THE GLACIERS OF THE KULU-SPITI DIVIDE

By A. E. GUNTHER

Air transport has put the Himalaya within a month's holiday from London. If one leaves London by Comet at 10.30 A.M. on Monday, one may breakfast in Delhi on Tuesday morning. A night train will land one at Pathankot in the Punjab, 250 miles north-west of Delhi on Wednesday morning, and by evening one may be in the foothills of the Pir Panjal Range, 100 miles east or 200 miles over mountain roads in an Indian bus—something of a come-down after Comet travel. Within three days, then, one can be 6,000 ft. up in the Kulu Valley amongst rice fields, Hindu temples, Sadhus, Tibetan nomads and snow-covered peaks rising over 20,000 ft. in an azure sky . . . or the autumn monsoon may still be coming down in torrents.

The mountains of the Pir Panjal Range were chosen for this expedition because few others could be reached within a month. A week's trek from the Kulu Valley could lead to within striking distance of the Lahul or the Spiti peaks, and with luck one might get something.

There is not much literature on this region of the Himalaya. General Bruce travelled in these valleys in 1912; there had been an Austrian expedition into the Lahul in 1939; Major J. O. M. Roberts had climbed one of the higher peaks on the Kulu Divide in 1941, and Deo Tibba, after a number of attempts, was first climbed in 1952. The map (Sheet 52-H. Bara Lacha La) south of the Pir Pandal was surveyed in 1921, but the region of the Kulu-Lahul-Spiti watershed remains as it was sketched by the reconnaissance of 1849–63. So we set out with the rather vague intention of travelling until we were fit enough to climb, wherever that might be.

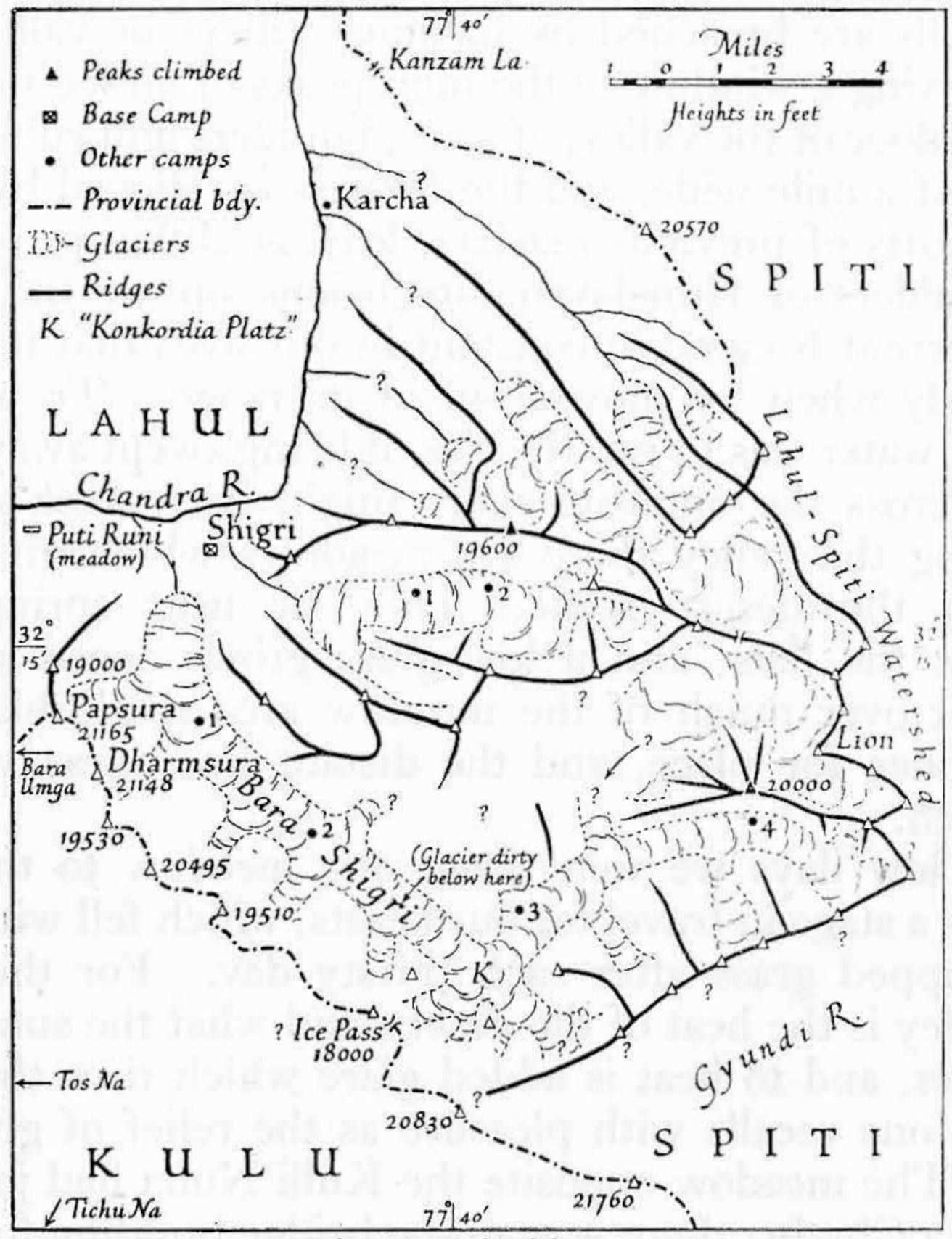
Beyond a certain point, therefore, we travelled blind, felt our way up glaciers not knowing where they led. And it is only since our return, when there has been time to plot compass bearings and to study photographs taken from summits on which the wind was too cold to see properly, let alone to make a map, that we began to realise where we had been, what we had done, and how much there is left to do. The ascent of individual peaks had come second to solving a problem in geography.

The expedition gathered at Manali, in the Kulu Valley. There were four Sahibs (two of us climbers, John Kempe[1] and myself), four Sherpas from Darjeeling, ten pack ponies in charge of a Gora (horse) Wallah and his mate, and food supplies for three weeks. All this sorted itself out under the ample patriarchy of Major H. M. Banon of whom Bruce had written in 1912, and whose 'Sunshine Orchards' supply fruit to all India. At Manali to show us how unpleasant it could be, the monsoon gave us three last drenching days of rain. Friday, September 18, dawned clear with fresh snow down to 12,000 ft.,

[1] Principal of Hyderabad Public School, 1951–1954 who had made the ascent of Kabru North earlier in the year, the writer's cousin.

and our pack train left Manali to cross the Pir Panjal Range into the Chandra Valley by the Rhotang Pass, a trek of two days to the north.

The Rhotang Pass, rising to 13,050 ft., separates one geographic province from another : the southern slopes of the Kulu Valley well watered by the monsoon, from the dry dessicated mountain zone bordering the Tibetan Plateau. On one side of this pass vegetation and trees flourish ; on the other there is virtually nothing, even juniper for firewood is scarce. The Kulu herdsmen take advantage of such



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greenness as may follow the spring monsoon to drive their flocks north over the Rhotang to graze till the autumn. As we climbed the pass they were returning with their kids and lambs south into the Kulu Valley having stripped the barren uplands of the scarce verdure. ' Flocks ' hardly describes sheep and goats sweeping down a mountain track by the ten thousand. But goats are gentle and understanding beasts. One might walk in their midst against the descending stream and not be touched by their long fearsome horns.

Whether the Rhotang Pass is a barrier between cultural provinces as well it is difficult in a scarcely populated country to say. Hindu temples are left behind in the Kulu Valley and at Khoksar, the highest village and cultivation in the Chandra Valley,[2] there are traces of

[2] In its lower reaches the Chandra River becomes the Chenab, one of the branches of the Indus.

Buddhism in Chortens and Mani Walls. Linguistically our Sherpas from Darjeeling felt more at home amongst the mongol tribes from the north than with the southern folk. But it is in appearance that the Valley of the Chandra offers the most striking contrast, and in descending into it one passes from one province of Asia into another.

Our route for the twenty miles east of Khoksar followed the Chandra Valley, virtually a cañon since to north and south the Lahul and Kulu peaks rise to 20,000 ft., sometimes sheer, always steeply. At intervals the cañon walls are breached by hanging valleys or valleys cut down to the floor giving a window to the high peaks of an ice world 8,000 ft. above. The floor of the valley, of sand, boulders and rubble, is seldom more than half a mile wide, and the flatness is relieved by terraces cut out of the débris of previous glaciers, leaving cliffs up to 100 ft. high tumbling boulders of Himalayan dimensions on to the track. The roar of the torrent became so constant in our lives that it entered consciousness only when we moved out of its range. To wade in more than a foot of water was to run the risk of being swept away ; so though only 50 ft. across the opposite shore might be a week's march. At intervals along the valley there are meadows which give a touch of greenness to the desert scene. They lie near springs or where streams cross the flats, and a low grass grows dense and is fit for grazing. But over much of the meadow area single blades vie with sand and stones for place, and the distant greenness vanishes with one's approach.

For four slow days we went from one meadow to the next, each pasture being a stage in travel for our beasts, which fell with relish upon the close cropped grass after each thirsty day. For the heat of the Chandra Valley is the heat of the desert, and what the sun doesn't bake the wind dries, and to heat is added glare which tires the eye. Each camping site one recalls with pleasure as the relief of greenness after the desert. The meadow opposite the Kulli Nulla had juniper for the fire ; at Chika Chatina there was a rope bridge building for a jeep track through to Spiti ; Puti Runi was the smallest meadow of all, and we wondered what our ponies found to graze there ; Jitang was a favourite spot for the larger Tibetan pack trains, for the grass if not lush was extensive and there were weeds ; and from Chaton, on a river terrace 100 ft. above the Chandra, we got our last view of the northern, barren region before crossing the Hamtah Pass into the Kulu Valley.

The Chandra Valley is also a vital route for trade. It links the east with the west, Tibet with Kashmir, the north with the south, the Indus Valley with the Sutlej Plains. There is a constant coming and going of men and beasts, in the spring north and east into the hills, in the autumn west and south into the plains. Much of the movement is trade in donkey—or in goat-loads for even goats and sheep carry their clip slung in balanced bundles on their backs. Much is merely the movement of nomads, who come from great distances, travelling for months and pay their way as they go.

Racially many of these nomads are Mongolian, coming from other parts of the Himalaya. They travel in small groups, at most a dozen or two, with a pack train of donkeys ; more often the party would be smaller, of three, four, or six, with a beast or two, a donkey or goat. Some are families, one led by a chieftain, a fine figure of a man in a dark maroon gown—which many wear—with shirts and high cloth boots with yak-hide soles. Many wear a dressing gown of coarse cloth with girdle, and black felt hats with fur-lined ear flaps. Some travel alone, the Indian postman making a fifty-mile round from Spiti to Kulu ; an itinerant gipsy or lama. One of these travellers we decided was up to no good, a Chinese student in corduroys whose job, perhaps, was to put the new Chandra jeep track north of the river on the map for his Communist masters.

The nomads were Tibetan in appearance, with hairless faces tinged deep by exposure and not washing, for why remove the natural protective oil from the skin ? The hair hangs wild and matted. Since the sexes wear the same habit, it was curiously difficult to tell them apart. Though life is hard for these people, many have great dignity. A friendliness penetrates their composure and often deepens from a broad open smile into uproarious laughter if something amuses them. But the simplicity of their appearance was mediæval, in the rough cloth they wore, in their primitive jewelry, in the ornamentation on what they used, on the bone handles of their knives or on the ribs of their pack saddles.

Of our four Sherpas all had been on major mountaineering expeditions, with the Americans to Kangchenjunga or with the Japs to Manaslu, but the hero of the party was Pemba Sunda who had got to Everest's South Col with the Swiss in 1952. Pemba's vivaciousness was infectious ; his smile consumed his visage and his laugh carried across the hills. His age was a puzzle ; in build he was a boy of 16 ; he may have been 25, but where his strength lay we could not guess. Mingma Gayalzon, our Sirdar, and Sherpa Tashi, the senior members of the party, were mountaineers of a very high order. To climb with Tashi was a treat, it was worth coming to the Himalaya for, so long as one went one's own pace and not his. Ang Tsering IV was our solid maid of all work, the quietest of the four.

Twenty miles above Khoksar (below the Rhotang Pass), the Chandra Valley widens into the Shigri flats, two miles long and a mile wide, a barren waste of sand and rubble washed there by glacial torrents which join the valley at this point. It is at Shigri that the Chandra turns north leaving the pass into Spiti, the Kanzam La (14,931 ft.) to the east. It rises against the Bara Lacha La (16,041 ft.) forty miles away.

On a meadow in the midst of the flats we made our Base Camp from which to explore the valleys radiating to south and east. These formed a part of the watershed where the provinces of Kulu, Lahul and Spiti meet, an area that had not been mapped. What appeared on the map was not an immense glacier system surrounded by peaks over 20,000 ft. high, but streams ' drawn in ' by a surveyor who had never been there.

To climb peaks thus became a secondary objective unless they might aid exploration.

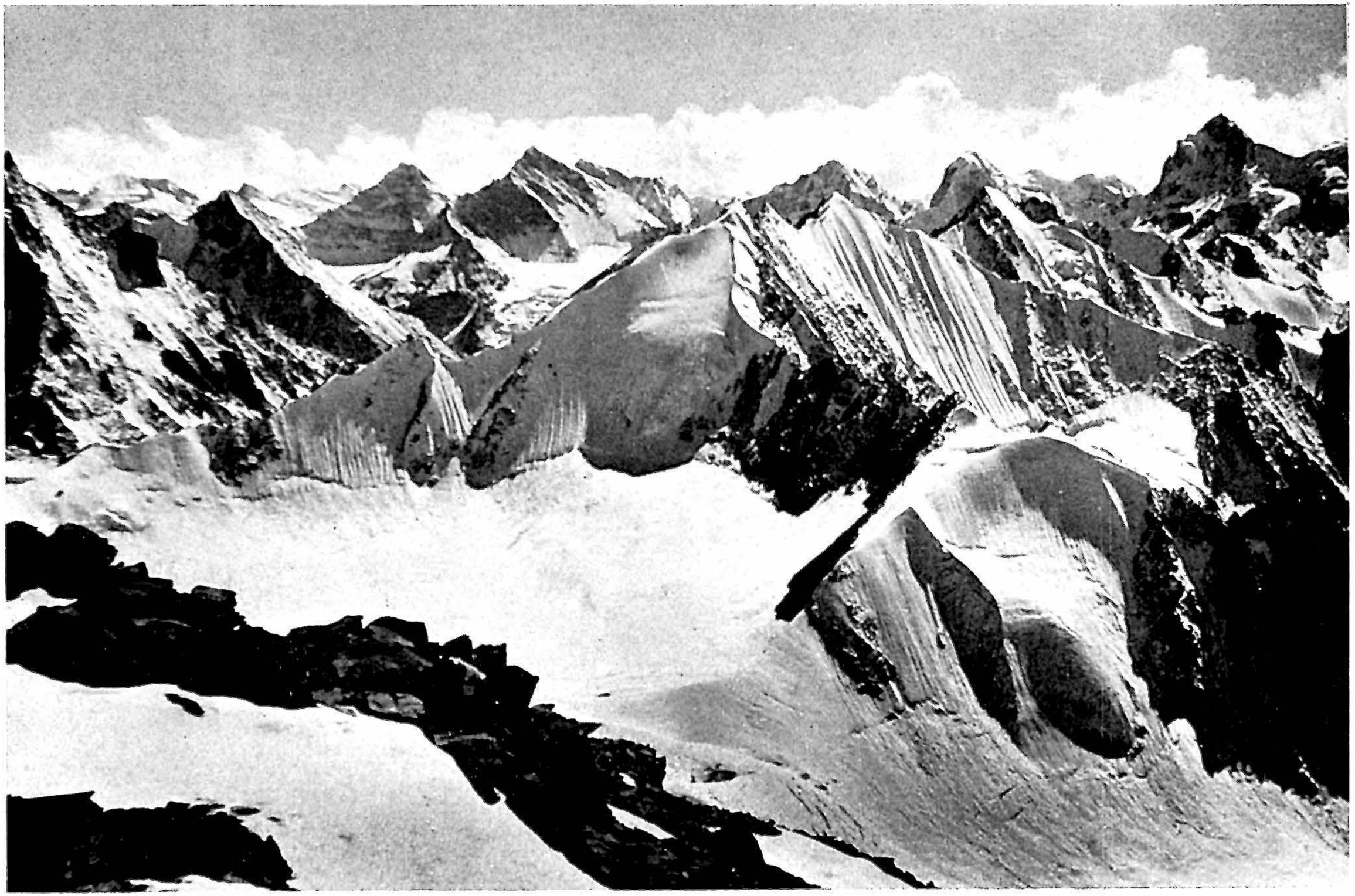
From the Shigri Base Camp we explored two valleys and made two ascents. The first was of a peak dominating a valley to the east, above the East Shigri Glacier, first seen from the Chandra Valley seven miles away. Being over 19,000 ft. high it would give us the lie of the adjoining glacier valleys. It would require two camps, and it would test our state of acclimatization.

By midday (Thursday, September 24) we had reached the valley end moraine, and by evening the clean ice of the glacier. Camp was pitched at 16,200 ft. two hours from the foot of the peak. The cold came quickly with sunset at 6 o'clock. Clouds massed against the 21,000 ft. peaks to the south-west and the wind drove snow storms across the valley though they did not reach us. It was cold taking compass bearings for the map, and an effort to put on extra clothes in the cramped quarters of the tent. We puffed and we blew and our heads ached.

The next morning we pushed Camp 2 another two hours up the glacier to 17,300 ft., and at 11 o'clock began the ascent of the peak rising behind it. The climb, we thought, might take two hours; it took four. The mountain was of shale which half way up formed slopes of scree so fiendish that two or three steps might get us nowhere, somewhat trying at 19,000 ft. Higher up firm rock out-cropped and a scramble of 50 ft. led to the summit. What a view that gave! It was a view different from that usual amongst the higher snow-capped peaks of the eastern Himalaya. To the north it was of a landscape from which ice had retreated, a deserted landscape of dry, barren peaks stretching north and east as far as the eye could reach into Ladakh and on to the plateau of Tibet. The colours were warm browns and red with an isolated peak mantled in ice and snow rising here and there above the mean mountain level.

To the west across the Chandra the Lahul group and in the eastern distance the snow-capped Gangotri, presented the more conventional Himalayan appearance of snow-capped giants of incomparable grandeur, a dozen in Lahul alone. But the southern watershed presented the grandest sight of all. From Deo Tibba west to the peaks of the Spiti divide, rose within a few miles of us a line of twenty ice-clad peaks forming the Pir Panjal Range each higher than ourselves, and all but two unclimbed. One of these we called the 'Lion,' an attractive double-domed summit of 20,000 ft., on the crest of the southern watershed. The glacier from which it rose must connect, we thought, with the Bara Shigri Valley, and it was therefore our plan to follow this up to climb the 'Lion.'

The cold (our aneroid read 19,600 ft.) drove us down. The descent was tiring, not exhausting unless we forced the pace, and we were back in camp within two hours. It had been a day of 9 hours, sufficient for incompletely acclimatized bodies (for John had not been well), and we decided, rather than explore the head of the glacier, to return to the Shirgi meadow, take a day's rest, and start up the Bara Shigri for the Lion.



KULU DIVIDE, FROM PEAK 1, 19,600 FT.

We felt relief in the greenness of the Shigri meadow but it proved an evil camp site. Few nomads seemed to tarry there and we soon learned why. The meadow is exposed to prevailing winds from east and west, changing in the middle day. Both were cold, dry, enervating winds which, out of the sun, chilled ; yet the sun was hot ; it drained one's energy away and glare from rock or sand shrivelled one. So we spent the day in tents on our sleeping bags to escape from the one or the other, and tried to get rest from sleep that left one liverish and worn. But nowhere else was there pasture or fuel in this region, and fuel was dung. In this one commodity the Shigri economy balanced. All else was import. Beasts came and fed, and their dried droppings served as fuel for us birds of passage, though we tired of its acrid taste in all we ate and its fumes hung about our clothes for long into the plains.

It was at this stage that Ferdinand joined the party. Ferdy was a ram detached from a passing flock at 35 rupees. His public relations consciousness was highly developed. Whether he knew what his fate was to be we couldn't tell, but he was lonely and his bleating, rising to a crescendo when tethered near the pots which were to be his eventual destination, would have moved any but those who were starting to combine night with day starvation. At last the day of his execution came. The Gora Wallah and his mate got busy ; they whetted the cutlass. Should the need arise, dear reader, this is what you do :

Caress your Ferdy, then crack him smartly on the neck with the blunt edge of a cutlass : this will stun him.

Turn him over gently grasping all his legs : and cut his throat to the bone ignoring such sighs as he may give vent to.

Then twist his head off by the horns. Struggles will begin at this stage until rigor mortis sets in. Blood will gush out of the neck as from a decapitated mediæval martyr in pictures. This is caught in a bowl and mixed with the intestines for sausages. But it would be unfair to think of the Gora Wallah as callous. He cared greatly for his ponies, rested and fed them well and dressed their sores with a lotion of Ferdy's fat mixed with the jelly in an electric dry cell. And he served us loyally.

Though after this Ferdinand was no longer with us, as the saying is, his liver very much was. Given hunger of the Shigri variety you won't need to turn your thoughts to other things while it goes down : and we took roast leg of mutton up a glacier to 17,000 ft. Until we left camp ravens hopped around after Ferdy's bones and a lammergeier, a bearded vulture with a 9 ft. wing span, the largest bird in the Himalaya, hovered menacingly above to revenge our lust for Ferdy's flesh.

We left the Shigri Meadow Camp early, with food for a week (Monday, September 28). The ponies were to take the loads on to the glacier snout a mile away ; the Sherpas after that. The ascent of the lower reaches of the glacier took three days, progress being desperately slow. The glacier was piled with rubble and blocks oiled by mud sludge, all in potential movement on an ice surface crossed by gaping crevasses enlarged by decay. Only where the mud formed pans between the

slipping débris was normal progress possible. On the first day, six hours of labour brought little reward ; and the best site we could find for a camp was a stony platform with water close by. Morale was low that night, and it wasn't to rise for another two days.

It was at this stage of the expedition that the weather began to spoil. In the previous afternoons, clouds from the south had massed against the peaks between us and the southern plains, but the threatened snow had not fallen. We had been warned by an Indian whom we passed in the Chandra Valley that winter was coming early this year, and here, we assumed, it was. On our second day's ascent of the Bara Shigri glacier it came.

It was another day of dirty, sliding rubble, until afternoon when we reached a more stable surface of granite slabs forming a level plateau on the glacier. This led to another area of decay for which the streams of two smaller glaciers joining the larger were responsible. Here at 4 o'clock in a snow storm we pitched Camp 2, and spent a cold, damp night. The next morning (Wednesday, September 30) was misty, and new snow covered the hills. Two hours after leaving camp we reached clean ice, and an hour later, at midday, a break in the weather revealed a vast Konkordia Platz two hours ahead, surrounded by worthy peaks. By three o'clock it was snowing again, and Camp 3 was made a mile up a glacier joining the Bara Shigri from the east, our aim being to reach the base of the Lion the next day.

But the Lion was proving something of a mystery. It did not appear at the head of this valley. So on the next day with two Sherpas and with ration packs for 48 hours we pitched a light Camp 4 five hours up the glacier, four or five miles higher, at the base of a peak to the north from which we might survey our position. This camp at 17,000 ft. was exposed to a biting wind from the east, off the Tibetan plateau, and it was very cold that night.

There was nothing eventful about the ascent of this 20,000 ft. peak. We judged it might take three hours ; it took more than four. Two hours of scree slope led to rock outcropping beneath an icefield which called for the rope, and we remained roped thereafter, rock alternating with iced snow. Approach to the eastern arête was steep ; a ridge of rock with the usual cornice on its north side. We crept up the snow delicately for a hundred feet and there was the top, a gentle dome of snow, falling steeply on three sides. At 20,000 ft. we stood above most of the peaks of this mountain world, yet some 40 ice summits in Lahul, Kulu and Spiti groups still appeared to rise above our level, the Lion slightly lower than we were to the east, two camps, perhaps, away. The summits of the watershed between Spiti and Lahul formed an imposing line lying further to the south than the map indicates.

But the cold was intense, the wind fierce. Fumbling with camera and compass was almost too much for our numbed minds and we could not easily stand upright. In two hours we were back in camp, and in another three at Camp 3, since it seemed that our exploration could better be directed to west and south against the barrier of the Kulu

SPITI WATERSHED, FROM PEAK 2, 20,000 FT.

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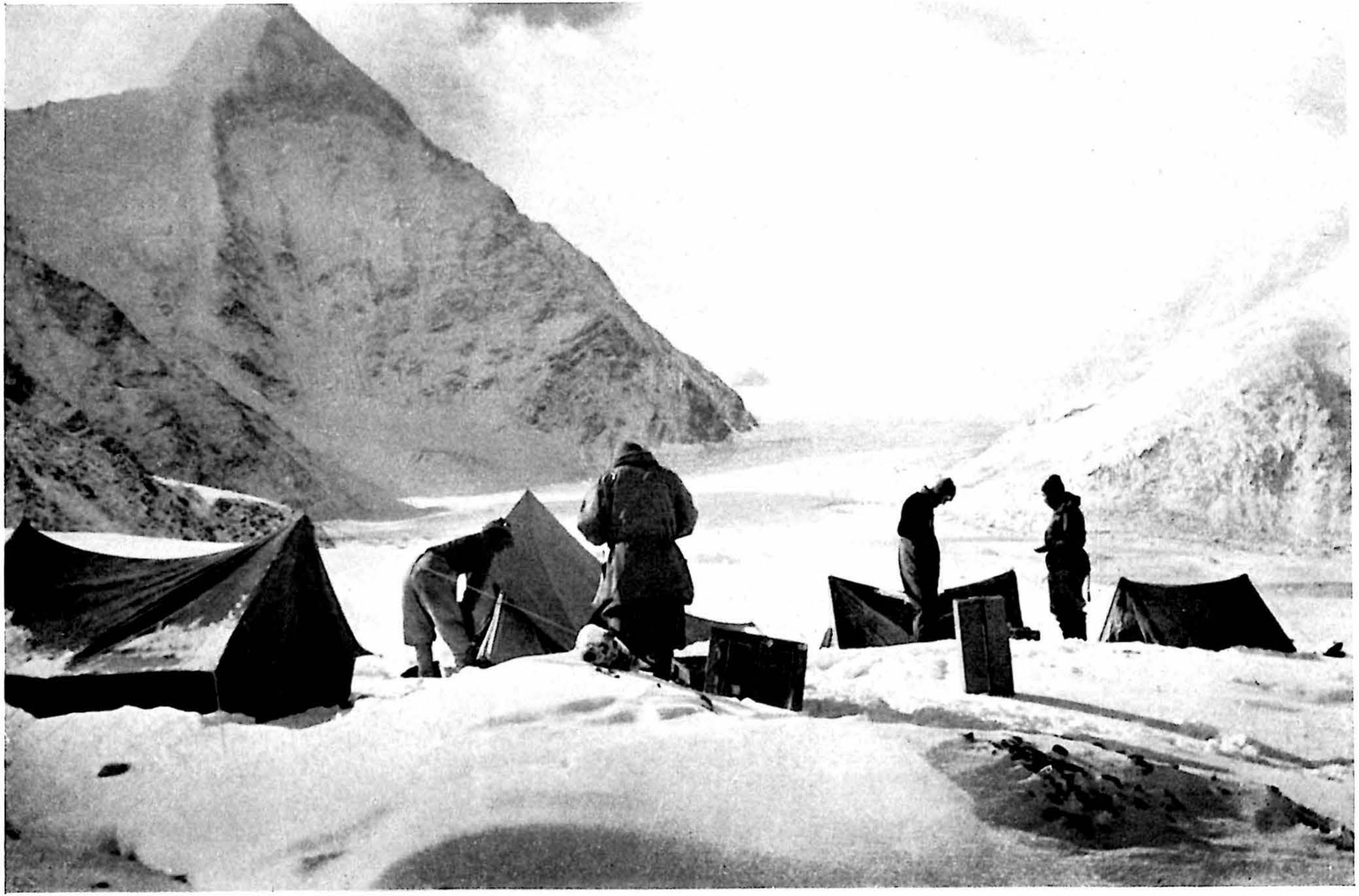

BARA SHIGRI: MORNING AFTER STORM, 16,500 FT.

range, where a glacier pass of 18,000 ft. that might give a short-cut home and a 21,000 ft. peak above it attracted us.

The wind presaged storm, and snow fell heavily that night. The next morning (Saturday, October 3) the glaciers and rocks were white, and the mountains surcharged with snow. The threat of avalanches, already peeling off the hills, put them out of bounds for three days. There was no purpose in getting up. We lay in our sleeping bags composing an article for the Delhi *Statesman*, periodically heaving snow off the tent.

In such weather there was no need of excuses for getting back late to our jobs ; but there was nothing we could do if we remained. The high glacier pass into the Kulu Valley to the west and peak above it were lost in cloud, while down on the glacier it snowed the whole long day of our retreat. So on an intensely cold morning in wind and snow and lowering cloud we broke camp, and in the next week felt our way down the Bara Shigri glacier, climbed out of the Chandra Gorge by the Hamtah Pass (14,027 ft.) into the Kulu Valley, and started the long journey back to Europe across the still scorching plains of India.

The cost of this holiday to one member of the party of four was as follows :

	£
Fare London to Delhi and return	288
Sherpas at Rs. 4 per day including fares from Darjeeling and insurance	28
Ponies at Rs. 3 per day and Gora Wallah	12
Hire of equipment, Himalayan Club	7
Food for Sahibs and Sherpas	23
Hotels and fares in India	22
Miscellaneous	20
Photography	20
	£420

APPENDIX I

THE GLACIERS OF THE KULU-LAHUL-SPITI WATERSHED

The mapping of the region covered by Survey of India Sheet 52-H comprising the watershed where the provinces of Kulu, Lahul and Spiti come together dates from 1849–1863. South of Shigri, in the Chandra Valley where the river makes a right angled bend from E-W to N-S, the present map shows a number of valleys, the Bara Shigri, Gyundi, and others without names, with the watershed between them.

In September, 1953, a small climbing expedition (A. E. Gunther and J. W. R. Kempe) entered this area from the Chandra Valley and made its base camp on the meadow of the Shigri Flats. It ascended two glacial valleys, one rising steeply due east of Shigri, the other the Bara Shigri ; and it ascended two peaks each of about 20,000 ft. above these

valleys. The purpose of these ascents was to view the area as soon as it was discovered that the map bore little or no relation to the ground.

From records it appears that no previous expedition had entered the area, but there had been two or three expeditions which had explored the peaks to the west and north, and which had crossed the passes joining Kulu with Spiti to the south. In 1941 Major J. O. M. Roberts[1] approached the peaks of the Kulu Divide from the west by the Tos Na and climbed Point 21,148 which he called the White Sail Peak. From this he looked down on to the Bara Shigri Glacier which he describes as running straight as a main road and saw ' the maze of Spiti mountains, and, beyond them, Tibet.' In 1951 K. E. Berrill and Jan Graaff made an attempt on Point 20,570 to the north of this area, but were stopped by technical difficulties on the west shoulder near the summit. The photographs taken by Berrill on this climb have helped to complete the map to south and south-east. Later in 1951 also, Jan Graaff with K. E. Snelson made the ascent of a peak of 20,300 ft., just to the west of Point 20,830 on the Kulu Divide. From this, about three miles to the north, they saw the large junction of the Bara Shigri glacier below Camp 3 on the map attached.

The Bara Shigri glacier is indeed as straight as a main road, lying parallel to the magnificent line of the Kulu peaks, but it is difficult to fit its length (judged on the ground) into the space shown on the map. Indeed, until Jan Graaff confirmed that Point 20,830 commanded the valley of a river flowing to the north-east, presumably the Gyundi, it was thought that the Bara Shigri-Gyundi watershed lay still further to the south. Despite this, it is difficult to make the Bara Shigri Glacier less than 12 miles long. Another discrepancy may occur in the distance of the Chandra River to the watershed above the Shigri Glacier, to the Bara Umga and to Point 21,165 ft. One's inclination would be to shorten this distance by a mile or two.

The findings of the 1953 expedition have been put on the map attached. In positioning it, the 1921 survey of the peaks of the Kulu Divide from Points 21,165 to 21,769 is assumed correct. The 18,000 ft. ice pass west of the so-called Konkordia Platz may lie, if our estimate of the length of the Bara Shigri Glacier is correct, not far to the north-west of Point 20,830, and it may therefore be reached by the glacier rising from the Tichu Na from the west.

These findings are subject to an accurate survey. Certainly the magnificence of the Bara Shigri Glacier basin was unexpected. The party was not equipped with surveying instruments, nor with the means of determining distances which are always deceptive in the Himalaya. These are invariably greater than they appear, and if errors are likely they are more likely to underestimate than to overestimate distances.

APPENDIX II

WEATHER

In autumn precipitation in this region comes with the monsoon from south and west. The Pir Panjal Range forms an effective barrier to much of this moisture, as the vegetation shows. The contrast between the glaciation of the watershed peaks from Deo Tibba into Spiti including

[1] *A.J.* 53. 323.

those of the Shigri area, and those to the north, the Lahul and Spiti Groups, is striking. East of the Lahul Group little snow falls north of the Chandra River line. Only a few summits above 20,000 ft. stand out white against the dry background of the plateau region.

In 1953 the monsoon ended with three days torrential rain, leaving snow down to 11,000 ft. A week of clear skies was followed by unsettled weather each afternoon. Clouds banked against the Kulu peaks from west and south. In early October under the great peaks in the Bara Shigri snowstorms would overtake us at three or four and this became the rule rather than the exception. The peaks of the watershed caught most of the snow; those to the north were lightly powdered. The Chandra Valley remained dry. An incidental result of the prevailing south and west winds is the formation of ice cornices overhanging the north flanks of peaks and ridges making ascent difficult from that direction. On the other hand, they often make a conveniently broad ice route up knife-edged ridges.

Between the third week in September and the second week in October, 1953, there was a marked change in temperature in the Chandra Valley. We felt that winter had set in.

APPENDIX III

GEOLOGY

The form of the Pir Panjal Range from the Rhotang Pass east to the peaks of the Spiti watershed is the combined result of glacial erosion and the nature of the rock. The rocks are of two kinds, granites and sediments. The higher peaks are mainly granitic, and their form is unmistakable. They rise south of the Chandra Valley and of the Bara Shigri Glacier majestically as half domes over 20,000 ft. high intermittently for forty miles, the concentric fractures giving them shape. Corries and serrated ridges connect one peak with another and gendarmes look large even miles away.

The sedimentary rocks, belonging to the older Palaeozoics (Haimanta System), are sandstones and shales. Thousands of feet of well stratified sandstones form the Chandra River gorge on the north, while the shales extend east into the Spiti hills, and north up the Chandra to the Bara Lacha La. Indeed the Chandra River has selected the softer, sedimentary rocks for its course, being deflected on to them by the granite masses of Kulu-Spiti and of Lahul. The line it follows parallel with the Pir Panjal is a reflection of tectonic forces, which may be seen in the valley. The contacts of granite intruded against the shales between Puti Runi and Shigri are very fine, and cut several thousand feet of mountain in a steep angle.

Erosion, glacial and other, has blunted the summits of the sedimentary rocks which if lower than the granitic still rise to 20,000 ft. Their screes are vicious. For the rest, glacial forms are a feature in the area, and the decaying glaciers are still doing their work. The Chandra Valley gorge is flanked by river terraces since cut through, and by the terminal moraines of past glaciation in the main or from side valleys. They offer levels for vegetation, several of the high meadows and the cultivation at Khoksar being situated on them.

APPENDIX IV

Glaciation

A feature of the region of the Kulu-Lahul-Spiti watershed is glacial retreat. Ice still fills the bottom of the Bara Shigri descending to the Shigri flats at 12,000 ft. But the snouts of the glaciers above Shigri are in decay, and their lower reaches are surcharged with débris which they are unable to disgorge, making their passage tiring and dangerous. Among the peaks of the Kulu divide rising majestically to 21,000 ft. there appear to be two glacial zones : the lower in decay, the higher active, but confined to the upper 1,500 or 2,000 ft. Here and there the upper zone is linked to the lower by the shallow séracs of narrow feeder glaciers that have cut deeply into the walls of the main valley. These conditions are significant for the climber because the lack of a continuous glacier rising to the summits, but only reaching to snow fields below them, adds enormously to the defenses of the peaks, making some very difficult indeed. At the head of the Bara Shigri glacier system southwards where the general level of the ice is higher, say 17,000 ft., the separation of the two zones is not as marked but it exists, if only in the form of séracs. To these difficulties are added, of course, the effect of glacial erosion during the ice age which has left the U-shaped valley and the corries with their precipitious walls and sharp indentated ridges. The width of the peaks and summit ridges of the Kulu divide is everywhere small, in terms, that is, of the Himalaya.

APPENDIX V

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