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THE 1921 MOUNT EVEREST EXPEDITION.

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OF Mount Everest and the country that surrounded it very little was previously known, and the maps of that district were vague and inaccurate. Mount Everest was discovered and measured from the plains of India from a distance of about 150 miles about the year 1850, but it was not given the name of Mount Everest until 1858, in honour of Colonel Everest, who was the Surveyor-General in India at the time of its discovery. The top of it can be seen from Sandak-phu and Phallut, places near Darjeeling, at a distance of about 90 miles, where it appears between the peaks of Makalu. In 1905 the late General Rawling and Colonel Ryder, the present Surveyor-General of India, following the course of the Brahmaputra, climbed up to the southern watershed of the Brahmaputra and had a distant view of Mount Everest from the north from about 80 to 90 miles. From this view-point they were able to see a great distance along the chain of the Himalayas, and were able to say that there was no doubt that it was the highest mountain in that range. Captain Noel tried to approach Mount Everest in 1913 through Tashirak, but was unable to get any near view of the mountain, and was stopped by the Tibetan authorities from approaching any nearer.

Political obstacles have always stood in the way of any exploration. Mount Everest is situated on the borders of Tibet and Nepal, both of which countries are closed to Europeans. The Gurkhas have always objected to Europeans coming into their country, and public feeling there is still very strong on the subject. In Tibet, too, there has been a great prejudice against the foreigner, and we also had a self-denying ordinance

with Russia by which neither country would allow their subjects to enter Tibet. Last year, however, owing to the changed political conditions it became possible to approach the Tibetan Government with a request that permission be granted for an expedition to proceed to Mount Everest. Mr. Bell was at the time going to Lhasa on a special mission from the Government of India, and, thanks to his personal friendship with the Dalai Lama, he was able to obtain permission for the expedition to start, and the Dalai Lama, besides giving the expedition a passport, sent written instructions to all the governors of the districts through which we were to pass that they were to give us all facilities, and were to help us in every way, which orders were carried out to our entire satisfaction, in spite of the fact that this policy was the very opposite to their traditional policy of the total exclusion of foreigners from the country.

The object of this year's expedition was to make a thorough reconnaissance of Mount Everest and of the approaches to it from the north, east, and west, and to find out whether a possible route existed that would lead to the summit, and that was not physically impossible. For the purely mountaineering part of the work we had Mr. H. Raeburn, the leader of the mountaineering party, Dr. Kellas, Messrs. Mallory and Bullock, all members of the Alpine Club. In addition to this object there was the very important work of surveying and mapping the unknown territory through which we were travelling and the very difficult mountainous regions that surrounded Mount Everest. For this purpose the Government of India had kindly lent the expedition two officers of the Survey of India, Major H. T. Morshead, D.S.O., and Major Wheeler, M.C., R.E. Major Morshead had already had a considerable experience of travelling in Tibet, having completed valuable travels and survey work in the Kham and eastern districts. Under him were three native surveyors, one of whom was left in Sikkim to revise the existing and out-of-date maps of that country; the other two, Lalbir Singh and Gujar Singh, accompanied us. Major Wheeler, the other surveyor, was an expert in the Canadian system of photo-survey, a method especially useful in difficult and mountainous country. The Indian Government had also lent the expedition the services of Dr. A. M. Heron, of the Geological Survey of India, to study the geology of the region, about which nothing was known. Mr. A. F. R. Wollaston, also a member of the Alpine Club, and well known for his journeys in Africa and New Guinea, accompanied the expedition in the capacity of doctor, naturalist, and botanist, and had brought out with him a complete collector's outfit.

At the beginning of the year, as soon as permission for the expedition had been granted, preparations were immediately begun to collect stores and to arrange for the Alpine and scientific equipment that was to accompany the expedition. Most of the stores were bought in England, and

all the Alpine equipment, including skis and snow-shoes, rope, crampons, and Alpine tents; the ordinary tents and a certain amount of food stores were bought in India. The scientific equipment included maximum and minimum thermometers, black- and bright-bulb solar radiation thermometers, hypsometers, George barometer, and aneroids in pairs to read from 15,000 to 22,000 and from 22,000 to 30,000 feet. The photographic equipment consisted of three stand cameras, one $7\frac{1}{2} \times 5$ and two quarter-plate, all fitted with telephoto attachments. There was also a Panoram Kodak and several small Kodaks for use at great heights, where it would be impossible to carry up the larger cameras. The Imperial Plate Company kindly presented all the dry-plates for the expedition. The members of the expedition left England at different times, arranging to meet at Darjeeling by the middle of May, when it was hoped that the expedition would be able to start. Mr. Raeburn was the first to arrive there, as he had gone ahead to collect coolies for the expedition. For high climbing a special type of coolie is needed, one who is strong and hardy and does not mind the cold and is also accustomed to live at great heights. The type of man who best fulfils these conditions is the Sherpa Bhotia, who comes from the north-east of Nepal from the districts that lie to the south of Mount Everest. He is a Buddhist by religion, and though at times quarrelsome and rather too fond of strong drink, yet he proved a very useful and capable type of man, who could be rapidly trained in snow and ice craft, and who was not afraid of the snow or the cold. We also picked up a few Tibetans from the Chumbi Valley on the way, and these proved to be as good as the best of the Sherpas; they were less trouble to manage, and could equally well carry loads at great heights. These coolies were all fitted with boots, and very difficult some of them were to fit with their broad feet—as broad as they were long. Blankets, cap comforters, fur gloves, socks, and warm clothing were issued to all of them, and for those that had to sleep at the highest camps, eiderdown sleeping-bags were taken. The expedition also took two interpreters with them, Gyalzen Kazi, a Kazi of Sikkim, who came from near Gangtok, and Chheten Wangdi, a Tibetan who had at one time been a captain in the Tibetan Army, and then had been with the Indian Army in Egypt during the War. They proved quite invaluable to the expedition. They were both of them very hard-working, and saved the expedition many thousands of rupees in expense; their tact and knowledge of Tibetan ways and customs were of the greatest use in keeping up the friendly relations established between the expedition and the Tibetans.

Lord Ronaldshay, the Governor of Bengal, showed the expedition every kindness and hospitality, and went out of his way to help it in every way possible at Darjeeling. The stores from England, which had gone round by sea, were unfortunately late in arriving, owing to

congestion in the harbour at Calcutta, and insufficient dock accommodation there. However, once they were landed, every one was most helpful, and the Darjeeling Himalayan Railway, which had given a free pass for them over their line, had everything brought up to Darjeeling by May 16.

Arrangements had been made with *The Times* and with certain Indian newspapers to publish periodical telegrams dealing with the progress of the expedition, and though this news was available to all other Indian papers, they took no advantage of it, and preferred to boycott the expedition.

Before going up to Darjeeling I had been to Simla, where I had had an interview with Lord Reading, the Viceroy, who had shown great interest in the expedition and had given a subscription of Rs.750 towards it. The Commander-in-Chief, Lord Rawlinson, I had also seen, and he had arranged to lend the expedition 100 Government mules. These arrived at Darjeeling early in May and were to be our main transport. The mules were a fine lot, sleek and fat, and we had great hopes of them. On May 18 and 19 the expedition left Darjeeling in two parties, with fifty mules and twenty coolies in each party. Major Morshead had left on May 13, travelling up the Teesta Valley, with his surveyors, and was to meet us at Kampa Dzong. We were unable to take all our stores at once, and left part of them behind, intending to make use of the Government mules in bringing them on later. Throughout the journey across Sikkim the weather was very wet, with heavy rain each day; the mountain tops and ridges were all covered with clouds and prevented our obtaining any views. Owing to its heavy rainfall Sikkim is a country with a lavish growth and a marvellous vegetation; the path that leads across to the Tibetan frontier is a very trying one, as it is a series of steep climbs followed by equally steep descents into steaming tropical valleys. Wonderful butterflies of every shade and hue flitted across the path, scarlet clerodendrons made brilliant patches of colour in the dark green of the luxuriant forest among huge tree ferns. Creepers and ferns hung from every tree; white, orange, mauve, or purple orchids grew among the mosses and ferns on the branches of the trees, and showed up in lovely clumps of colour. We passed big hedges of daturas on the way, 15 to 20 feet in height and covered with hundreds of great white trumpet-shaped blooms, quite 8 inches in diameter and fully a foot in length. At night they gave out a strangely sweet scent and seemed to gleam in the darkness with a curious kind of phosphorescence.

Ever since leaving Darjeeling our mules had been giving trouble, and two or three from each party had to be left behind after each march. After travelling for four days we stopped at Rongli, hoping they might recover after a day's rest. Ten mules had already been left behind and one had died. The next march to Sedonchen was a short one of only 9 miles, but

the path climbed from 2700 feet to 7000 feet, and this completely finished the mules. For one party alone we had already hired twenty-two ponies to take some of the loads, and after Sedonchen we should have had to hire ponies to carry their own line-gear as well as all our loads, so that there was now nothing to be done except to send the mules back and rely on what local transport we could get. The marches ahead of us were longer and the climbing steeper than anything we had yet done. We were, however, on the main trade route to Tibet, and had passed hundreds of Tibetan mules coming down from Tibet laden with bales of wool and others returning with rice, grain, and cloth bought in exchange. We were, therefore, able to pick up sufficient mules to carry us to Yatung; if we had taken the shorter route up the Teesta valley this would have been impossible, as villages there are small and there is practically no transport passing along that route.

The path is really only a steep stone causeway up the mountain side, a regular *via dolorosa* and most unpleasant to walk upon; but probably anything else would be washed away by the torrential rain that falls here during most of the year. Leeches abounded here, sitting up at the end of every leaf and fern and waving at the passers-by. From Sedonchen to Gnatong the path climbs 5000 feet in the first 5 miles, and as we rose higher we entered into the rhododendron forests after passing through the zone of oaks and magnolias. The rhododendrons at this time of the year were a glorious sight. No photograph could do justice to the scene—it needed a painter at least. The hillside was a blaze of colour—rhododendrons, orange, red, deep crimson, pink, white, cream-coloured, formed a glorious mixture of colours. Every yard of the path was a pure delight. Now appeared grassy fields carpeted with primulas and many others of the purely Alpine plants. Gnatong was a very wet and cold spot with a rainfall of 180 inches, and on the next day we crossed the Jelep La, 14,390 feet, in pouring rain. This was the frontier between Sikkim and Tibet, and on going a few hundred feet down on the Tibetan side we emerged into fine weather with blue skies, having left the rain behind us on the Sikkim side. Everywhere were primulas and rhododendrons, the former appearing the moment the winter snow had melted from the ground. It was a steep and a stony descent of over 5000 feet into the Chumbi Valley, but the rhododendrons in the great forest of fir trees showed up splendidly, the big pink blooms of *Aucklandi*, the orange bells of *cinnabarinum*, and many a white and yellow one too, in striking contrast to the dark green of the firs. We now met birch, sycamore, and willows, all pale green, with the tender green of early spring, white spiræas and clematis, yellow berberis, white and pink roses, purple iris, and a mass of other wild flowers. The Chumbi Valley is one of the most fertile and prosperous valleys in all Tibet; the houses are large and well built,

reminding one very much of Tirolese villages. The rainfall here is but a quarter of that which falls on the other side of the Jelap La; potatoes, barley, wheat, apples and pears all grow well here. The air everywhere at this time of the year was scented by the wild roses. From Yatung to Phari was 28 miles, two days' easy march up the Chumbi Valley. We visited the Galinka and Donka monasteries on the way, both containing enormous prayer-wheels in which they said there were over one million prayers. Each time the wheel is turned a bell rings, and one million prayers have ascended to heaven. In other places we met prayer-wheels turned by water brought down in irrigation channels, and again in other parts the wind was used to do the same work, a kind of anemometer being fitted up to catch the wind. This latter was, perhaps, the most constant, as the wind blows both summer and winter in Tibet, whereas for six months in the year the water is frozen, and the water-wheel is silent and can offer up no prayers. In the Donka monastery was a famous oracle, a regular Delphic oracle who was consulted far and wide, and his oracles had a great reputation for truth. Here we were given the usual Tibetan tea, poured out into agate and silver teacups and made with salt, tea, and butter, all churned up together. On a cold day this was a warming drink, but I never much took to it as a beverage, though I had to take many cups of it during the next few months and had to pretend to enjoy it.

Phari is a very dirty village, with a stone fort, and is situated at a height of 14,300 feet. It is always a cold windy spot, but it is an important trade mart, both to India and across the Tremo La to Bhutan. It lies at the foot of the sacred peak of Chomolhari—a very beautiful mountain, just under 24,000 feet, which stands at the entrance to the real Tibet, where the great plains and rolling downs begin with their far distant views. We left Phari on May 31 with a most marvellous collection of transport animals, comprising donkeys, bullocks, mules, ponies, and yaks. There is a short way from Phari to Kampa Dzong which takes only three days, but we were told that it was too early in the season to use that road, and that we would have to take the long way round. We afterwards found out that this was a lie, and that they had sent us the long way round in order to be able to charge us more. We had not yet got accustomed to Tibetan ways.

From Phari to Kampa Dzong by the long route took us six days. For the first two days we followed the ordinary trade route to Gyantse, over the Tang La, 15,200 feet, through Tuna to Dochen, keeping at a height of 14,800 all the way. Chomolhari was a magnificent sight the whole time, with its 7000 feet of precipices descending right on to the Tuna plain. Near Dochen was the large shallow lake of Bam-tso, a lake with the most lovely colours, the shades varying from deep blue through purple to a light blue-green. In other parts of it the waters were quite red from a weed

that grew in it, and in the still morning light the whole of the range of glacier-covered mountains that formed the background to the picture were reflected in its calm waters and formed a charming picture. Many bar-headed geese were seen swimming about, also some Brahmany duck and a few terns. On the plains roamed herds of Kiang, the wild horse of Tibet, and many Goats, the Tibetan gazelle, were feeding there, but the latter were very wary and would not allow us to get within 500 yards of them. It was at Dochen that our cook tried to boil a tin of fish without opening it first, and when he tried to open it afterwards when it was hot, to his surprise and fright, it exploded like a bomb in his face, and he and all his assistants in the kitchen were covered with small pieces of fish.

From Dochen we crossed the Dug Pass, 16,400 feet, to Khe, which was the site of the once-important town of Khe-tam. In those days the Kala-tso must have extended right up to it, but everywhere were traces of rapid desiccation. Ruins extended for more than a mile in every direction, and some of the buildings must have been of considerable size, but now there is no water in the valley, and all we could get that night came from a very dirty and muddy pond that was nearly dried up. From here we marched to Kheru, and camped at 15,700 feet with some nomads who were very friendly. The days were very warm, but at nights there were still sharp frosts. From Kheru there was a longer march of 16 miles to Tat-sang, crossing two small passes of 16,450 and 17,100 feet. Tat-sang lies at a height of 16,000 feet on the edge of a broad plain, where there were some excellent springs full of fish, and below a small nunnery, which stands on a commanding rock. That night, again, there was a sharp frost. The next day's march to Kampa Dzong led for 12 miles along a barren and dry valley to a pass 17,300 feet, and then gradually descended through a curious limestone gorge to Kampa Dzong, whose walls suddenly appeared towering above us on the cliffs. We passed many iris, light and dark blue, growing in the valley, and a curious pink trumpet-shaped flower that came straight out of the sand. Game was plentiful along the route, and I shot a gazelle and an *Ovis Ammon (Hodgsoni)* on the way. Here we met Morshead and his surveyors, who had come up the Teesta Valley and over the Serpo La.

Several of us, ever since leaving Phari, had not been feeling well, and had had stomach troubles owing to the change of climate and bad cooking on the part of our cooks. It took most of us some time to get acclimatized to the changed conditions. Dr. Kellas, however, instead of getting better, gradually grew worse and weaker every day, until on the last march before reaching Kampa Dzong, while being carried in a litter over a 17,000-foot pass, his heart failed him, and he passed quietly away. The following day we buried him at Kampa Dzong, within sight of the three great mountains he had climbed in Sikkim—Pawhunri, Kinchen-

jhow, and Chomiomo, and in view of Mount Everest, which he had so longed to approach. Mr. Raeburn, too, had been gradually getting worse, and there was no other alternative but to send him down with Mr. Wollaston to Lachen and put him under the care of the missionaries there until he could recover. This was a very serious blow to the expedition, the loss of two of the members of the climbing party.

After Kampa Dzong our route lay across broad plains and along the flat and swampy valley of the Yaru with the snowy chain of the Himalayas to the south of us; from these heights, for we were about 15,000 feet, they did not appear nearly as imposing as they do from the south, and for the most part the northern slopes were not as steep as those on the south. Game was plentiful all the way to Tinki Dzong, and we passed many ponds covered with teal, duck, and bar-headed geese. In these flat valleys the midges were very troublesome all day, surrounding us in clouds. Tinki Dzong was a picturesque old fort, situated on the banks of a large pond that swarmed with bar-headed geese, Brahmany duck, and teal. They were wonderfully tame and came waddling round our tents, knowing no fear of man, for they had never been shot or killed here. For some years a Lama, who had been sent from Lhasa, had lived here and made it his special object to tame all the wild animals around. The Jongpen rode out to meet us and escorted us to tents which had been pitched for us, where he had ceremonial tea, sweetmeats, and chang—Tibetan beer—all ready for us. The Jongpen was very Mongolian in appearance, and was dressed in fine embroidered Chinese silks, and proved a most obliging and courteous host, presenting us with a couple of hundred eggs and four sheep. There were several large monasteries and prosperous-looking villages tucked away all around in the recesses of the hills. The barley here was just beginning to come up, for in Tibet it can be grown and ripened at heights of over 15,000 feet, and during the summer months I saw some of the finest crops that I have seen anywhere. It is nearly all irrigated, as they do not seem to put much faith in the rain.

On June 11 we left Tinki, and had the usual trouble in starting. Some forty-five families were supplying us with transport, and as each wanted the lightest loads for their animals, there was a babel of noise and nothing was done. The headman eventually settled the squabbling by taking a garter from each family, and after mixing them up, laid one on each load, and whoever was the owner of the garter had to take the load. Crossing the Tinki Pass we descended again into the Yaru Valley at Chusher Nango, passing on the way a curious dwarf gorse which carpeted the valley with yellow. Our yaks here proved very wild, and the plain was soon strewn with loads flung off by them as they careered away, tail in air, in every direction. We forded the Yaru here by a ford 3 feet deep

and some 80 yards wide, and soon afterwards came to the fine country house of Gyanga Nangpa, which was the home of the Phari Jongpen. He rode out to meet us, and provided us with a very solid meal of soup and Tibetan dumplings with a chillie sauce. As we were given fifteen dumplings apiece we found some difficulty in making room for these. Europeans had never been seen before in any of these parts since leaving Kampa Dzong, so everywhere we were objects of the greatest interest to all the inhabitants who flocked out to see us.

Our next march proved a more exciting one, as after fording the Yaru again we had to cross a wide sandy plain full of shifting quicksands. When we arrived there a violent sandstorm was blowing, which our guides said would make the crossing easier. So off we started, dressed as though for a gas attack, with goggles over the eyes and with mouth and nose covered with handkerchiefs and mufflers. The sand was blowing in great clouds from off the sand-dunes, through which we wound our way, and under one we found some of our coolies halted and quite lost. After leaving the sand-dunes we had some wide stretches of wet sand to cross, over which the dry sand was blowing in smoke-like wisps, so that the whole ground appeared to be moving. In places where the wet sand shook and quivered we hurried on as fast as possible, and eventually we got everything over in safety. It was too late now to go on, so we camped in a howling gale among the sand-dunes, and it was many days afterwards before we got rid of the sand which had penetrated everywhere.

Close to this camp the Bong Chu and Yaru rivers meet and flow south, cutting their way through the great Himalayan mountain range. Much to our surprise, there suddenly appeared just before sunset, and far away down the valley over the clouds, a lofty and very beautiful peak. This we eventually decided must be Mount Everest, and the next morning we were able to prove this was so by climbing one of the hills to the west of the camp, from which we could see the whole range of the Himalaya to the south of us. Our drivers called this peak Chomo-uri, the Goddess of the Turquoise Peak, but this can only be a very local name, as Everest is known and called by the Tibetans Chomo-lungma, Goddess Mother of the country. This is the official name in Lhasa, and this name was known throughout the country, so that this is apparently the correct Tibetan name for Mount Everest. From this point we now entered the valley of the Bhong Chu, and this we followed up to Tingri. Major Morshead and his surveyors were kept very busy all the time, mapping the country as they went along, for they were travelling now in unsurveyed country. From one peak to the north of the Bhong Chu we had a very extensive view, stretching from the snowy ranges beyond Chomolhari and 120 miles to the east of us to Kanchenjunga, and then on to Makalu and Everest, and from there passing on to the high snow peaks west of Everest and to Gosainthan,

a range of some 250 miles of snow peaks ; but above them all towered Mount Everest, several thousand feet above its neighbours.

Three days' march brought us to Shekar Dzong, where was the headquarters of the district with two Jongpens. There was also a large monastery here containing 400 monks. Shekar was a most remarkable place, on a rocky hill like a gigantic St. Michael's Mount. The town is at the base of the hill, but the monastery, consisting of innumerable buildings with narrow streets, was literally perched on stone terraces built out from the rocky sides of the hill and connected by walls and towers with the fort, which was built still higher up, and this again was connected by turreted walls with a Gothic-like structure at the summit, where incense was freely burnt every morning. Immense crowds came to see us and were most embarrassing in their attentions. While we were here we visited the monastery, which was a very rich one. In the largest temple, which, like all Buddhist structures, was very dark, were several life-sized gilded statues of Buddha, covered with precious stones and turquoises, and behind these was a colossal statue of Buddha fully 50 feet high. Round the temple were eight curious figures, about 10 feet in height, and dressed in quaint flounce dresses, which were the guardians of the shrine. From the entrance to the temple we climbed up a steep staircase, almost in complete darkness, until we came out on a platform almost opposite the gilded face of the great Buddha. Here were offerings of grain and butter and some exquisitely carved bowls and teapots of silver. The abbot of this monastery was the reincarnation of a former abbot, and was looked upon as an extremely holy man. He had spent sixty-six years of his life in this monastery, and all the monks seemed to adore him for his gentle and charming personality. His attendants with much difficulty persuaded him to be photographed, as they wanted to have some picture of him, for they said that his time on earth could now only be short. They dressed him up in some beautiful gold brocades, and priceless silk hangings were put up for a background. This photograph proved afterwards most useful, and people hundreds of miles away used to beg for a print of it, as they put it in their shrines and worshipped it and burnt incense before it, and I could not give any one a more welcome present than the picture of the old abbot of Shekar-chöde.

Two days' march from here brought us to Tingri, which was a large village and trading centre, situated on a small hill in the middle of the great Tingri plain. This was to be our first base while reconnoitring the north-western approaches to Mount Everest. We could get no information about the country to the south of us, so that it was necessary to send out parties in different directions. Information on any subject was always hard to get in Tibet. Most of the people knew nothing beyond their own village, and of those that had travelled further no two would tell you the

same story. It was the same with distances; they would have no real measure of distance or time. It would be a long day's journey or a short one, and for short distances it was expressed by cups of tea, which means the time that it would take to drink one, two, or three cups of tea. The representative of the Depon received us at Tingri, and put at our disposal the old Chinese Rest House, where we made ourselves quite comfortable. We had rooms in which to put away our stores, and another room we turned into a dark room to develop all the photographs that we were taking. It had taken the expedition just one month to get to Tingri from Darjeeling.

No time was lost, as it was not known when the monsoon might break, and how strong it might be in Tibet, and on June 23 Mallory and Bullock started off to find the easiest method of approaching Mount Everest from the north-west. Mount Everest was clearly visible from Tingri, about 40 miles away, and across a low range of hills and to the west of it were some fine snow peaks 25-27,000 feet in height, which dropped down to the Khombu Pass. It was just possible that a glacier might come from Mount Everest and join the Kyetrak River, so the following day Major Wheeler and Dr. Heron started off to go towards the Khombu Pass. From now on Dr. Heron was on the move all the summer, sometimes with one party, sometimes with another, and often by himself studying the geology of all the valleys and mountains. He travelled over more country than any other member of the expedition. Major Wheeler, too, began his photographic survey from the Khombu Pass, and most of the summer he spent by himself in lonely camps 18-20,000 feet high. The weather was very provoking, and often he would spend day after day, over 20,000 feet, on the top of a mountain in bitter cold and driving snow, waiting for the clouds to lift, to enable him to take his photographs. I think that he had the hardest and most trying time of all of us, and deserves the greatest credit for his work.

On June 22 Mr. Wollaston rejoined the expedition, after having taken Mr. Raeburn down to Lachen and handed him over to the care of the lady missionaries there. After his arrival I was now able to go away for a few days, and see personally where the various parties were and the general lie of the land, and I also wanted to find a place for our second base when we were reconnoitring the other side of Mount Everest. I first went and joined Major Wheeler and Dr. Heron at Kyetrak, and climbed up to the Khombu Pass—a fine glacier-covered pass 19,000 feet—leading into Nepal and across which a certain amount of traffic comes. It is always a dangerous pass, but early in the season they appear to take yaks over it. To the east towered up the great cliffs of the 26,800-foot peak, and to the right were the icefalls of Chorabsang. From here, with Dr. Heron, we crossed over the Pusi La or Marmot Pass (17,700 feet), a

quite easy pass into the Rongshahr Valley and down to its interesting gneiss gorges. The Tibetan frontier in many places extends for several days' march south of the main watershed of the Himalayas, as it is easier to get from Tibet over the passes into the upper reaches of the valley than it is from Nepal. At a certain distance down the valleys they narrow into steep precipitous gorges up or down which the going is very difficult and often impassable in the rainy season, as the rivers are quite unfordable. This is the case with the Nyanam Valley, the Rongshahr Valley and the Arun Valley. On the south side of the passes there is a considerable rainfall and the vegetation becomes quite luxuriant. Near Tazang the white roses covered the hillsides, while spiræas, small yellow and white rhododendrons, yellow primulas, wild gooseberries and currants grew everywhere, and the shady side of the hills were covered with forests of birch, while juniper covered the other slopes that faced south.

Owing to the amount of juniper which grows in it, and which is very aromatic and used as incense, the valley is looked upon as a sacred one, and there were several hermits that lived here in caves among the rocks. The nearest village supplied them with food, and morning and evening clouds of incense used to ascend from the mouths of their caves. After ten years of meditation the anchorite is supposed to acquire great holiness and to be able to support life on ten grains of barley a day. There was a female anchorite here, they told us, who had lived to 138 years, and was greatly revered. She forbade any killing of animals, and hence we found the wild sheep everywhere very tame. After returning to Keprak we travelled east to Zambu, a prosperous-looking village, owning some 3000 yaks, and with fine views looking up the Rongbuk Valley to Mount Everest, which was now only about 20 miles away. This valley led apparently right up to the foot of the giant precipices that come down from its north-western face. A large and unfordable glacier stream came down this valley, but at the monastery of Chöbu, 3 miles from Zambu, there was a foot bridge across which the loads were carried by hand, while the yaks were swum across the river. Some of the yaks preferred to stop on an island in the middle of the stream. Throwing stones at them was no use as they refused to budge, but at length some one produced a sling, and the stones thrown by this method evidently stung the animals considerably more and produced the required effect. The Rongbuk Valley was wild and gloomy, with great cliffs coming down to the muddy glacier stream, but it was a strangely holy valley, too, for at a height of 16,500 feet there was a large monastery, and besides the inhabitants of the monastery they told us there were between three and four hundred hermits and nuns living in little solitary cells or caves. Here, far away from the outside world, under the shadow of the great precipices of Mount Everest, they could meditate in peace and in perfect seclusion. All the wild animals and birds in this

valley were wonderfully tame. With my own eyes I watched the wild sheep coming down in the early morning to the hermits' cells and being fed not 100 yards from our camp, and I walked up openly to within 20 yards of a herd of burhel and they showed no signs of fear or paid the slightest attention to me. The rock pigeon would come and feed out of our hands, and so it was with all the other wild birds.

We found the Alpine climbers in a camp further up the valley, on a sunny terrace about 18,000 feet, above the left bank of the Rongbuk Glacier, and commanding magnificent views of Mount Everest about 7 miles away at the head of the valley. From here for a month they were able to train their coolies in snow and ice work, and to explore the side glaciers and the great spurs that come out to the west and north-west and which appeared so very impossible. At first, and up to July 7, the weather remained pretty fine; but then the monsoon broke and rain and snow hindered the work of reconnaissance very much and made all high climbing impossible. From this point Dr. Heron and I retraced our steps to Chöbu, and then in three marches, crossing the Doya La on the way, we reached Kharta and the main Arun Valley, or Bhong Chu, as the Tibetans call it as long as it remains in Tibet. The people here were at first very frightened of us. Villages were quite deserted when we approached, but after a while they crept back one by one. The Alpine flowers on the Doya La were exceptionally beautiful. The lovely blue poppy abounded and grew in clusters everywhere; pink, yellow, and white saxifrages covered the rocks, and several varieties of gentian were just beginning to come out. The Doya La marks a distinct barrier, the country to the north being barren, while on the south the moister currents of air penetrate up the Arun Valley and its tributaries, giving it a distinctly damper climate. This was very noticeable in the vegetation as we descended—rhododendrons, willows, juniper, roses, clematis, currants, abounded, and the ground was in places carpeted with yellow and sweet-scented primulas.

After much trouble we at length found Kharta, for the old maps here were hopelessly wrong. It was really a large collection of villages, near where the Kharta River ran into the Arun. We rode up to see the Jongpen, who lives in the village of Kharta Shigar, some 3 miles up the Kharta Valley. He had a large Chinese tent pitched for us in his garden, which was well sheltered and shady with willow trees all round, and containing a large painted water prayer-wheel under a great poplar tree, turned by a gurgling little stream that ran through the garden. The Jongpen was quite a young man, though he had been there for some years, and was most friendly and hospitable. He insisted on giving us all our meals, but we were getting experienced now in the use of chop sticks, and the Tibetan cooking was often better than that done by our own servants. We were able to look round for a suitable place for

our second base camp, as it would be necessary to explore the upper Kharta Valley and another valley that they told us about, that lay to the south of it. We eventually selected a house that stood all by itself on an old river terrace, and was surrounded by a shady garden of poplars and willows. The rent we had to pay for the house and garden amounted to $3\frac{1}{2}d.$ a day; but living is cheap in Tibet, and you can get a house-servant there for *2s. 8d.* a year!

The rains now broke in earnest, and we had a very wet journey back to Tingri, going to Lumeh, with its huge poplar, 40 feet in circumference, and crossing a dangerous ford over the Rongbuk river higher up at Tashi Dzong; but I got back in three days, riding 36 miles the last day in pouring rain. During my absence Major Morshead had been busy surveying the country to the north of Tingri, and on my return he and Mr. Wollaston started off on a journey of exploration to the south-west, having had an invitation from the Jongpens at Nyanam to visit them, and they were able to see the great peak of Gosainthan and Gaurisankar, which was for a long time confused with Mount Everest, though over 20 miles away from it and 5000 feet lower. It was a very striking and beautiful peak. They also visited Lapchi Kang, where the poet Mila Rapa had lived and which was a great place of pilgrimage. Its name was known far and wide, and some people even applied this name to Mount Everest. The weather, however, unfortunately spoilt their trip, as it rained nearly all the time. But Mr. Wollaston managed to collect many natural history specimens and a great variety of new flowers. At Tingri, too, during this time, we had heavy storms of rain and thunder every night, fresh snow coming down as low as 15,000 feet; but most of it melted again during the day. The plains around Tingri were rapidly becoming marshes and the rivers soon became unfordable. The storms always formed to the north of us along the Sipri limestone ridge and the watershed between the Brahmaputra and Bhong Chu, and then gradually worked down towards the south. Fine weather came to us from the south, and when the south wind blew the rain stopped. It was seldom that the monsoon clouds brought rain directly to us. Every evening at Tingri we had brilliant lightning and loud thunder to the north, and our house proved to be very leaky. The rain poured in through the mud roofs.

On July 24 we started moving all our stores from Tingri to Kharta, and our first march was to Nezogu, where there was a bridge over the Kyetrak River. A couple of inches of snow fell during the night, and many of us who did not put on snow goggles soon enough suffered much the next two days from snow blindness. Wheeler, who had finished his survey of the Keprak and Khombu valleys, accompanied me as far as Chöbu, where he started to go up the Rongbuk Valley. Here he re-

mained for a month, having a very trying time with constant bad weather. Mallory and Bullock, finding the bad weather too much for them, joined us and came along to Kharta, and their coolies were also in want of a rest. From Chöbu to Rebu was a pleasant march through a fertile valley full of fields of barley, peas, and yellow mustard, and the wild flowers were very beautiful along the irrigation channels—a black clematis, blue monkshood, and delphinium predominating. The next day we crossed the Doya La, and on the 28th reached Kharta, where we established our camp in the garden belonging to the house that we had hired, the house itself being used for all our stores and for a dark room. Here we were only at a height of 12,300 feet, and the valley was green with fields of peas and barley. Just below us flowed the Arun, now a majestic river over 100 yards wide, and a mile lower down it entered into its great gorges, where in the course of the next 20 miles it drops from 12,000 feet to 7500 feet, a fall of over 200 feet in the mile. Every day the monsoon clouds came up through the gorge in thin wisps, but melted away always at the same spot, and though it poured with rain a mile below us, yet every day with us the sun shone brightly and it was very rare for any rain to reach us. Twenty miles away to the north again were heavy clouds, and storms and rain fell there daily, so that we seemed to be in a dry zone between the two storms. The forests of fir and birch came up to the limit of the rainfall, and then ceased suddenly when the rain stopped a mile below us.

On August 2 Mallory and Bullock left Kharta to explore the eastern approach to Mount Everest. Neither the Jongpen nor any of the inhabitants could tell us where the Kharta river had its source, and whether it was possible to get to Mount Everest that way. They said, however, that in the next valley to the south it was possible to do so. I followed the Alpine climbers a couple of days later, as Mr. Wollaston and Major Morshead had returned from their trip to Lapchi Kang. After going for 7 miles up the Kharta Valley, which is very fertile, with every level space filled with barley-fields, and containing numerous villages and monasteries, we turned up a side valley and then crossed over a chain of mountains to the south by the Langma La, a pass 18,000 feet in height. This led us into the wonderful Kama Valley, a valley unexcelled in beauty anywhere in the Himalayas, with the most stupendous scenery—gigantic rocky cliffs towering up to heaven, and immense cliffs of ice torn and riven, breaking off and falling with a thunderous roar far down into the valley below; there were smiling pastures right up amongst the ice and snow, with fields carpeted with many varieties of gentian; rhododendrons, birch and fir trees surrounded some of the lower glaciers, and forests of some of the most magnificent fir trees grew in the lower parts of the valley, the whole forming a combination of beauty not often seen.

At the extreme end of the valley towered up Mount Everest with its great buttresses forming a huge semicircle, and like a great snake, the Kangshung glacier, with its bands of black moraine, crept up to the foot of the rock walls and cliffs that formed the eastern side of Mount Everest. It did not need a long survey of these faces to satisfy the Alpine climbers that there was no practicable route up this side, but there was still an untried approach up the Kharta Valley, and to this valley they now turned their attention. But before we deal with the first reconnaissance of the Kharta Valley I should like to discuss the Kama Valley more fully; it was so very beautiful that I paid three visits to it at different times. From the upper Kharta Valley at the end of September, I paid my third visit with Major Wheeler and Mr. Wollaston. We crossed over a high pass well over 20,000 feet, and descended into the head of the valley. The weather was fine, and we were able to get some good photographs of Everest and Makalu—the latter a mountain only a little over 1000 feet below Mount Everest—yet a far finer mountain to look at and far more imposing. I was able to climb up on to a ridge between the two peaks, whence I got some superb views of the incredibly narrow peaks of Makalu, with its cliffs and formidable precipices often too steep even to be lightly powdered with snow. To the south we looked down over range upon range of snow mountains in Nepal. In the Kama Valley, Makalu is the most astonishing spectacle—its terrifically steep precipices descend sheer for 11,000 feet into the valley, and huge buttresses of perpendicular black rock support it with jagged black spires and towers. The Tibetans do not know the name of Makalu, but call the mountain Chomo Lönzo. From the northern peak the Kangdoshung glacier pours straight across the valley, forcing the stream that rises on Mount Everest itself to go under the glacier, entering it in an enormous black cavern. Rhododendrons, willows, mountain ash, blue poppies and iris now abound, and a few miles lower down begin the birch trees and the juniper, which grow with the greatest luxuriance, and in the autumn I never anywhere saw such beautiful colouring as the scarlet of the mountain ash and berberis, the yellow and gold of the birch and willows, and the deep red of the wild roses.

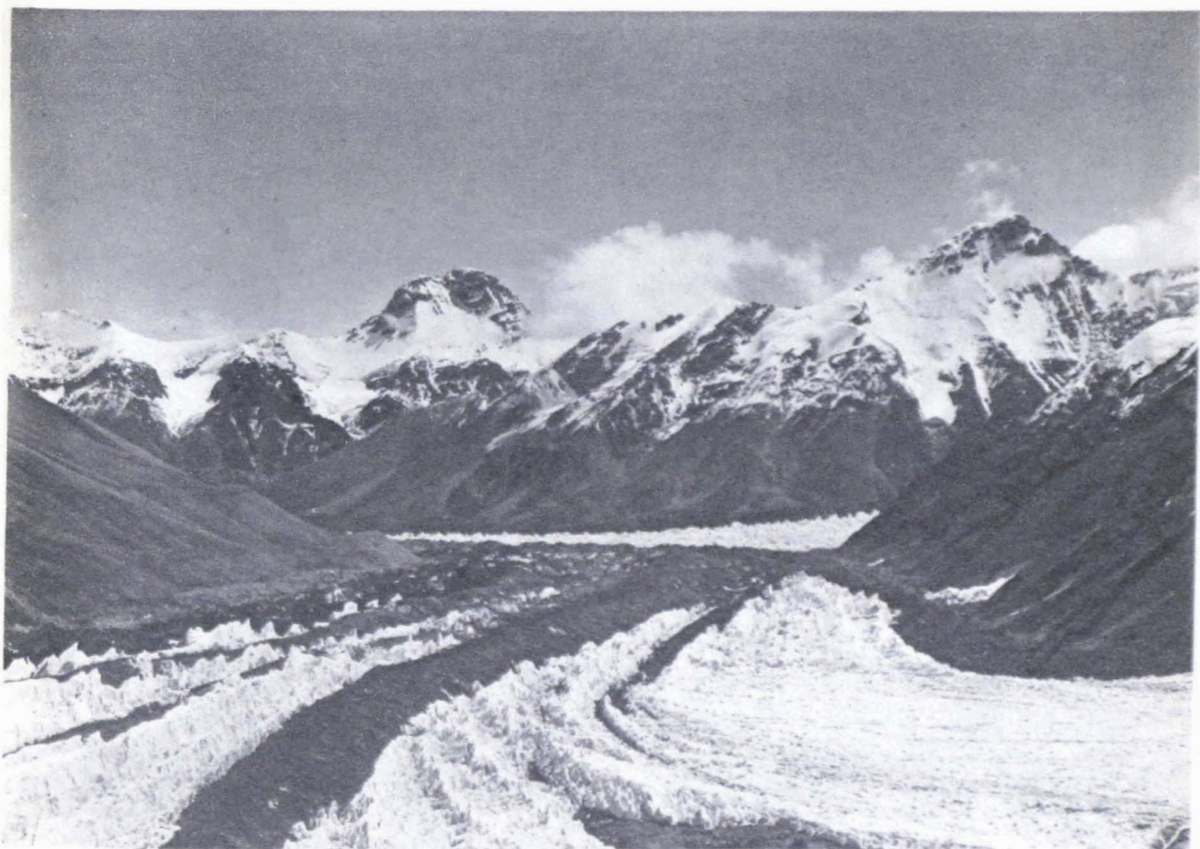
Towards the end of August, while waiting for the weather to improve, Mr. Wollaston and I crossed over the Chog La and dropped down to Sakeding (the pleasant terrace), a small trade mart a little lower down in the Kama Valley, in order to pay a visit and investigate the lower parts of the valley. Here we entered at 12,000 feet into the zone of the real forests. Here were juniper trees of a size quite unknown, with stems 20 feet in circumference and rising for 50 and 60 feet without a branch. Then a little lower down we entered into the zone of the silver fir (*Abies webbiana*), where the trees grow 100 feet and more in height and with a girth of over

Summit

End of N.W. Ridge



1. LINGTREN PEAKS, HEAD OF RONGBUK VALLEY, BETWEEN THE RONGBUK AND WEST RONGBUK GLACIERS



2. LOOKING DOWN WEST RONGBUK GLACIER ACROSS THE RONGBUK GLACIER TO THE PEAKS OF THE NORTH RIDGE

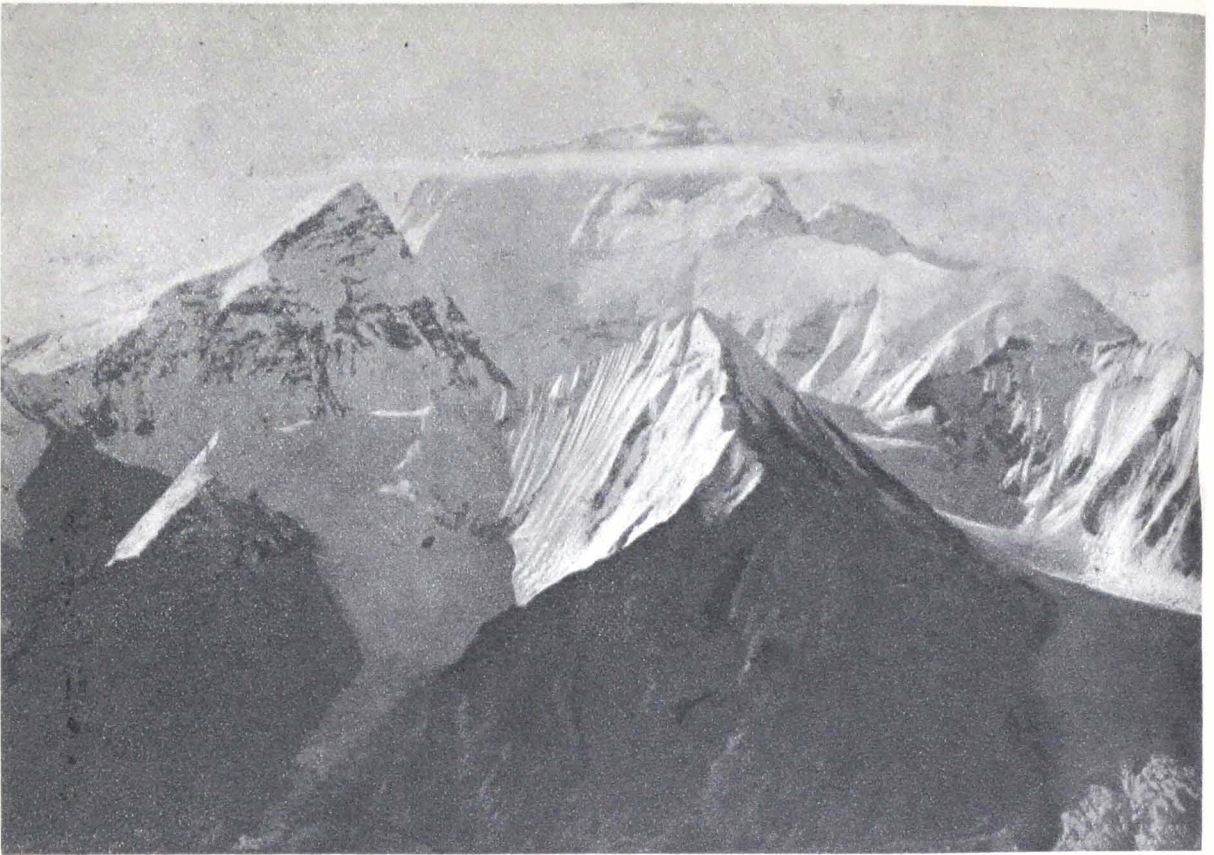
Phot. by G. L. Mallory

Lingtren

Summit

Lhotse

Western Cwm



3. MOUNT EVEREST, NORTH-WEST RIDGE, WESTERN CWM ON EXTREME RIGHT AND LINGTREN PEAKS

Summit

Lhotse

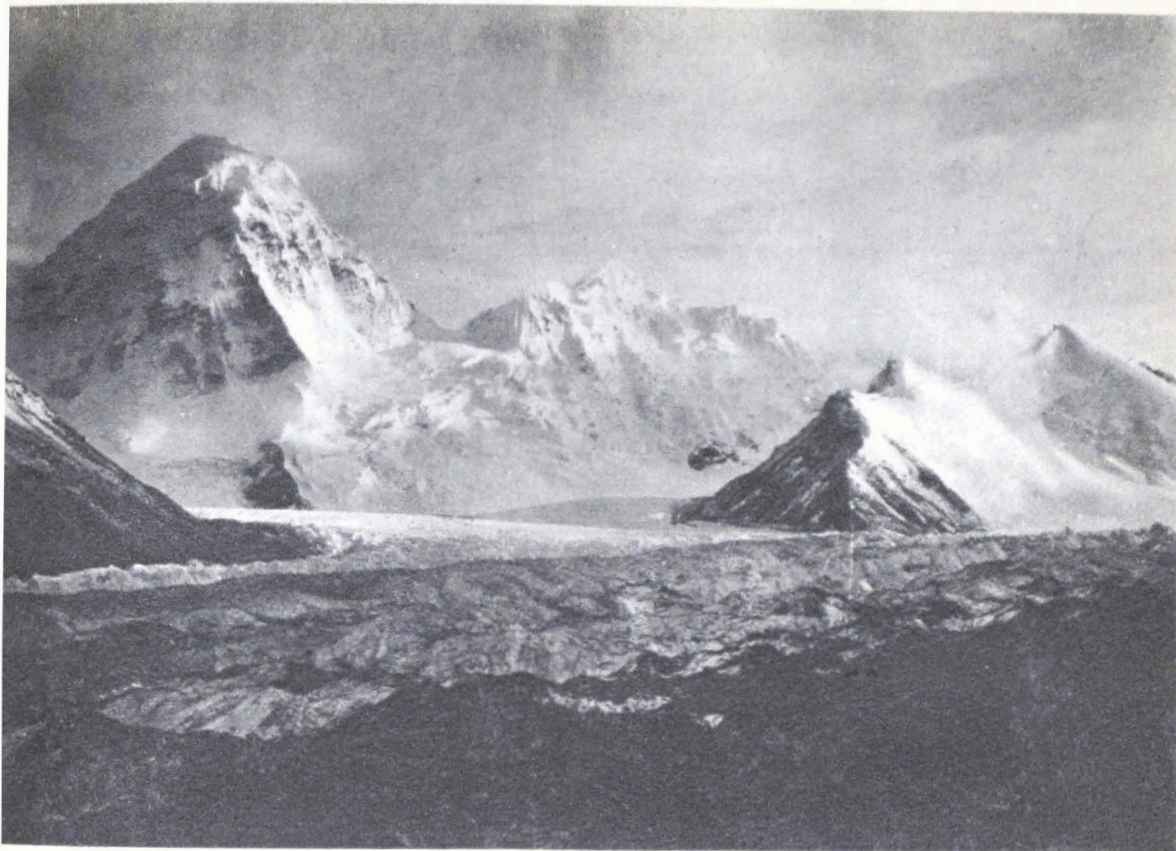


4. MOUNT EVEREST AND END OF NORTH-WEST RIDGE WITH SNOW PASS LEADING TO WESTERN CWM

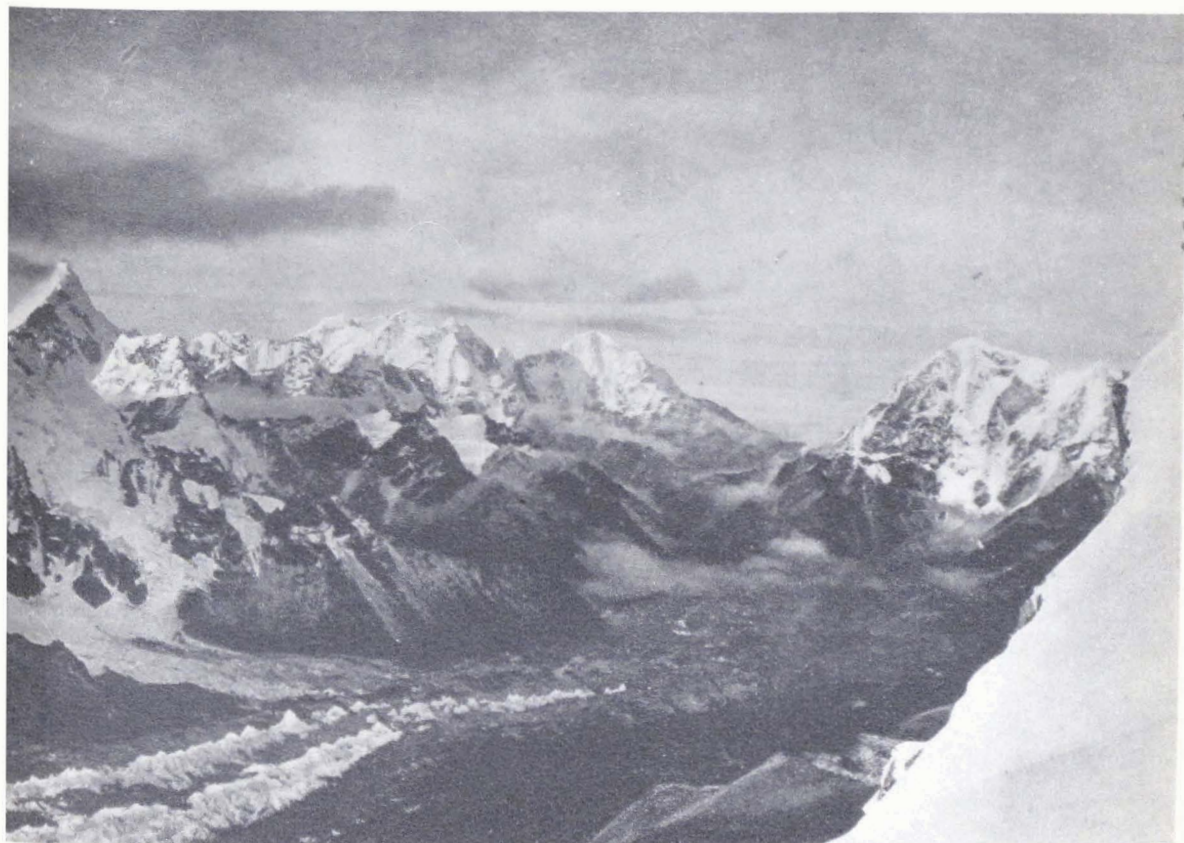
Phot. by G. L. Mallory

Pumori

Lingtren-nup



5. PUMORI AND LINGTREN-NUP. LOOKING SOUTH ACROSS WEST RONGBUK GLACIER



6. LOOKING SOUTH INTO NEPAL FROM THE SNOW PASS LEADING TO THE WESTERN CWM GLACIER

Phot. by G. L. Mallory

Kartse



7. THE CHANGA LA FROM THE RONGBUK GLACIER HEAD



8. KARTSE AND MAKALU FROM THE WEST

Phot. by G. H. Bullock



9. ENTRANCE TO EAST RONGBUK VALLEY FROM WESTERN SLOPES OF RONGBUK VALLEY THE UNNAMED PEAK IS THE "LIGHT ROCK PEAK" PHOTOGRAPHED BY DR. KELLAS FROM THE KANG LA

Phot. by G. L. Mallot



10. THE LOWER REACHES OF THE EAST RONGBUK GLACIER

Summit



11. LOOKING UP THE EAST RONGBUK GLACIER

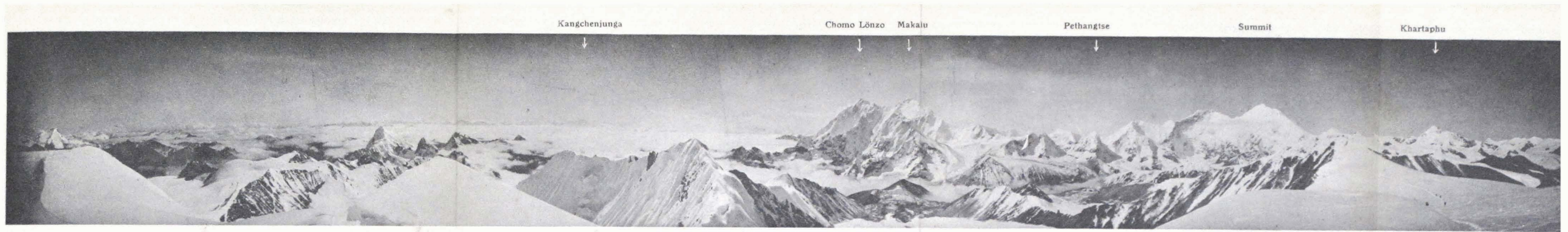
Summit

N.E. Shoulder

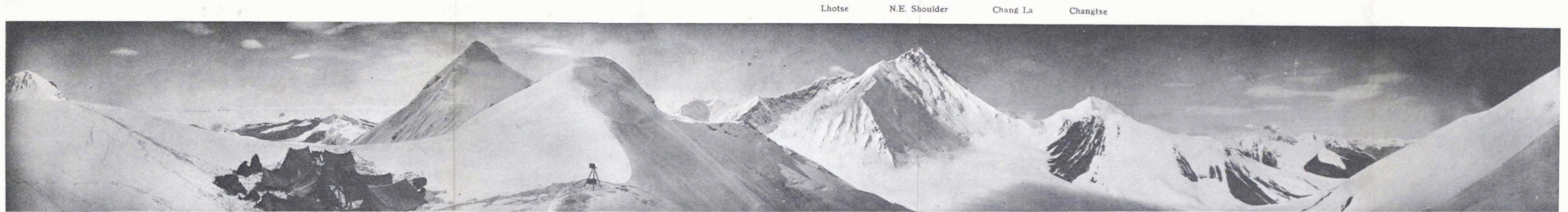


12. THE NORTH-EAST ARÊTE OF MOUNT EVEREST

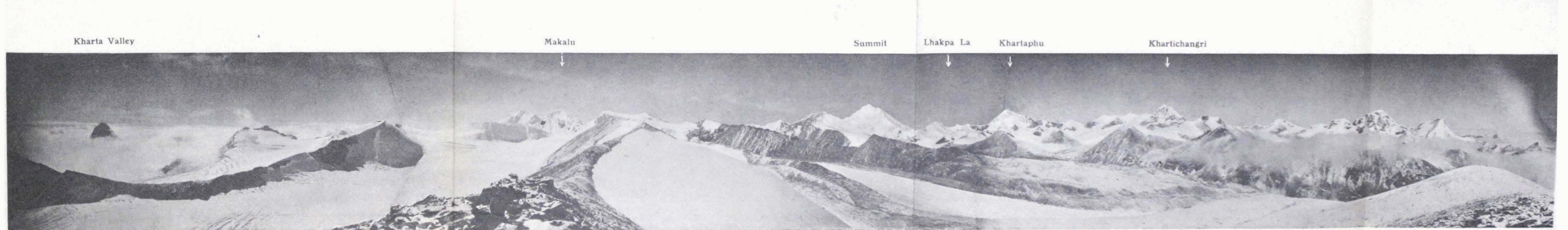
Phot. by A. F. R. Wollast



13. PANORAMA FROM KAMACHANGRI (21,300 FEET)



14. CAMP ON LHAKPA LA (22,500 FEET), CHANG LA, CHANGTSE, AND HEAD OF EAST RONGBUK GLACIER



15. PANORAMA FROM PEAK NORTH OF ADVANCED BASE CAMP, KHARTA VALLEY



16. CHOMO LÖNZO, MAKALU AND COUNTRY SOUTH OF MOUNT EVEREST FROM RIDGE AT 21,500 FEET SOUTH OF KAMA VALLEY



17. PANORAMA OF THE KAMA VALLEY FROM SOUTH OF THE KANGSHUNG GLACIER

Khartaphu

Lhakpa La



18 LOOKING BACK FROM THE LAST CAMP TO THE LHAKPA LA

N.E. Shoulder

Summit



19. LOOKING OBLIQUELY UP THE NORTH FACE OF MOUNT EVEREST
FROM THE CHANG LA

Phot. by G. L. Mallory



Kharta Glacier

20. WIND BLOWING SNOW FROM THE MOUNTAIN, SEPT. 1921, FROM ABOVE 20,000 FEET CAMP

Phot. by A. F. R. Wollast.

Lhotse

N.E. Shoulder

Chang La



21. DETAIL OF NORTH-EAST ARÊTE AND NORTH FACE FROM THE LHAKPA LA

East Rongbuk Glacier



22. GAURISANKAR FROM THE WEST

Phot. by A. F. R. Wollasto

25 feet, and a little lower down at 9-10,000 feet the lovely feathery *brunoniana* grew over 150 feet in height, and with trunks over 30 feet in girth. In these zones grew also the great rhododendrons, *argenteum* and *Falconeri*, for here was a climate of constant rain. These high mountains seemed to draw up the monsoon currents towards them, and every tree and bush was covered with long grey lichens that hung down and gently swayed in the wind; the hillsides were running with water and the path was a morass of black leafy mud, except where logs had been laid down on which to walk. Such conditions were favourable to leeches, and they abounded in this valley and to heights over 12,000 feet. They had evidently never tasted European blood, and were anxious to do so, thinking that we were a new kind of food and a great delicacy, for they climbed up the tent walls, on our clothes and legs and faces; they got on to our plates and cups and into our food, and we never knew when we might not meet them. We travelled down to where the Kama River joins the Arun River, at a height of 7500 feet, below the first great gorges of the Arun and some 20 miles below Kharta. All this country is still in Tibet, as the Nepal frontier runs along the Everest-Makalu Ridge, and then continues eastwards, following the crest line of the ridge down to the spot where it joins the Arun. The ridge is crossed by one low pass of 14,000 feet, called the Popti La, and across this pass a certain amount of trade is carried on with Tibet by coolies during seven months of the year. For five months the pass is closed by snow, but chillies, dyes, and rice are sent over from Nepal and are exchanged at Sakeding for salt. It is all done by barter and no money changes hands.

Meanwhile Mr. Mallory and Mr. Bullock had been joined by Major Morshead, and had gone up to the headwaters of the Kharta Valley, and, after exploring it under bad conditions of weather and with very soft snow, had decided that there was a practicable means of getting on to Mount Everest by this route. The rainy season, however, was still in full swing; far more rain had fallen all through Tibet than we had ever expected to meet; the rivers everywhere were unfordable now, and all the bridges by which we had crossed in the spring had been washed away, so that there was nothing to do but wait until the weather improved. About the beginning of September the weather showed signs of improvement, and Mallory, Bullock, and Morshead moved up to the advanced base camp up the Kharta Valley, which was situated at a height of over 17,000 feet. Wollaston and I arrived there on September 6. Our tents were pitched in some little grassy hollows, which formed a perfect Alpine garden, as they were carpeted with gentians and saxifrages, and all around grew a host of other lovely little Alpine plants. Unfortunately the weather broke again, and until September 19 we had constant falls of snow every day. The time was spent in carrying up fuel and stores to the

20,000-foot camp, so that as soon as the weather improved we might start off at once.

There was a temporary break on the 17th, and with Mallory and Morshead we made one of the most delightful excursions that I have ever taken part in. We started off at 2 a.m. with a full moon shining with the most brilliant light, turning night into day, and we climbed up along the ridge south of the camp which led to a peak 21,300 feet high that overhung the Kama Valley. When we started there were 13 degrees of frost, and, except for the distant roar of the stream far away in the valley, there was no other sound, only an intense stillness. The valleys in Tibet, the great gorges of the Arun, the wooded valleys of Nepal, all lay buried under a white sea of clouds, out of which emerged the summits of the highest mountains, like islands out of a fairy sea. In the bright moonlight mountains like Kangchenjunga, 100 miles away, stood out sharp and distinct, and far away to the south, over the plains of India, was constant lightning. Here on this sharp ridge, at a height of 21,000 feet, with no obstruction to hide the view, sunrise came to us in all its grandeur and beauty. To the west, and close at hand, towered up Mount Everest, still over 8000 feet above us, at first cold and grey, like the dead, and with a sky of the deepest purple behind. Then, all of a sudden, a flash of golden light touched the utmost summit of Mount Everest and spread with a glow of gold all over the highest snows and ridges of this wonderful mountain, while behind the deep purple of the sky changed to orange. Makalu caught next the first rays of the sun and glowed as though alive, and then the white sea of cloud was struck by the rays of the sun and gleamed with colour; then slowly rose and struck against the island peaks in great billows of fleecy white. Such a scene it has seldom been the privilege of man to see, and once seen leaves a memory that the passing of time can never efface.

By September 20 we had all moved up to the 20,000-foot camp, situated on a sunny terrace of stones between two glaciers. Even here a few flowers existed, and every night any food in my tent left unprotected was eaten by some mountain rats, though what they can find ordinarily to eat at these heights I cannot imagine. The nights here were cold, but the days delightfully warm, and the black-bulb thermometer registered sun temperatures of 195° and 197° Fahr. regularly. The sun at these great heights is one of the great foes that we have to contend with. It seemed to exhaust and draw off all one's vitality and leave us limp, and good for no exertion. The whole climate is trying, and the extremes are so great that your feet can be suffering from frost-bite while you are getting sun-stroke at the same time. It is only the young and thoroughly fit person that can withstand the extraordinary changes of climate and temperature that there are in Tibet, and can acclimatize himself properly to the changed conditions of existence and food.

We had been saddled with a very useless and incompetent sirdar, who was in charge of the coolies; he was a thoroughly untrustworthy man, and was always making mischief; we had sent him away to Kharta to get him out of the way, and once he was gone we never had any trouble with the coolies, who worked most willingly. On September 22 six of us moved up to the Lhakpa La, a col 22,320 feet in height, to which Mallory had been busy carrying up stores; from here the only possible way up to Mount Everest could be seen clearly. It necessitated first a descent of 1200 feet on to a branch of the Rongbuk Valley, and then a steep climb up to the north col, a col that joined Mount Everest with the north peak, a peak some 24,600 feet in height. Mr. Mallory with Mr. Bullock and Major Wheeler went on the next day and reached the col at a height of about 23,000 feet; but the fates were altogether against them, and though the weather remained bright and clear, a north-westerly gale had already set in which made life even at the Lhakpa La camp very unpleasant, and conditions became absolutely impossible for any higher climbing. The whole slopes of Mount Everest seemed to be smoking with the snow being blown about in suffocating whirls and clouds, and with the iciest wind that made breathing almost an impossibility. After the monsoon there seems to set in a strong north-westerly current of air, with the force of a gale at heights over 23,000 feet, and nearly every day afterwards, throughout all our journey back, and right to the end of October, we could see the snow being blown off in great clouds from every peak over 23,000 feet, by a gale from the north-west, which would seem to preclude any higher climbs after the monsoon has ended in this easterly portion of the Himalayas. Tracks of hares, foxes, and wolves were seen in the snow at great heights up to 21,000 feet, and the track of what was probably a large loping grey wolf, which had tracks very like that of a barefooted man, gave rise to the legend of the snow man, which was well known to our coolies. As in many other countries, they have in Tibet a bogey man with which to frighten their children when naughty, and this takes the form of a hairy man that lives in the snow; and when they want to escape from him they must run downhill, as long hair from his head falls over his eyes when he runs downhill, and he is then unable to see, and so they can escape from him. Many such stories they have, and these wolf tracks in the snow, which looked at first sight like human prints, were at once accepted by them as being the tracks of wild men.

Defeated by the continuous gale, Mallory, Bullock, and Morshead, with Raeburn, whom they had picked up at the 20,000-foot camp, returned straight to Kharta, while Wollaston, Wheeler, and I crossed over a pass opposite the 20,000-foot camp and went round to Kharta after spending a few days in the Kama Valley, where we were lucky in getting some good photographs. It was not until October 5 that we were able finally

to get away from Kharta. The autumn colours in the Kama Valley were magnificent, and near Kharta the willows and birches were all brown and gold. The crops of barley and peas had all been garnered, and the people of these villages were very satisfied, as they said that we had brought the rain with us, and that their crops were 50 per cent. better than they were in most years.

We chose another route for the journey back, following up the valley of the Arun or Bhong Chu, as it is called in Tibet. This route was impassable during the summer months, when the rivers were in flood, but now with the snow and ice no longer melting its width was reduced by half, and it was fully 10 feet lower, so that we could make use of the Heath Robinson bridge of twisted hide at Gadompa. Across these ropes each load and person were slowly pulled, and when the Tibetans wished to play a joke on any one they let him slide rapidly down to the centre of the rope, where it sagged just clear of the water; but as a large wave formed in the rapids they had only to pause for a moment to allow the unfortunate passenger, who was helplessly trussed up, to get a ducking in this ice-cold water. At Shilling, near the sand-dunes and the quicksands, we struck our old route and travelled back swiftly along it, as winter in these lofty regions was coming on apace, and between Kampa Dzong and Phari the thermometer fell to zero Fahrenheit, and we had a regular blizzard of snow. This time we came back by the shorter route, so that it only took the caravan three days to get from Kampa Dzong to Phari, but the marches were long, over 20 miles each day, and over 16,000 feet all the time. Darjeeling was reached on October 25, and the expedition of 1921 was over. The expedition had accomplished what it had set out to do. All the approaches to Mount Everest from the north, north-west, north-east, and east had been carefully reconnoitred, and a possible route to the top had been found up the north-east ridge, and it was only climatic conditions that prevented a much greater height being attained this year.

The scientific results have not yet been fully worked out, but in general outline some 13,000 square miles of new country have been surveyed and mapped, part of this by the method of photographic survey and on a large scale; a large number of birds and mammals of all sizes have been collected; the geology of the whole region has been carefully worked out by the indefatigable Dr. Heron, who is at present compiling a geological map of the district, and a series of photographs have been taken of a country quite unknown and containing some of the grandest scenery in the world.

Such, in brief, have been the results of the first year's expedition.