane, Hemel Hempstead, Herts.
Mars Limited, Dundee Road, Slough, SL4 JX
Pindisports, 373/5, Uxbridge Road, London W.3.

The following individuals assisted us in various ways :

Professor J.H.Bird, Dept. of Geography, University of Southampton
Dr W.Branch, Dept. of Biology, University of Southampton
Jurgen Burkart, Wanneweg 1, 7881 Schworstadt, W.Germany
Reg Chandler, c/o State Bank of India, Main Bch, (For. Ex. Dept.) New Delhi
Ian Coward, 198 London Road, Twickenham, TW1 1EX
Clive Denby, 30 Pound Street, Bitterne, Southampton
Richard Gilbert, Stac Polly, Crayke, Easingwold, York
Tony Hereward, The Gables, Bull Lane, Maiden Newton, Dorset
Helga Hirshberg, Strahuberstrasse 5, 8, Munchen 71, West Germany
Wolfgang & Inger Kilfer, Kreuzstrasse 31, 75, Karlsruhe, West Germany
Alan Kitson, Zoology Dept. University of Aberdeen
Helena Norberg-Hodge, School of Oriental & African Studies, London
Andrew Phillips, 26, Booth Avenue, Colchester, Essex
Dr Barney Rosedale, Thornsend, Kingbury Hill, Marlborough, Wilts
Dr D.W.Snow, Sub-Dept. of Ornithology, The British Museum (Natural History), Tring, Herts.
Colin Wilks, 20, Alresford Avenue, Harrogate, N. Yorkshire

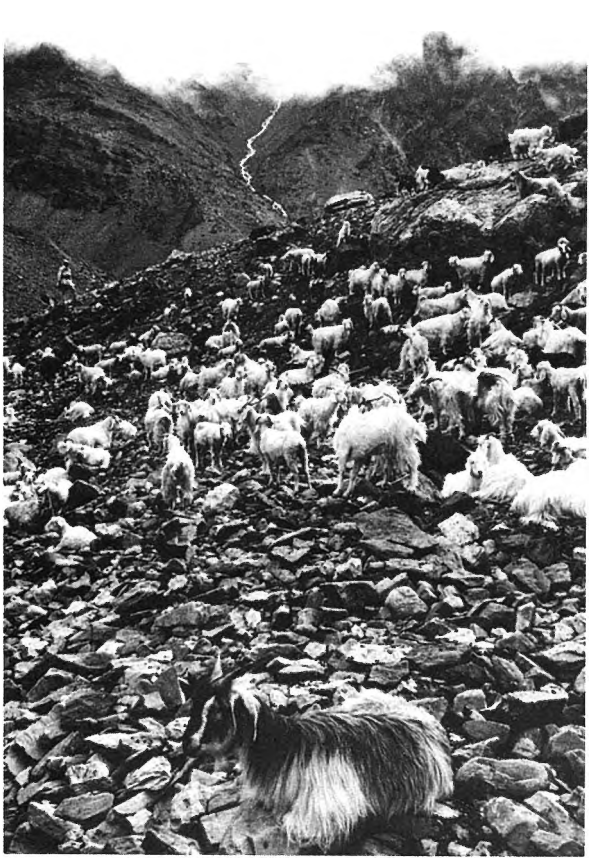
Various people in India went out of their way to help us.
We are most grateful to the following :

John Banon, Manali Orchards, Manali, Himachal Pradesh
Tashi Rabgyas, Information Officer, Leh, Ladakh
Sonam Stanzin, Tongityogmapa, Markha, Ladakh
Tsewang Rinchin and Gunzang Yangskit, Tongityogmapa Khangu, Markha, Ladakh
Tsewang Rigzin, Shen-Pa, Hemis Monastery
J.C.Daniel, Curator, The Bombay Natural History Society, Hornbill House, Shahid Bhagat Singh Road, Bombay
Ramesh Bhagat, Dept. of Zoology, University of Kashmir, Srinagar
A.R.Naqshi, Dept. of Botany, University of Kashmir, Srinagar
Shahniaz Naqushbudi, Divisional Forest Officer, Leh, Ladakh and his predecessor and other members of the Forestry Department staff in particular Mr Deshpaul (Wildlife Officer), Chering Narboo (Forest Ranger) and Sonam Dorjay and Mohammed Ali (Forest Guards).

There are numerous others in India and the Himalayas who remain anonymous, but to whom we are grateful for simple kindnesses and hospitality shown.

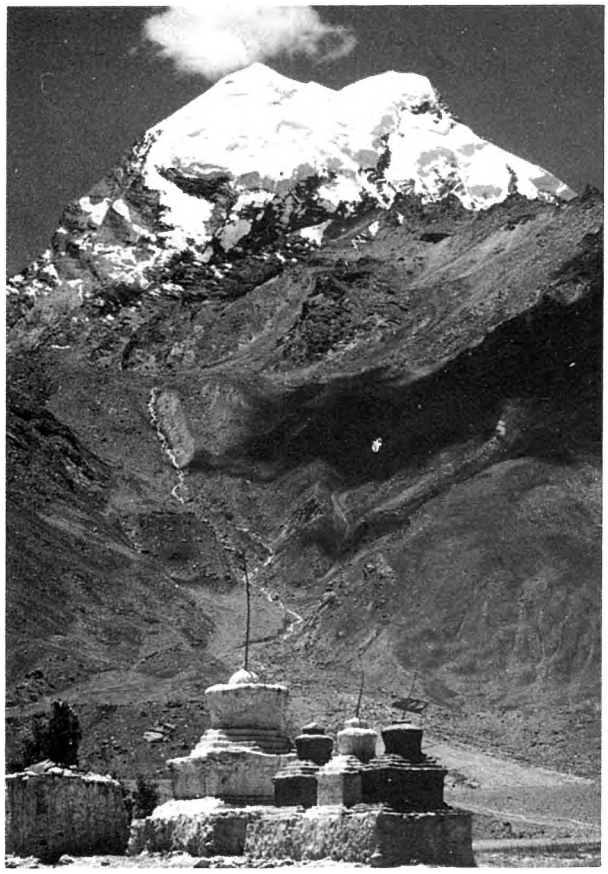
Finally, our particular thanks to Mr Eric Gordon for his continued help and encouragement, to Mrs E.M.Hall for administrative support, to Mrs T.Clinton-Carter for typing this report. And a special thank you to our two Lahuli horse wallahs, Angyal and Namgyal, who will never read this but to whom we shall always be grateful for doing so much to make the summer of 1977 one that we shall never forget.

5. *Left to Right:* Mike Ritchie, Simon Fraser, Mark Dravers.

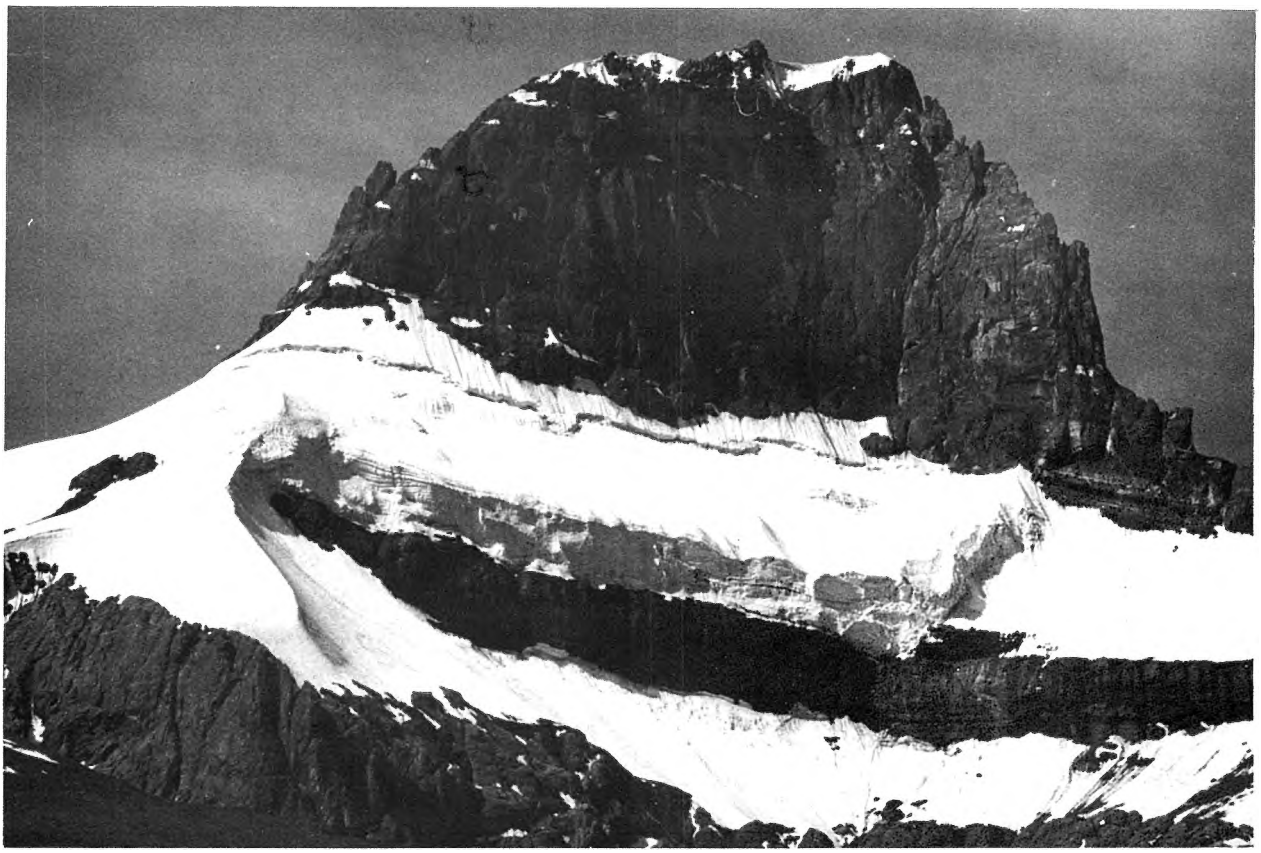


6. & 7. Goatherds and shelter at Zingzingbar, south of Bara Lacha La.

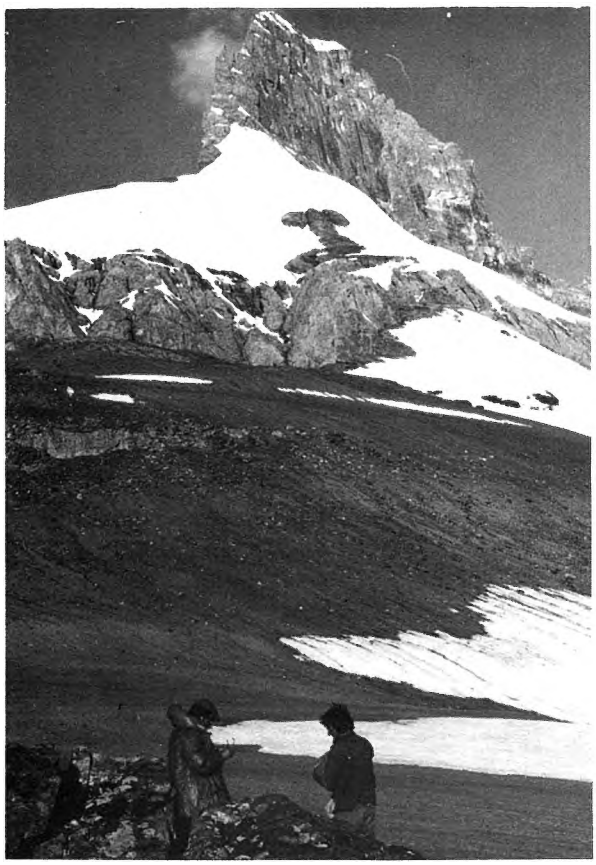
8. & 9. The expedition's pack animals passing through typical Zangskari terrain.



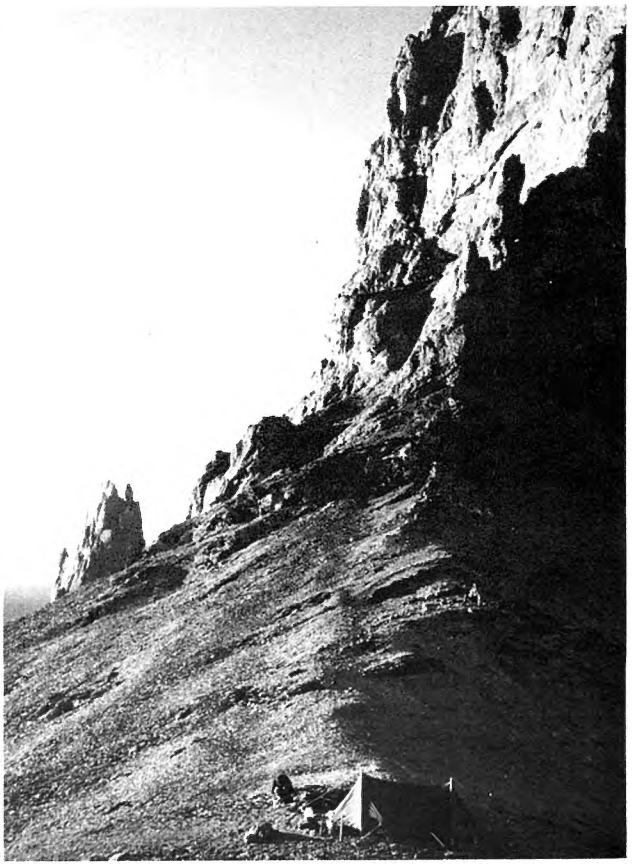
10. & 11. Peaks and valley in Zangskar.



12. Telephoto of Singi Kangri (19,400 ft.) from the North.

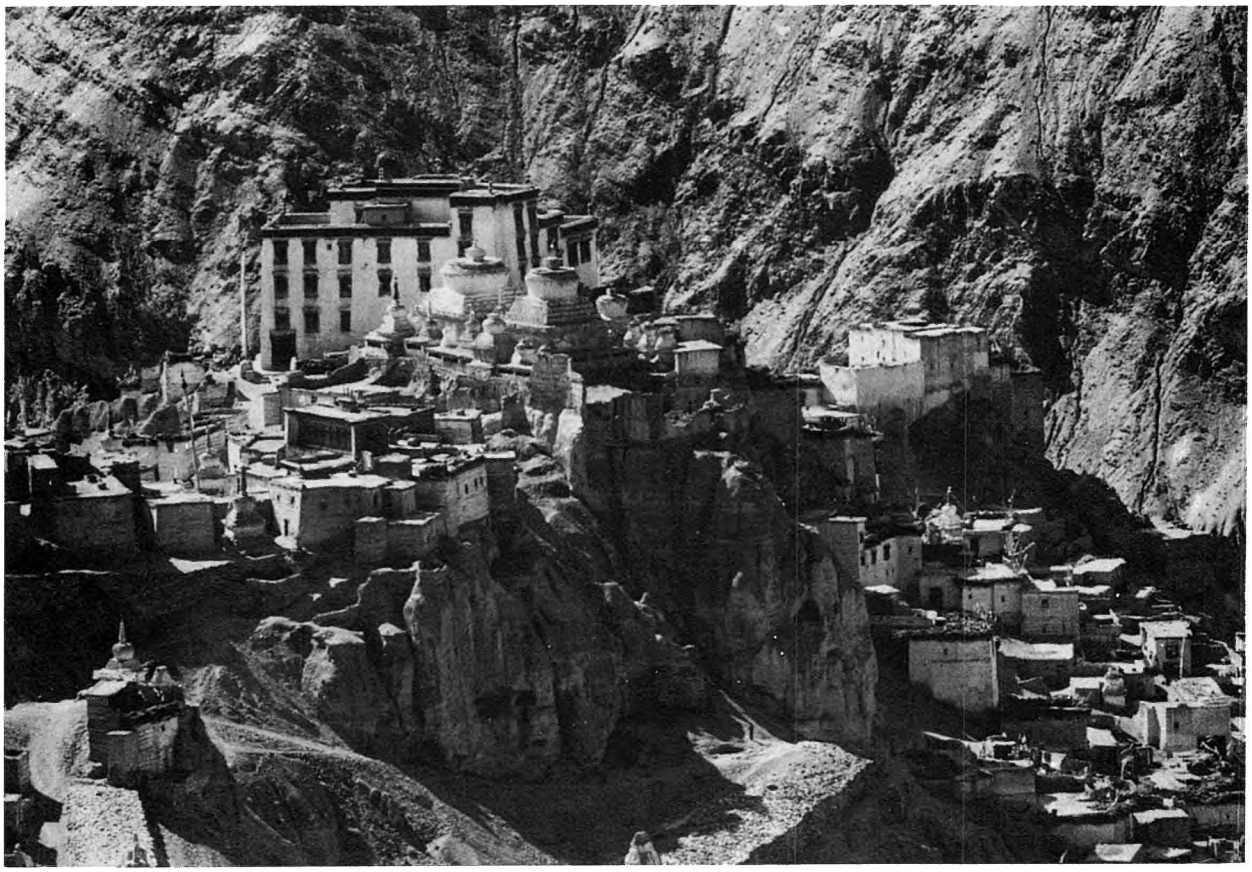


13. View from Singi La at dawn.



14. Evening at the assault camp at 18,500 ft.

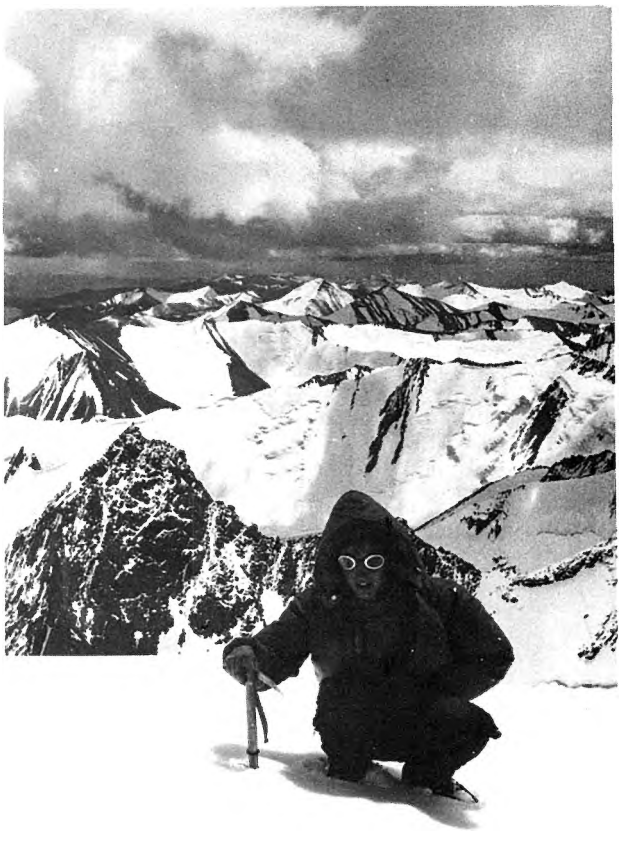
15. Kursha Gompa, Zangskar.



16. Lamayuru, Ladakh.

17. Pt. 6160m (20210 ft.); north face at dawn.

18. The west ridge of Pt. 6160m from col at 5890m (19325 ft.)



19. Summit view of unexplored peaks to the south of Pt. 6160m.

20. Pt. 6160m (left) and Pt. 6120m seen from summit ridge of Kang Yisay.