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Preparations for Everest

Cho Oyu, London and Zermatt 1952

This is the last in a series of four articles, in consecutive volumes of the Alpine Journal, describing some of the important events, both geographical and scientific, which preceded the first ascent of Everest in 1953.

The 1952 Cho Oyu expedition was the first to combine mountain exploration with modern medical research in the field. It ensured that the preparations for the attempt on Everest in 1953 were correctly and scientifically based. The exploration carried out on this expedition filled in two large 'blanks on the map' of the Everest region: that of the N-S watershed/frontier range between the Tesi Lapcha pass in the south to the Nangpa La in the north and the Barun glacier and W side of the Makalu region. At the same time, the medical work accomplished by Griffith Pugh between the summer of 1951 and the autumn of 1952 solved the problem of 'the last thousand feet' of Everest. However, the inception of the 1952 Cho Oyu expedition was, to say the least, inauspicious and, at the time, it was considered a failure. In fact, nothing could have been further from the truth.

The expedition came about as a result of the Swiss obtaining permission to go to Everest in the Spring of 1952. The British were slow off the mark and attempts to mount a combined Swiss–UK expedition to Everest in 1952 not surprisingly failed; so, as an alternative, the British expedition to Cho Oyu, 30 miles west of Everest, was organised. It had two objectives: first, to obtain a nucleus of climbers for any future Everest attempt; second, to obtain information on every aspect of the effects of cold and altitude in the Himalaya, and to establish the most effective flow rates of oxygen, in both the open and closed circuit oxygen sets, for the purpose of putting a mountaineer on the summit of Everest.

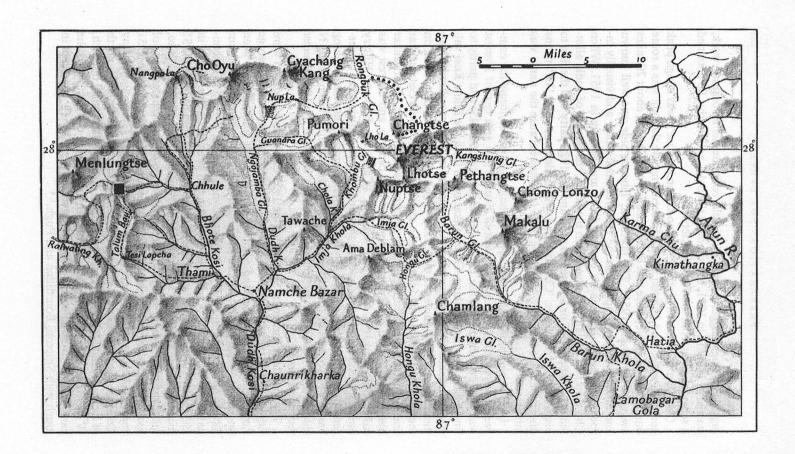
The members of the 1951 expedition had already consulted Griffith Pugh and the Medical Research Council unofficially, before the Joint Himalayan Committee of the Alpine Club and the Royal Geographical Society (previously the Everest Committee) became involved in the project. It was the members of that party, rather than the Joint Himalayan Committee, who had asked Eric Shipton to join them as leader, and Shipton, in turn, who had insisted that the Alpine Club and RGS should be involved. When the 1951 expedition returned to the UK, Pugh was asked to advise on diet for an Everest attempt. It was obvious to him that a much more radical approach to the Everest problem was needed. So when the Cho Oyu expedition was

organised, Pugh suggested that he should continue his laboratory work, started in London in 1951, at altitude in the field, and for this he obtained a separate grant from the Royal Society.

Cho Oyu was chosen for the 1952 expedition because it was a high peak near to Everest, and Shipton and I had seen what we thought was a route on the southern, Nepalese side from a peak above Chhule, about 20 miles away, in November 1951. The northern, Tibetan, side was well known and had been photographed on the 1921 reconnaissance and visually inspected from the Nangpa La by Bourdillon and Murray in 1951. When Cho Oyu was initially surveyed from the north, the Survey of India allotted the symbols T.45 or M.1 to this peak and the 1921 party was the first to discover its correct name. 'Cho' means a deity or demon, whilst 'Yu' means turquoise. The letter 'O' may have been included because the name was misheard.

In 1951 we climbed the peak above Chhule, partly to continue the compass traverse that I was making west of Everest (the area east of Everest was already included on the Hinks–Milne map of 1933-45) and partly to find a pass into the Menlung–Gaurisankar basin from the Bhote Kosi valley. We wished to do this because on the quarter-inch Survey of India map there appeared to be an extra peak, later called Menlungtse, in a 'blank on the map', and we wanted to confirm the correct position of both Gaurisankar and the 'extra' peak. Historically, too, the area was interesting: Gaurisankar had been mistaken for Everest in the late 19th century, and Everest was called Gaurisankar in early *Alpine Journals*. In addition, Edmund Hillary and Earle Riddiford had inspected the south side of Gaurisankar by descending the Rolwaling valley a few days before we crossed into the Menlung basin. An account of the first exploration of the Menlung basin on the N side of Gaurisankar can be found in Shipton's book on the 1951 Everest reconnaissance.²

The members chosen by Shipton for the 1952 Cho Oyu expedition were Edmund Hillary, who had been on the 1951 reconnaissance, and George Lowe, Hillary's New Zealand climbing partner, with whom he had been on Mukut Parbat in 1951; Earle Riddiford, who had been on both Mukut Parbat and Everest in 1951; Tom Bourdillon, a member of the 1951 reconnaissance expedition; Charles Evans, who had been in Central Nepal in 1951 with Tilman (but who had not been able to come with us on the 1951 reconnaissance because of surgical commitments); Campbell Secord, who, independently, was pressing for a reconnaissance of the Nepalese side of Everest, had alerted the Joint Himalayan Committee to our plans in 1951 and had helped with the early organisation; Alfred Gregory and Ray Colledge, two well-known and experienced mountaineers from the north of England; and Dr Griffith Pugh who was to do the physiological research. W H Murray was not available. Unfortunately I was unable to join the party as I had to complete my national service in the RAMC; but I kept in touch with Shipton, Bourdillon and Pugh.3,4



Before leaving the UK, Shipton went to Zurich to co-ordinate the approaches to Namche Bazar of the two expeditions. The Swiss came in from the west via Kathmandu and arrived 24 hours before the British–New Zealand party, who approached from the south via Jogbani. Pugh also spent some time in Switzerland testing out new methods of measuring oxygen consumption in the field at intermediate altitudes.

From Namche Bazar the British party went straight up the Bhote Kosi towards the Nangpa La. Evans and Gregory and two Sherpas turned east onto a ridge running south from Cho Oyu which divided the Bhote Kosi valley from the Ngojumba glacier which we had visited in 1951. Their main and most distressing finding was that there was no possibility of a route up the S face of Cho Oyu - it was too steep and too long. The only feasible alternative lay on the north side in Tibet. In the meantime, Hillary and Lowe climbed two peaks of 21,000ft to the west of the Nangpa La, and later another peak to the north, in Tibet. From these they had excellent views of a feasible route on Cho Oyu - from Tibet. Unfortunately, any serious attempt from Tibet posed considerable political problems. Because of the continuous passage of Sherpas over the Nangpa La to Tengri in South Tibet, the presence of a British party would soon be known to the Chinese in Tengri and it was very likely that an armed party would be sent up to investigate. Shipton himself would be viewed with considerable suspicion. for in early 1951 he had returned to the UK from his post as Consul in Kunming by 'escaping' down the Yangtse Kiang river and was, in any event, considered by the Chinese to be a spy because of his postings to Kashgar and Kunming. Moreover, he, together with Murray, Bourdillon and myself, had been captured inside Tibet in the Rongshar valley in the autumn of 1951, when we had bribed our way out.

The whole party discussed the situation over two days, 27-29 April, and finally came to the conclusion that to attempt a full-scale assault on Cho Oyu from Tibet would take about two weeks, and that politically this was too risky. Each member of the party, except Earle Riddiford, agreed that such an attempt should therefore be abandoned. Riddiford was in favour of launching an all-out attempt in spite of the political dangers, and when it was clear that this was not going to happen, he left the expedition and returned to New Zealand.

In spite of these difficulties, a partial reconnaissance was made of Cho Oyu and a light camp established at 21,000ft; from here Hillary and Lowe

Left
Map from Eric Shipton's article 'The Expedition to Cho Oyu' in the
Geographical Journal 119, 1953.

The position of the 1952 physiology camp on the Menlung La.

The extra line of dots indicates the route up the East Rongbuk Glacier.

hoped to reach a considerable height and perhaps even get to the top. This was not to be, however; they stopped at some steep ice cliffs at 22,500ft but, having no back-up owing to illness, decided not to push it hard. Realising that a more sustained attempt would take time and possibly attract an investigation by Chinese soldiers, they decided to abandon the attempt.

No other really high peak was accessible. Gyachung Kang, from the south, looked too difficult, as did Menlungtse (in Tibet), and Gaurisankar was on the border. The decision was made, therefore, to carry out as much exploration as possible, whilst climbing peaks up to 22,000ft. Large areas of the Everest region had not been visited by the reconnaissance expedition of 1951, so there was still a genuine need for further exploration of the many unvisited peaks, valleys and glaciers before any map could be made, and already such a map was being considered in London. This also suited Shipton's temperament for he did not care for highly-structured expeditions. It was the paradox of 1952 that the Cho Oyu expedition involved both a highly-structured scientific investigation and a minimally-structured reconnaissance. It only worked because each group was kept separate.

The party now split into three groups. The first group consisted of just Hillary and Lowe who wanted to try an exciting but obviously over-ambitious project – to circumnavigate Everest by crossing the Nup La, travelling round to the Kangshung glacier, crossing into the Barun glacier and returning via the Hongu and Imja to Namche Bazar. Instead of making this circuit they decided to cross the Nup La and try to climb Changtse, a peak north of Everest, by its E ridge. The second group – Shipton, Gregory and Evans – explored the complex border range north of the Tesi Lapcha pass and south of the Nangpa La. It was planned that these two explorations were to be followed by the exploration of the Barun glacier and the W side of Makalu. Meanwhile, the third group – Pugh, Bourdillon, Secord and Colledge – carried out physiological studies on the Menlung La (20,000ft), a four-man party being the best number for Pugh's work.

Crossing the Nup La and the attempt on Changtse

Shipton thought that crossing the Nup La would be so difficult that Hillary and Lowe would use up all their time doing this and that the likelihood of their getting into Tibet was remote. Even if they succeeded, it was thought unlikely that they would be discovered, as the lamas from the Rongbuk monastery did not normally ascend the Rongbuk glacier. However, by avoiding the lower icefall of the Ngojumba glacier, which had stopped us in 1951 (and which was very much more difficult than the Khumbu icefall), and by attacking the upper Nup La icefall from the west, Hillary and Lowe reached the Nup La pass in six days. Here they left a food dump for their return and descended the west and then the main Rongbuk glacier. They just managed to prevent their Sherpas paying a visit to the head lama at Rongbuk monastery and ascended the East Rongbuk glacier to the foot of the long and easy-looking E ridge of Changtse. As they had left their

crampons on the Nup La, preferring to take their weight in food, they could only ascend slowly by step-cutting and had to turn back at 22,000ft.

Returning to the Nup La they descended the Ngojumba glacier to its junction with the Guanara glacier and, ascending this, crossed by the pass we had used in 1951, to the Khumbu glacier where they visited the Swiss Base Camp at the foot of the Khumbu icefall. Finally, they descended towards Namche Bazar, where they joined up with Shipton.

Exploration of the frontier ridge between the Tesi Lapcha and Nangpa La. The Tolam Bau glacier

Shipton, Evans and Gregory made a number of attempts to find another pass between the Bhote Kosi valley (leading to the Nangpa La) and the Menlung basin to the west. These all failed, showing how lucky we were to find the Menlung La in 1951.

The first attempt to find a pass north of the Menlung La was made west of Lunak. This failed, so the party crossed a snow col to the south and entered the Pangbuk basin, from which the Menlung La is crossed. They then descended the Bhote Kosi and turned west again by the Langmoche Khola. No way could be found over the frontier ridge here and neither could they discover a high snow plateau previously seen from the north. Returning to the Bhote Kosi again, they crossed the Tesi Lapcha pass and, on its far, W side, found a glacier, the Tolam Bau, coming in from the north. Ascending this, they came to the 'plateau' – a snowfield at the head of the Tolam Bau.

From this plateau they climbed a peak of 21,000ft and then a pass, hoping to cross into the Menlung. Unfortunately this led only into the Nangaon valley – a side valley of the Rolwaling. Neither did another pass further north give access to the Menlung basin. Finally they returned to Namche Bazar. Alf Gregory then returned home, whilst Shipton and Evans joined up with Hillary and Lowe for the Barun exploration.

The Tolam Bau glacier region was surveyed in 1955 by a Merseyside party led by Alfred Gregory, and a peak, Pangbuk, to the south of the Menlung La climbed by Bourdillon and Colledge in 1952 had a second ascent, by Dennis Davis. This complicated piece of country was therefore finally elucidated and the 1955 survey incorporated into the RGS map of 1961.

Exploration of the Barun glacier and west side of Makalu

This large glacier system, which drains the west side of Makalu, the frontier ridge, Pethangtse, and the east side of the Hongu-Barun watershed, was discovered from photographs taken on the Houston-Westland 'Flight Over Everest' expedition in 1933. In 1951 Hillary and Shipton had viewed it from the Hongu watershed and wondered if it would be possible to descend it to the Arun valley, which marks the eastern boundary of the Everest group. Such a bold piece of exploration would fill in a large gap on the

Pugh's scientific work on Cho Oyu in 1952 may be summarised in the following table: Altitude problem of Everest Pugh's solution in 1952 Hallucinations Adequate supplementary oxygen Hypoxia Extreme shortness (4 litres/minute on open-circuit) of breath (7-10 breaths per step). Extreme fatigue Slow rate of ascent Dehydration Extreme thirst 3 litres/day fluid intake Low urine output Fluid loss from lungs Starvation Weight loss 3000k cal/day Loss of muscle Incipient hypo-Increased climbing rate and Cold injury thermia therefore heat production

Flexible modern clothing

Sleeping oxygen: 1 litre/minute

Frostbite

Deterioration Mental and physical

map to the east of Everest. It was to be the culminating journey of the 1952 expedition, passing from one river system to another, and was carried out in two stages. Firstly, it was necessary to find out whether it was possible to cross from the Hongu into the Barun and whether there were any pastures in the upper part of the Barun valley; pastures would indicate that the gorge into which the Barun glacier drained was passable by men, sheep, goats and yaks. Secondly, enough food needed to be carried over two passes, from the Imja to the Hongu and from the Hongu to the Barun, to supply the party for the descent to the Arun gorge. Shipton decided that Evans should first cross into the Hongu by the Ambu Lapcha pass (crossed in 1951), leave a dump of food at the Panch Pokhari lakes at the head of the Hongu glacier and, if possible, then cross into the upper Barun glacier and follow it down to the first grass pasture. Having confirmed whether or not herdsmen used the pastures, he would return to the Panch Pokhari lakes and wait for the main party.

This preliminary exploration was completed by Evans between the 1st and 12th June, and then he was joined by Shipton, Lowe and Hillary. On the Hongu-Barun watershed they climbed two peaks and then descended

into the upper Barun glacier, where they turned north, reaching a pass on the Tibet-Nepal frontier to the west of Pethangtse. From here they looked down into the upper Kama valley and the Kangshung glacier, visited for the first time in 1921. (Pethangtse was later climed in 1954 by an Anglo-New Zealand party.) Returning down the Barun glacier they passed a number of yak and sheep herders who were astonished to see them. They were forced to avoid the Barun Khola gorge by climbing over a ridge, now called Shipton's Pass, and reached the Arun river on 20 June.

Here, with Da Tenzing and Annalu, Evans left the others at Hatia, crossed the Arun and went east and north up the Arun valley, reaching the Lumba Sumba Himal of NE Nepal. He then followed the Mewa Khola to Tapeljung and, crossing the grain of the country, reached Darjeeling by the Singalila Ridge. In the meantime, Hillary, Lowe and Shipton continued down the Arun gorge to the East Nepal border with India at Jogbani.

Physiology camp on the Menlung La (20,000ft)⁵

Pugh set up this camp, with Bourdillon, Secord and Colledge, on 22 May and carried out a number of studies on a prepared track of a known height and steepness under identical climatic conditions.

His most important finding was that a four litres per minute flow rate of supplementary oxygen in the open-circuit sets was necessary both to compensate for the weight of the set and to give a boost to performance at extreme altitude. In effect, this would lower the altitude 'in the depths of the lungs' to 20-21,000ft. Only two litres per minute had been used on all previous Everest expeditions, and this explained their relatively slow rate of ascent and failure to gain the summit. Pugh emphasised this critically important point in his article about the 1953 expedition in the Geographical Journal.⁶ In military terms it was as if, in 1953, a successful army had won a battle with twice the firepower of its predecessors. Yet no mention of this salient fact was made in subsequent books. This omission raised a significant number of eyebrows at a meeting⁷ (attended by both Pugh and myself) held at the Royal Society in early 1954 which was chaired by Sir Bryan Mathews FRS, then Director of the Institute of Aviation Medicine at Farnborough, who had overall responsibility to the Joint Himalayan Committee for all the scientific aspects of the 1953 expedition.

At the end of the research period Bourdillon and Colledge made the first ascent of Pangbuk, 22,000ft, a striking peak to the south of the Menlung La. They then crossed into the Rolwaling valley and returned to Namche Bazar by the Tesi Lapcha pass.

On his return to the UK, Pugh was able to compare and contrast the performance of the Swiss and British-New Zealand parties who were in the field at exactly the same time. The Swiss, from the start, were very fit and active, suffering little or no gastro-intestinal and respiratory infection during the march-in. By contrast, the UK party suffered considerably because their public health precautions were rudimentary in the extreme

and Pugh was rightly scathing about these. The Swiss reached the South Col at the same time as the UK party were abandoning Cho Oyu. Overall, the Swiss performance at altitude was much better than ours (though a few members of the Cho Oyu party, in particular Hillary and Lowe, came up to the Swiss standard). However, owing to a design fault, the Swiss oxygen sets, which had worked well at sea-level, could not cope with the vastly increased breathing rates at increased altitude and were virtually useless. This factor was critical to the Swiss failure on Everest in 1952. In addition, they became extremely dehydrated at high altitude owing to respiratory water loss – a factor for which they had not catered. It was exhaustion caused by these combined physiological and equipment defects, rather than any mountaineering or leadership problems, that stopped them reaching the summit.

It cannot be over-emphasised that the various *disorders* of altitude – oxygen lack, fatigue, hunger, extreme cold, dehydration, ⁸ lack of sleep – will, both separately and together, adversely affect the brain's 'higher centres' (the parts of the brain concerned with intelligence, co-ordination, decision-making, etc.) Unless each and every one of these factors is combated, as they were on Everest in 1953 with the scientific work, but *not* by the Swiss in 1952, then the odds against success are considerably lengthened.

The lessons to be learned from the Swiss failure were recognised by the Joint Himalayan Committee. All Pugh's recommendations were accepted and immediately put into effect on his return from Cho Oyu. Most of them, but not all, were completed by October 1952, when John Hunt took over as leader.

London and Switzerland

Because of the general dissatisfaction felt about the Cho Oyu expedition, Shipton's management had been called into question and this was compounded by a letter from one of the members of the Cho Oyu party who wrote to the Joint Himalayan Committee criticising Shipton and suggesting that he (the writer of the letter) should take his place as leader in 1953; but as the writer had been one of the least active members of the expedition, his missive was not taken very seriously. Eventually it was decided not to appoint Shipton as leader since it was clear that a successful Everest expedition would necessitate a large party and a highly structured and organised assault. Shipton had repeatedly indicated that he did not feel at home with that kind of expedition. Looking at the successful teams which he had led over the previous years - Nanda Devi in 1934, Everest in 1935, the two Karakoram expeditions in 1937 and 1939 respectively, and Everest again in 1951 – all had been reconnaissance-type undertakings. Shipton would have been very happy with the present-day lightweight alpine-style expeditions to the world's highest peaks.

All this decision-making took time and it was not until September 1952 that Charles Wylie took over as secretary and started the initial organisation

for the 1953 expedition. Before this, and whilst still on Cho Oyu, Shipton had asked Alfred Gregory to find further possible members for the 1953 party. It was therefore arranged that Tony Streather, John Jackson, Jack Tucker and myself should join Alf Gregory in Zermatt at the end of August 1952. The weather was quite atrocious, but the Alphubel, Aletschhorn, Täschhorn and Weisshorn were climbed. An attempt on the Rimpfischhorn was abandoned because of massive snowfall and avalanche danger.

Tony Streather showed by far the best adaptation to altitude, having climbed the 25,264ft Tirich Mir and spent long periods in Chitral at altitude, but he was less technically adept than the rest of us. However, his later performance on K2, Kangchenjunga and Haramosh showed that he should really have been a member of our Everest team in 1953.

After the ascent of Everest the Mount Everest Foundation (MEF) was set up as a charitable trust, jointly managed by the Alpine Club and the Royal Geographical Society. Its creation was masterminded by Sir Edwin Herbert (Lord Tangley), then President of the Alpine Club. The present vigour and longevity of the MEF is largely the result of his expertise, foresight and drafting; it was his greatest gift to mountain exploration.

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APPENDIX

In 1953 I took a detailed 'clinical' history from each climber who went above the South Col. These were completed as soon as possible, often within 30 minutes to an hour, after the climber's return to Camp IV at the head of the Western Cwm. The history that I obtained from Edmund Hillary on 30 May was concerned with the basic facts of oxygen flow rates, food and fluid intake, and how these affected climbing performance.

Of particular interest in this account are:

- 1 The fact that Hillary carried 63lbs from 27,300ft to 27,800ft. He was only able to do this because he increased his oxygen flow rate to 5 litres/minute. This would effectively have *decreased* the altitude 'in the depths of his lungs' from around 21,000ft at a flow rate of 4 litres/minute to the equivalent of a much lower altitude. As Hillary told me: 'It was like changing gear everything went more easily.'
- 2 Hillary passed urine on the summit. This meant that he was *not* badly dehydrated, which was later confirmed by clinical examination in the Western Cwm. In fact he drank about 2250mls on 28 May and 3000mls on 29 May. This was close to the daily intake, 3000mls, recommended by Pugh.
- 3 Food intake over the whole assault period was not adequate, but over this short period it was of less importance than adequate fluid intake.
- 4 Sleeping oxygen at 1 litre/minute promoted sleep, produced a feeling of warmth and recovery from fatigue. Therefore it combated high-altitude deterioration.

It is difficult to fault any of the recommendations contained in Pugh's Report on the British Himalayan Expedition to Cho Oyu, published by the Medical Research Council in 1952.