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A JOURNEY TO THE GLACIERS OF THE EASTERN  
KARAKORAM: *A paper read at the Evening Meeting of the Society  
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IT may perhaps seem superfluous that I should say why I undertook this journey into Eastern Karakoram. But for its story's sake I may mention that I had the great fortune of being a member, as Geographer and Naturalist, of the memorable expedition organized by Dr. Filippo De Filippi and led by himself in 1913-14. During that time I asked and obtained from the leader the widest freedom of action and movement. And thus for a whole year and a half, nearly always alone with my very light personal caravan, I was in continual movement, because I knew it was necessary, for my own experience of the region and for the contribution I could bring to its knowledge, that I should see as many valleys and glaciers, as many plateaux and villages or shepherds' camping grounds as I possibly could. And thus at the end of the expedition I could say to myself I knew all Baltistan and all Ladakh and the first Tibetan plateaux as far as Pankong lake and the Aksai Chin.

One blank, however, had remained: the Nubra valley from its mouth in the Shyok valley to its origin in the Siachen glacier. The Nubra valley in its lower half is frequented by caravans which cross the Karakoram Pass during the summer, and it has been followed by various travellers; however not much was known about it, and I had special ideas regarding its population, from an anthropological point of view. The upper half of the valley had been climbed by very few travellers indeed. Of the old ones, Moorecraft in 1821, Vigne in 1835, Thomson and Henry Strachey in 1848, and some years later by Drew. Then we come to quite modern times, with Longstaff in 1909 and the Vissers in 1929; but its geological conditions were practically unknown.

At the head of the Nubra valley is the Siachen glacier, which is said to be the largest glacier on Earth outside Polar regions. Longstaff had discovered and been on it in 1909, the Workmans followed in 1911 and 1912, and also the Vissers climbed it in 1929, but only for a few miles from the front upwards. Of the geological conditions of its immense basin nothing was known. And this represented the chief blank in my personal knowledge and in connection with the attempt that I have been preparing for years, of reconstructing the

geological history of the entire region, which is the last part, and perhaps not the least important, of the scientific results of the De Filippi Expedition.

This blank represented a wish on which for years I dwelt with always greater affection. To this you can add the longing I felt for the free caravan life, and that peculiar longing for a region which is grand in its landscape and highly interesting in its inhabitants. All these reasons of attraction grow all the greater when you think of the life a man of study leads in his own town, tied down to his writing table and by his numerous duties.

At the end of 1929 I could resist no longer, and decided for the Nubra valley and the Siachen glacier. And I worked out my own programme. As my programme was merely the manifestation of my personal wish to fill up a scientific blank—a blank not only mine—and to live again the healthy strong and free life of travel in regions neither well known nor of easy access, I wished my expedition to represent only a personal initiative of my own: I did not ask nor seek the help of any society nor of any committee. But this fact, though it brings as a consequence no light financial weight for a poor professor, as in no country in the world are professors wont to swim in gold, also brings the immense advantage of the most complete freedom and independence. Thus it was not necessary for me even to announce my programme. I chose my companions and set to work at my preparations.

My companions were to be very few. Miss Elly Kalau, my faithful collaborator for some years, a strong alpinist and skier, and prepared for the journey, if only by tradition in her family which has produced naturalists and travellers. Doctor Ardito Desio, my former pupil, possessed of a wide scientific preparation and quite good experience as a traveller; unfortunately he was hindered at the last moment to join me on account of his University duties. Third in my programme was Hashmatullah Khan, an Indian whom I had known as Wazir in Ladakh, and who had helped me a lot in my researches, rendering them easy in every way with the authority due to his official position. I meant to do without interpreters or caravan leaders, feeling capable of managing the men by myself, even in case of eventual difficulties.

The greatest difficulty I experienced perhaps during the period following my decision, namely in obtaining the necessary permits. From Rome to London, from London to Delhi, from Delhi to Srinagar, and then all the way back: that way is a long one indeed. And only in February did I finally receive the news that I was lacking no further official sanction. I like to name this date, especially when speaking to Englishmen, who are men of action, and who can therefore measure the rapidity with which my journey was organized. In one month, exactly, everything was ready, and on April 9 I left my own town, Florence, foretasting the delight and the enjoyment that were in store for me. However the rapidity was not to last only during the time of preparation: it had to be kept up also during the first part of our journey, that is during our movements of approach towards our still far-off goal—the Siachen.

The summer campaign, in fact, is perforce very short, and sharply limited within the year, when the essential part of the programme is to evolve on high glaciers; and in this particular case the upper Nubra valley was so renowned for its not easy accessibility, owing to the summer floods of the river, that any delay would have meant a serious menace to my entire programme.

At Bombay two days' halt to verify the food supplies, ordered from Italy at the Army and Navy Stores; then straight to Kashmir with the whole luggage of my expedition; five days at Srinagar to arrange all the loads and organize the crossing of the Zogi La, which did not present itself favourably, on account of much snow and numerous avalanches. And in fact it proved not an easy matter, but on May 9, just one month after leaving Florence, I was in the small bungalow of Machhoi, beyond the pass across the Himalayas, with all my 180 loads.

For some days still, on account of avalanches and landslips, the way was not always easy; then up the Indus valley our marches became faster until we reached Leh. On the way however I deviated towards Temesgam, to engage forty permanent porters in that village and in the neighbouring one of Teah, as I had never forgotten the solid qualities of the men who had followed me during the summer campaign in 1914, in the fatiguing and uncomfortable marches to the glaciers of the upper Shyok valley and on the first Tibetan plateaux, giving proof of a strength of resistance and faithfulness beyond comparison.

At Leh five days' halt, but not of rest indeed. The passes of the mountain range towards the Shyok valley were all under snow, and the most direct one, the Khardung La, was unpassable. From the first day I started sending ahead the main bulk of loads by small separate caravans, across both the Digar La and the Chang La. In the bazaar I bought part of the food supplies for the porters, that is butter, tea, salt, also tobacco, enough to last four months; and I sent at once into the Nubra valley a trustworthy man to buy and collect on his way as much flour as he could possibly obtain, according to the custom of the country, of barley and wheat.

On the fifth day I also started together with my caravan, crossing the Digar La in a somewhat tiring eleven hours' march, and reached Panamik in the Nubra valley after some days, having picked up on the way all the flour that my man had been able to gather all along the valley. As I at once pushed on beyond Panamik, the Nubra river did not present any difficulties, and I reached the front of the Siachen glacier, with my 180 loads which I had taken with me from Italy and then from Bombay, plus 7 tons of food for the porters and, if you are interested in the lesser details, with a small flock of sheep, 120 living chickens, and a provision of 120 dozen eggs. I remember how in Florence, just a few days before my departure, Dr. Longstaff recommended to me above all "food, food." You must admit that I had done everything to put into practice his excellent advice. And on June 9, exactly two months after my departure from Florence, I personally led a caravan to form a first depot some miles up on the glacier. You will acknowledge that a greater rapidity could hardly have been possible.

Now began our march up the glacier, and began for me the greater difficulties, namely those imposed by logical necessities. In a completely uninhabited region it is absolutely ridiculous to think of augmenting the number of men so as to diminish the difficulties of transport, because men have the unpleasant habit of eating, and therefore require provisions for their necessary feeding. Just think that a porter normally carries, in uninhabited regions, a useful weight of about 48 lb., and eats daily something more than 2 lb. He

carries thus about twenty-four days' food for himself, whilst my programme had planned a stay of nearly four months in uninhabited regions. Hence the necessity of recurring to expedients which constitute surely the most difficult thing in a journey like mine. The secret is to reduce the number of the men as much as possible, and to encourage them to the limit of their capacities and of their strength. My men made double stages every day, during three and a half months; but only thus, with that constant effort required of them, have I been able to overcome the really very great difficulties I met with. A caravan of seventy porters accompanied me to the centre of the Siachen, during our first fifteen days on the glacier; fourteen were then sent back to their villages so as to lessen the number of mouths to be fed.

The advance had not been a difficult one. I can certainly deny without hesitation the fame of inaccessibility of the Siachen's front, which, besides, had already been climbed by Longstaff and by the Vissers, though only for some miles. The extreme snout, as in nearly all large Karakoram glaciers, is broken up into a gigantic intricacy of ice hillocks, more or less covered by moraine, and furrowed by deep little valleys and often cut up by perpendicular walls. But with some patience and numerous windings the way is to be found. Farther up the glacier's surface changes its aspect, longitudinal zones or bands appear, some of them consisting of pure ice, others instead of moraine. The pure ice usually rises above the general surface to form tall banks or high series of picturesque pinnacles, and also the moraines form complicated broken and irregular ridges. Inconvenient, sometimes difficult, is the crossing of the glacier, consisting as it does in overcoming these obstacles. But to climb up it is easier, because you can always find a longitudinal zone between some embankment of ice and some moraine ridge, where marching is relatively easy and fast.

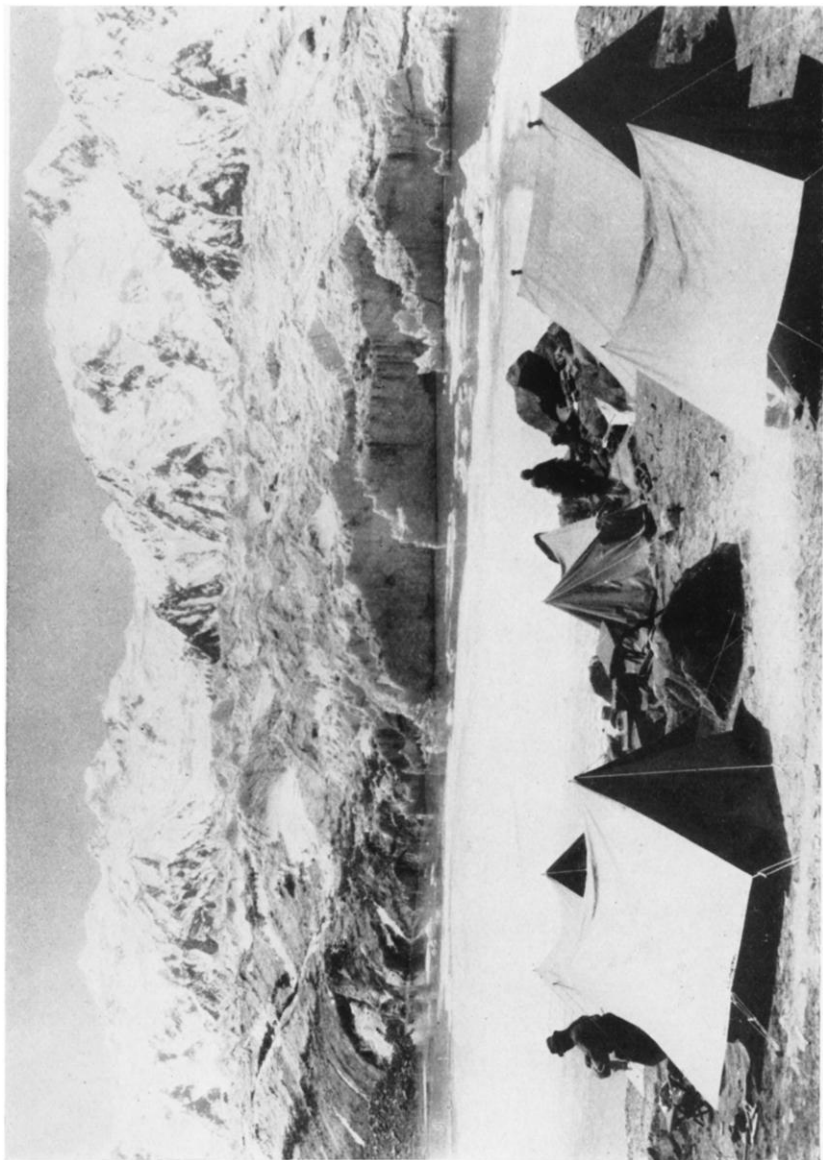
More difficult perhaps is the establishing of the camps, because you must avoid depressions which are always so inviting but dangerous in case, for instance, of a sudden emptying of one of those numberless lakes which dot the surface of the glacier; neither is it easy to find sufficient space to put up the tents, and it is mostly necessary to level moraine and ice, trying to avoid the too dangerous vicinity of crevasses. But all my camps on the glacier have left in me the remembrance of something supremely and inexpressibly picturesque.

Farther up the Siachen's surface tends to become more uniform, banks of ice and moraine ridges smooth themselves down; our vision of the neighbouring slopes and of the mountains in the distance grows always wider and grander and marching becomes easier and faster. When I arrived not far from the junction with the Teram Shehr, the principal affluent descending from the east, I deviated and abandoned the main tongue of the glacier, and reaching its rocky border I established a camp at about the same place where the Workmans had stopped already eighteen years before. This became my base camp for more than one month and a half.

My base camp halfway up the Siachen was simply wonderful. Imagine its position at about 20 miles' distance up from the front of the glacier, which extended itself for another 20 miles to its head; on one side, towards the east, the Teram Shehr came flowing in, measuring by itself alone about 18 miles,



*Third camp on the Siachen Glacier; mountains of the right flank in background*



*Base camp beside a lateral lake on the left side of the Siachen and near the confluence of the Teram Shehr Glaciers*

and from the opposite side came the Lolofond glacier, less long, but having other glaciers beyond its head before reaching the depths of some ice-free valley, just as beyond the Teram Shehr stretches the immense tongue of the Rimo. It is difficult to imagine an ice world of such immensity. Nevertheless there in the middle of it my base camp was like an oasis, well sheltered from the wind, well exposed to the sun rays, on the margin of a small lake shut in between ice and rocks, and surrounded by a vegetation and a flora which in all the Karakoram Range, even outside the glacier region, is really unusual. Rarely have I seen in our Alps high pasture grounds with such an intense abundance of flowers, of every kind, of every colour, and of every perfume. There was also a rich and varied fauna in which the hibex reigned supreme, that came down to graze every morning in groups of dozens and dozens and gazed stupefied at this strange invasion of men and tents and at the movement and activity that seemed to agitate this corner of their ice world. As a culmination to our good fortune we also found a great quantity of burtse, that little plant the small boughs of which make good fuel. It thus became unnecessary to refurnish our camp with juniper wood, which is relatively abundant near the front of the glacier.

Everything was of interest around my base camp, also the lake. After my arrival its level began to rise, at first rapidly, then more slowly; but after having risen over 70 feet it ended by endangering my camp, and I was obliged to set my tents higher up on the slope with all the boxes and bags that had accumulated around them. Then however the lake began to decrease, at first slowly, then with always greater rapidity, and on the last day of my stay in the oasis it emptied itself almost suddenly, whilst the Siachen's ice masses, robbed of their support, split up into large crashing blocks. My porters said that as the barasahib—the great lord, by which name they meant me—was leaving, so also the spirit of the lake was going.

The base camp naturally was not an oasis of rest. It was the centre of excursions upward along the Siachen and along its main affluents. These excursions were also difficult to organize: there were still loads to be fetched from the front of the glacier; fourteen men, as I have said, had been sent back; permanently five or six were on the sick list; and moreover I had not come to the Siachen from Florence to idle about amongst the flowers near the lake of my base camp. The solution I found to the difficulties was to organize a system of flying caravans, generally led by Miss Kalau, which were to make depots of food and fuel in places easy to locate. These caravans accomplished as many as three stages and more a day, and made it possible for the following caravans to move with very few men and more slowly according to working exigencies. I am glad to think that not one man during the whole time that my expedition lasted was kept in want nor short of food or fuel.

In the meanwhile the Siachen revealed itself always more to my curiosity as a naturalist and to our admiration as alpinist travellers. Above the base camp, where the glacier presents its greatest width, of over  $3\frac{1}{2}$  miles, it grows steadily more uniform, the moraine ridges do not only become depressed, but they also separate from one another, and individualize always better; and each one can be traced to its origin, in one or the other of the mountain spurs at the foot of those ranges. Still farther up they disappear completely beneath the even

mantle of the eternal snow, which levels everything and also hides insidious deep crevasses.

One must not believe however that the glacier's uniformity is as great as it appears when seen, from above and at some distance, from the rocks overhanging my base camp. Though high ice-banks and elevated moraine crests are not found here any more, yet there are tracts all broken up into pinnacles and pyramids and spires, where the hollows are invaded by numberless lakes, which are sometimes rather difficult to cross; also real watercourses on the ice, rivers, and torrents can be met here, with deeply excavated beds, running often between almost perpendicular banks, where patience is needed to find some way across, often only on a feeble snow bridge, which in its turn requires prudence and the use of the rope. But these are not real difficulties for those who are experienced alpinists, and for men like the Ladakhs who follow faithfully where their master has passed before them.

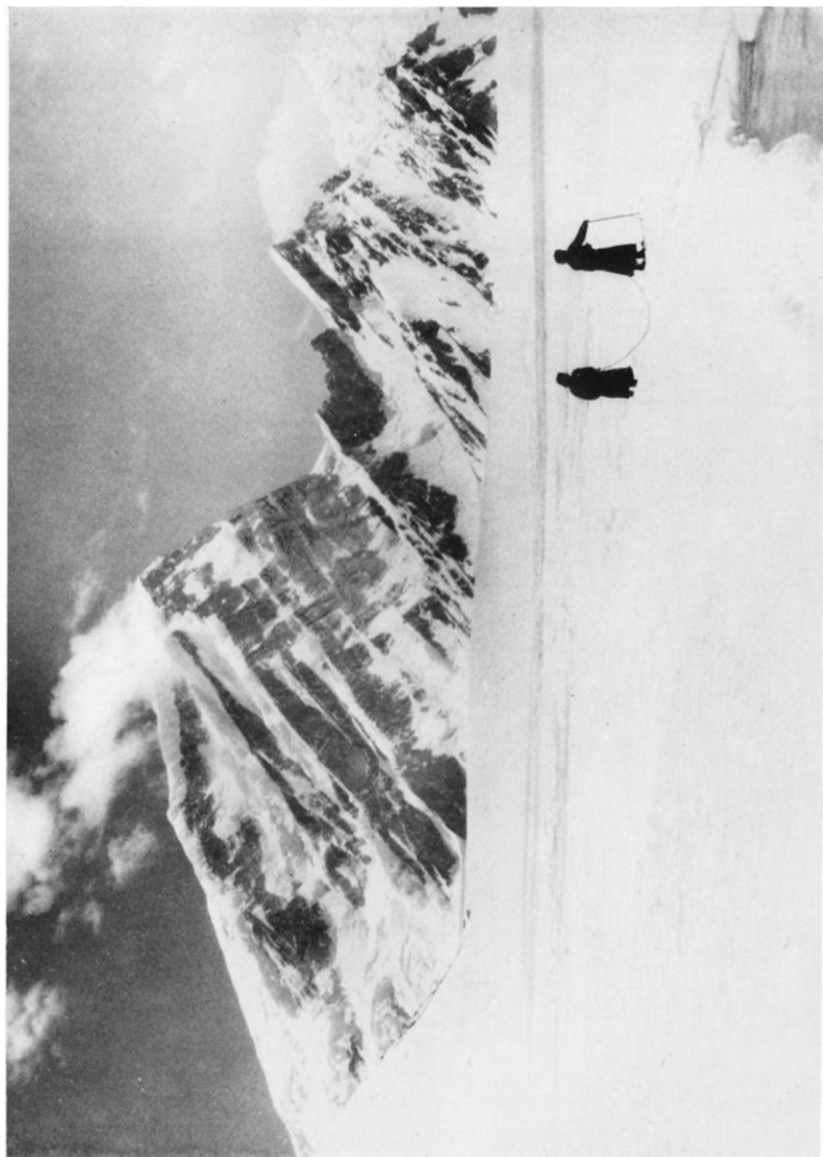
But the spectacle of that immense glacier world and of those fantastic mountain circles was supremely wonderful. The mountains above all perhaps, for although disposed in series constituting ranges and watershed ridges they seem to show, each one of them, an individuality of its own, as if some artificer had modelled them thus, with mighty blows, out of the compact mass of rock. And each one seemed to have its special physiognomy, be it the long crest of the Teram Kangri, or the pyramidal and most daring peak of the Rose, or the Twins joined in their massive power, or the Ghent, with its snowy summit divided like a saddle bow, or the Hawk, its upper part resembling the beak of a bird of prey, or the Hardinge and the Queen Mary, in the King George Group, with their daring pointed peaks, or the Hidden Peak, a gigantic block and the extreme bastion between Siachen and Baltoro glaciers. Of these names I think that only Teram Kangri is officially admitted.

Two months had thus passed on the glacier. I had to think of our departure. In fact I had been thinking about it for some time already, with all the more preoccupation as the news in the meanwhile had not been of the kind to leave the leader of an expedition quite indifferent. A weekly service of couriers had been established to descend into the Nubra valley with my post and bring up that which might have come for me from below and from Europe. For two weeks everything went well. But already the first couriers I had sent from the base camp had found the Nubra so swollen and impetuous, on account of the beginning summer floods, that they were unable to ford it. I thus remained completely blocked on the glacier, completely shut off from the outer world. The consequences, as you can imagine, were not of the most agreeable: impossibility to receive those last food supplies for which I had arranged, and impossibility to send back some twenty porters, as I had planned, so as to facilitate my exit from the Siachen, which was still full of uncertainties.

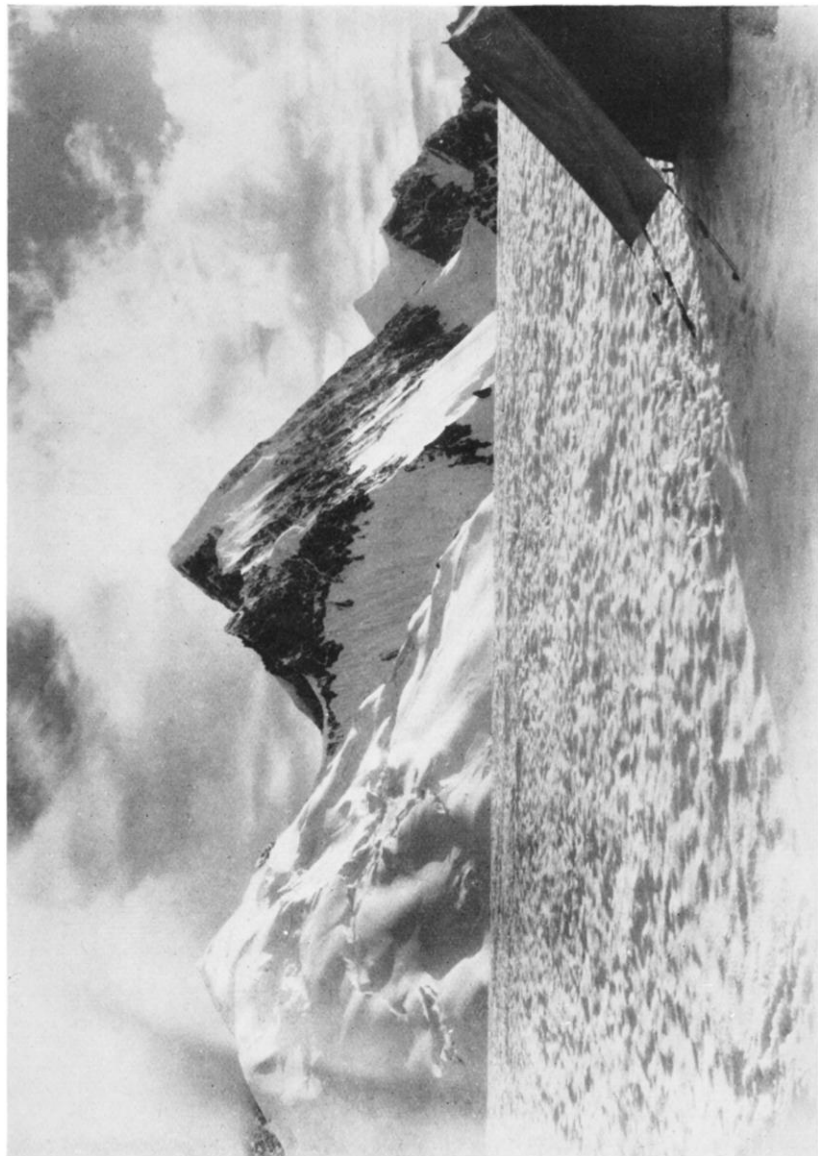
My plans in fact had foreseen to leave the Siachen with not more than forty men; I found myself with seventeen more with a long journey in front of me, with food supplies that were forcibly becoming scarce, and with a new way ahead, already attempted without success by the Workmans, who had failed because of the difficulties they encountered, failed though they were not followed by a loaded caravan, but alone with two famous Alpine guides.

You must remember that Dr. Longstaff in 1909, and the Workmans in 1911





*Peaks 35 and 36 from the east*



*Mount Lakshmi on the left of the Teram Shehr Glacier, flowing from the left*

and 1912, had entered the Siachen and had also left it by the Bilafond La, a pass to the west leading into the Saltoro valley in Baltistan. My plan had been, instead, to leave towards the east, by that unknown pass, which presumably led to the Rimo glacier, explored by the De Filippi Expedition. The Bilafond La was the known way, which would have brought me in a few stages into inhabited regions; by the unknown pass I would have to descend the whole Rimo and part of the upper Yarkand valley, reaching the Karakoram caravan route, and then follow it for twelve good stages, before reaching the first villages.

This way, I repeat, had been attempted up to the col by a caravan consisting only of alpinists and two Alpine guides. And the attempt had failed. Some one may think perhaps that I was rather too daring in wanting to follow it with all the loaded caravan and in the particular conditions in which the Nubra had unfortunately placed me.

I decided to anticipate the departure by five days, as this would procure me a corresponding economy of food supplies. I told my men that during the crossing of the glaciers I would continue to distribute complete rations, reserving to myself the right to shorten them once outside the glaciers, if it should prove necessary. They agreed to whatever restrictions I might decide upon, for they knew it was a question of *force majeure* independent of my will and my preparations.

And thus in the first days of August I began to send food and fuel up the Teram Shehr glacier, which was now to be my way of exit. Just think that of burse alone there was more than a ton. On the 7th I folded up the tents of my base camp, where an inscription on a moraine block marks the dates of my stay there, and I began to ascend the Teram Shehr, which for two good stages is nearly as easy as a highway. And thus far the Workmans had pushed forward with their two guides, and thence had tried to reach the col.

Let us see what they have written of their attempt.

“Seen from the Rose [or Siachen] this glacier [the Teram Shehr] appears to rise gradually for miles, but in reality its higher part was composed of three slopes broken by short snow-terraces, and its whole upper area was cleft by crevasses of a size and depth not met with on the Rose or its other large affluents. A wide plateau was finally reached lying at over 18,000 feet. This white sea is cut up by shrunds and chasms running in all directions. Leading the caravan cautiously in and out of this maze, we advanced slowly, until Savoye said the responsibility for him was too great, as the caravan might at any moment become engulfed in this vortex of seemingly bottomless chasms. We had wished to reach the end of the plateau, now quite visible, and see if any possible passage existed leading towards Nubra and the Remo glaciers, but this was no smooth lustrous expanse, such as are some elevated plateaux in Himalaya, but a mountain devil’s snow-continent set with death traps to entice unwary men into their pitiless jaws.”

There was reason to be at least somewhat preoccupied. I won’t hide that in fact I did feel a bit so, especially on account of my caravan’s weight, that is for the great number of loads which obliged me in the beginning to repeat three times every stage, then twice only, as soon as the consumption of food had rendered it possible.

But the leader’s troubles were not yet over. No sooner had we reached the Teram Shehr than it began to snow. And then persistent adversity of

the weather set in, with nearly continual snow, thick fog, and violent wind-storms. As soon as the fog lifted even slightly I had to fix well in my mind the topography of the glacier, so that our going should consequently be as little dangerous as possible. Many times was I forced to stop on the way because the storm prevented my proceeding any farther. But, since fortune helps the audacious, as our Latin forefathers said, I succeeded in avoiding the worst crevasse fields, and with continual prudence and giving personal aid to each porter whenever it seemed necessary, for the glacier was treacherous, I overcame the worst difficulties, in spite of the weather's obstinate adversity. And when on the eighth day of this period of trial the fog finally cleared, the clouds vanished, and the sun reappeared in a radiantly serene sky, my tents were set up against the rocks in the now immediate neighbourhood of the pass.

From here, in a few hours' time, the col was easily reached, the large tongue of the Central Rimo descended from it, which I recognized in every detail of its own and of its surrounding mountains. A long descent on skis brought me halfway down its length, against the left rocky border, in a miserable camping ground, where I was forced to remain for two days, so as to collect all the loads that had been left behind.

The descent along the Rimo was almost playwork, almost like taking a walk. Not so our exit from it. I meant to leave it by that northern tongue which during the De Filippi Expedition both Major Wood and I, each one separately and at only two days' distance, had discovered to be the source of the Yarkand river. But the front of that glacier was so much swollen, and ended in an ice-wall of such height, that it was impossible to find a way out on the evening of our arrival. I was forced to pitch our tents there, on the extreme edge of the glacier front, and it seemed as if the Yarkand river were mocking me all the time, running so quietly just below me. We even got into our sleeping-sacks without a warm supper that night, because our fuel supply had just then come to an end, so precise had been my calculations for the necessary economy of loads.

One whole day was needed to get out of the Rimo. You will understand my emotion when, setting up my tents under the shelter of some rocks, I discovered a heap of dried-up burtse, abandoned by myself sixteen years before when I had been camping in that same place.

Thus the expedition could be considered as come to an end. Not yet however my various preoccupations. I immediately reduced the food rations of my men and speedily started on the return march. But luckily, near the Karakoram Pass, I met a relief caravan, on which I had not really counted much, as from the Siachen I had been unable to send any precise orders. But the general arrangements I had made in the Nubra valley had been so marvellously carried out that I was now again swimming in plenty, just at the moment when restrictions had been imposed by circumstances.

By the Karakoram caravan route I returned into the Nubra valley, by the Khardung La to Leh; by the high passes of the Rupshu into India at Sultanpur. Thus the journey was ended.

I regret that the limit of time has hindered my saying more about the majestic grandeur of the Siachen and its mountains, and my showing you a

larger number of those photographs which Miss Kalau's intelligent activity has contrived to bring back. It is certainly not sufficient to be accustomed to the beauty of the high mountains in the Alps to form an adequate idea of what are the mountains and glaciers of the Karakoram. The scale is so different, so uncommonly grand, that those phenomena and those shapes which are quite familiar to us in the Alps seem almost new. The surface rivulets, which can be crossed by one step or by one jump on our glaciers, there, in the Karakoram, are or can become great rivers, broad and deep and impetuous; the small pools of our Alpine glaciers become large lakes on the Karakoram glaciers, and can be found innumerable among the moraine hills or in the lowlying portions of the crystal ice. The small irregularities of the surface, which in the Alps seem and are small details, almost miniature shapes, there become gigantic banks, forests of pyramids, labyrinths of spires, amidst which, if the sky is uniformly covered, it is necessary to use the compass, so as not to lose our direction. The glaciers are so large that it is difficult to embrace them at one glance, while they flow along, though scarcely winding, in their gigantic troughs; and the mountains are so high and full of majesty that any one of them having there the importance merely of a small detail of a secondary range has in itself the majesty and grandeur of a Mont Blanc seen from Courmayeur.

All this is more than sufficient to fire the imagination and to satisfy the passion of one who feels deeply all the fascination of the high mountains and knows, from a now long experience, that nothing like the high mountains can give full satisfaction to every sense of beauty and a serene and absolute calm of the mind to him who has known how to conquer them.

But allow me to say when the traveller is also a geographer, also a naturalist, his satisfaction must be, and is, far greater, even if the world, more or less, would go on just the same even without knowing what rocks constitute the Siachen basin or what flowers adorn that rocky corner, that seems a small paradise made purposely to receive the traveller who should venture into that glacier world.

I can say that I have experienced all these special satisfactions. And I allow myself to set them before you briefly in this place and to an audience amongst which are men who have accomplished memorable journeys in the Karakoram Range. It is enough to mention Lord Conway, Sir Francis Younghusband, and Dr. Longstaff, to whom we owe the first and real discovery of the Siachen.

There was the small topographical problem concerning the col between Siachen and Rimo. The Workman Expedition in 1912, as I have already said, had attempted but had failed to reach it. From the travellers' accounts it seemed that they believed they had seen it. But it was simply an illusion, since from the place they had reached the col is not visible.

The De Filippi Expedition, in 1914, did not even try to reach it from the Rimo glacier: they stopped at a distance of several miles from it, but, as it is a typical tableland col, they were able to sight it though only indistinctly, as was then my impression, and as I have ascertained later.

Further, the map of the De Filippi Expedition sets down, though incompletely, that which ought to be the southern side of the Karakoram watershed range in correspondence with the Central Rimo's summit. Major Mason, from the Shaksgam valley, surveyed the northern side. But between one and

the other there remained a blank space, which the recent edition of the Map of India has logically filled up, imagining a long and narrow glacier as an affluent of Northern Rimo. This representation did not convince me, so far as I remembered the Rimo.

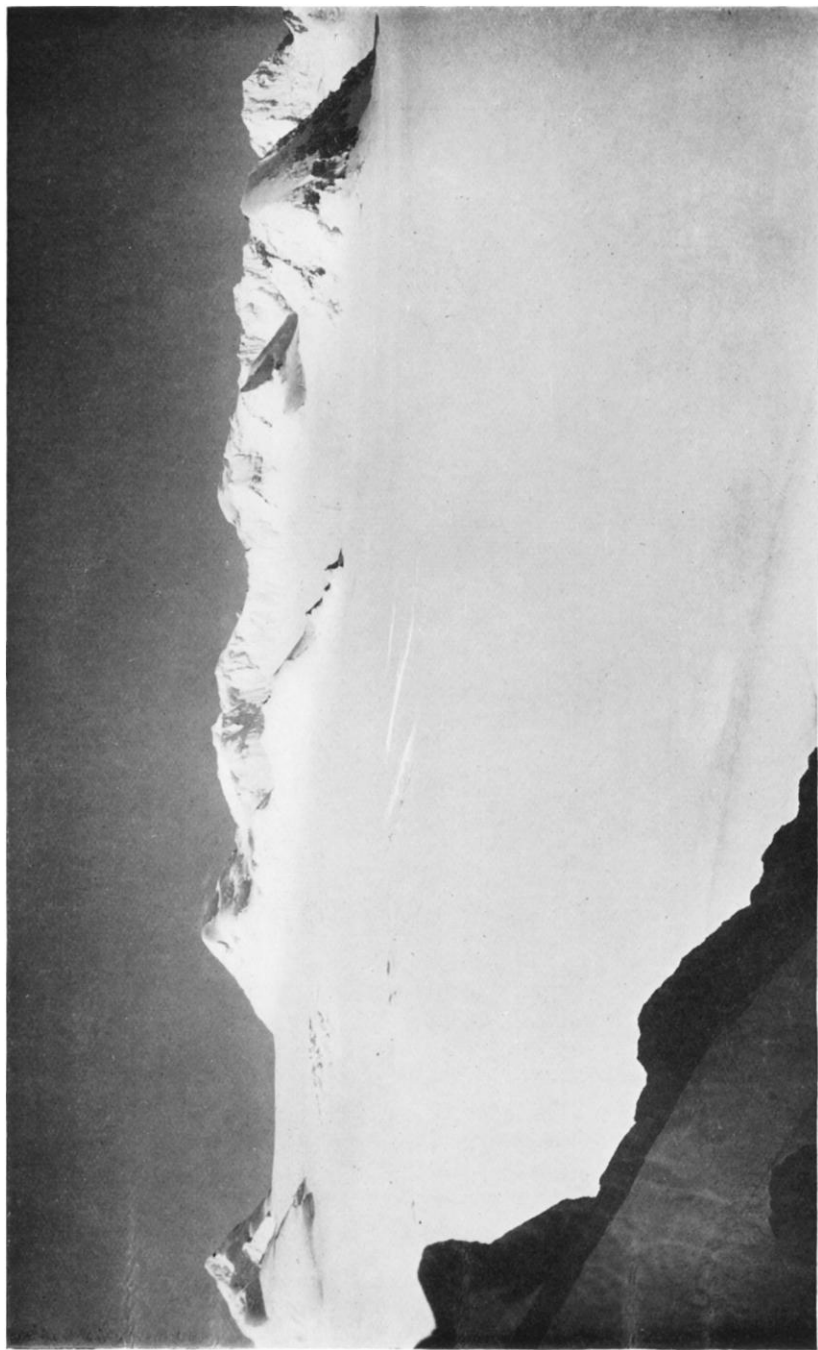
These were all good reasons, though simply topographical ones, that added themselves to the others to induce me to include in my programme the crossing of that col, and to make me persist in that programme in spite of every difficulty and of the contrary weather. Results proved that I did well in persisting.

The col, which is about 20,000 feet in height, is situated about  $3\frac{1}{2}$  miles more to the east than the place shown on the recent maps. It is not closed in, as the maps show it, between two opposite mountain spurs, but is wide and placed on a kind of plateau, where from both opposite directions, from the north and from the south, two large glacier branches of alimentation come flowing in. Besides, of these two branches, the southern one, which, according to De Filippi's map would aliment the Rimo, in reality is alimentering the Siachen, and its head is not shut in, as the map has it, by a mountain ridge, but ends in an ample level saddle, by which it must be possible to reach the more southern glacier explored by the Vissers in 1929.

That long and narrow glacier placed in the maps immediately south of the principal watershed ridge as an affluent of Northern Rimo does not exist; into the northern Rimo runs, correspondingly, an insignificant small valley and not a tongue of ice 8 miles long. And the Central Rimo actually reaches with its head the principal watershed ridge of the Karakoram. Thus the large collecting basin of Central Rimo is determined, a collecting basin however not simple and uniform as it would appear from the maps if that inexistent ridge were taken away, which limits that imaginary glacier to the south, but a basin, rather than divided up by real mountain ridges of some length, interrupted by isolated hillocks, especially in its more southern portion.

This upper basin opens out widely from the north on to the col which I crossed; it opens on to the col like a gigantic fan of ice, alimentering simultaneously both the Siachen and the Central Rimo.

One more remark. The recent maps give, immediately east of the col, a narrow and rather long glacier, shut in by two mountain ridges, which is supposed to feed the Rimo. As the col is really situated much more eastward, that small narrow glacier would feed the Siachen. But in reality it does not exist. To understand how it comes to figure on the Indian map we must think how this map has necessarily been constructed for that region, that is by joining both Workman's and De Filippi's maps, according to the geographic co-ordinates. But one of these two maps must contain some error in the geographic co-ordinates, because those two mountain ridges, which there appear different and separate, leaving a gap which the Indian map has been obliged to fill up by placing between them a small narrow and long glacier, correspond in reality to the same and only ridge seen from the two opposite directions. That there must be some error in the geographic co-ordinates, in one or the other of the two maps, can also be proved by the fact that a peak, figuring on both maps with an identical quota, does not coincide as to its position, but appears in two distinctly different places, and therefore is doubled, in the same way as the ridge was doubled, which in reality is only one.



*Zone of the Colle Italia from the north; the pass is just to the right of the crevasses in the middle of the photograph*



*Zone of the Colle Italia from the east; in the middle the huts of Professor Dainelli's first camp on the Central Rimo and his caravan tracks down the glacier are visible*



These are the essential modifications to be introduced in the recent maps of the region: not very great ones, naturally, as they certainly do not revolutionize the Karakoram topography, but yet they may have a certain importance, seeing that to reach the col between Siachen and Rimo is not as simple as taking a walk between one meal and another.

Let me record a few more among the results of my expedition. When I was in that region the time before, I intensified my excursions so as to obtain also elements for the sketching of a geological map, that should be at least an improved and more up-to-date edition of Lydekker's old map of about fifty years ago. There had remained for me the blank of the Siachen's basin; and now, at least partly, this blank is filled up since I know which part in the geological constitution belongs to intrusions of granite, which to antique crystalline rocks, which to the Permian period of normal facies, and also which to the Trias period of Dolomitic facies.

The time before, from a very vast region, but of which no fossils were known except through vague, uncertain, and even erroneous indications, I was fortunate enough to bring back large collections almost of every geological epoch, from the Silurian to the Eocene. But also this time, even though less abundantly, I brought back fossils both from levels from which I had already collected, and from levels that I consider new, belonging to the Permian, to the Trias, and to the Jura periods.

As to the morphological problems connected with the phenomena of the Quaternary period, I could not hope to bring back anything very new. I have already published a study of a monographic and extensive character on the Quaternary period in the whole of that region, and, by analogy and by induction, I have already said what must have been the conditions of the Nubra valley and of that short tract of the Shyok valley which I yet did not know. I have the satisfaction to state that what I have now observed confirms, I can even say completely, all I had previously inferred.

At the base camp, in the centre of the Siachen, at 15,000 feet above sea-level, during a month and a half, registering instruments recorded the temperature, the dampness, and pressure. They will bring a contribution to the knowledge of the daily course of these meteorological elements.

Thanks to Miss Kalau, a diligent gatherer, I have brought back several hundred specimens of high mountain plants. As before, I again did not consider it necessary, with the many occupations I had, to think of the flora in the lower valleys, where so much has already been collected and where I, simply passing through, could have gathered but little. But again, I did not want to neglect the flora of the real high mountain areas, where very few travellers have collected and where it is possible to be thorough, or nearly so. My botanical colleague to whom I entrusted the Alpine flora brought by my expedition assures me it is the richest that has yet come from the Karakoram region; especially interesting is that of my base camp's glacial oasis.

The time before it had been my task to draw the plans of the different houses, so that I believe this essential element of the material human life is now well known in reference to the region from Baltistan to the first Tibetan tablelands. I was still ignorant as to the Nubra valley; but from the Nubra valley I have now brought with me plans of houses sufficient to show the

similarity of the general structure and the local variations due to the influence of the milieu.

The time before I brought back the anthropometrical measurements of 450 individuals, taken in a way that for each people one had a series sufficiently long to allow the anthropologist to make his deductions, as in fact he has done. This time I have measured another 150 individuals, divided in three series, namely three groups of different peoples.

And finally I may mention a small discovery, which can interest those who know the Karakoram. In one of my studies I have endeavoured, some time ago, to reconstruct all the routes followed in former times by the Baltistan natives across the large mountain range. Also the Workmans had affirmed that the Siachen itself was normally visited by the natives, but evidently what they had heard was a purely fantastic legend, namely that a real town had existed on the rocks halfway up the glacier. From sure accounts I collected in the Saltoro valley and from evident traces of a shelter arranged by human hands, right at the northern front of the Rimo, I had concluded that the Baltis used, as a way towards Yarkand, also that one which, starting from the Saltoro valley, climbed the Bilafond La, crossed the Siachen, ascended the Teram Shehr, surmounted the pass between Siachen and Rimo, and finally, descending this last one, ended in the Yarkand valley. Well, ladies and gentlemen, when, having established my camp under that pass, the fog cleared and I was able to make a proper inspection of all the neighbourhood, I discovered above the rocks near my tents two cairns of perfect shape, as if they had only just been erected. Thus my hypothesis that this way had been used by the natives in former times was completely proved.

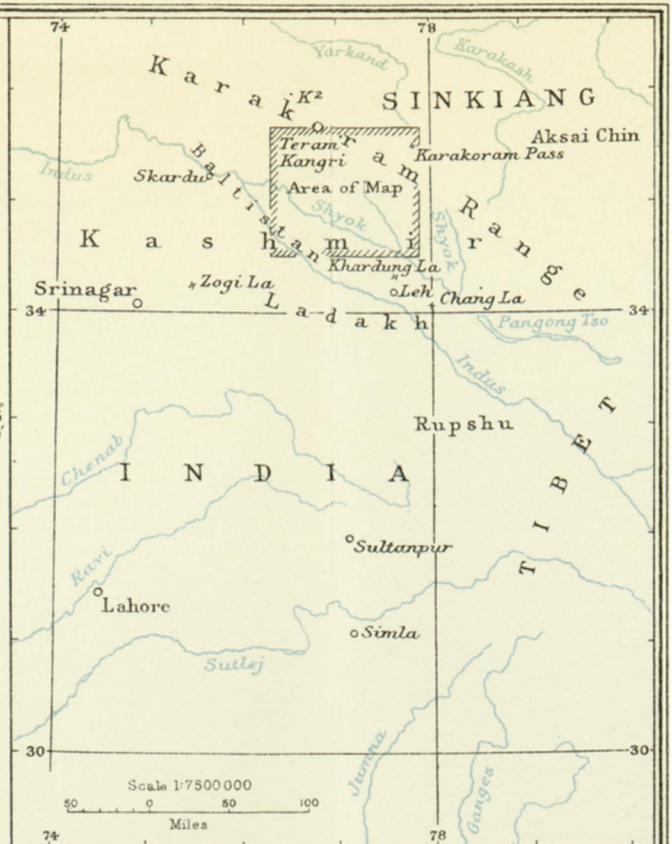
Some one might philosophize on the illusion we live in, we who believe we are exploring and discovering that which other men, instead, have known before us, perhaps for centuries. But we explore and discover for the sake of general knowledge and of science, and we cannot feel diminished if only in this sense be understood the discovery of the Yarkand source from the Rimo, made sixteen years ago, or the so-called first crossing of the col between Rimo and Siachen. For geography and for science, as well as for alpinism, it has certainly been the first crossing and therefore, in remembrance of the contribution which my fellow citizens have brought to the knowledge of the Karakoram, I have allowed myself to give the name *Colle Italia* to this pass, crossed for the first time by a caravan led by a European.

## DISCUSSION

Before the paper the PRESIDENT (Admiral Sir WILLIAM GOODENOUGH) said: No session passes without at least one evening being devoted to a consideration of some part of the Himalaya, and we may say that the Karakoram is part of the Himalaya. I speak with certainty on that, for having no experience of those parts myself I consulted what I considered to be expert opinion. Of that great range of mountains which would seem to be the backbone which supports half Asia, buttressed and branched and ribbed and jointed for hundreds of miles, the more we hear the more we want to hear. To-night we are to hear of a portion of the Eastern Karakoram from one who combines in a very remarkable degree the geographer, the traveller, and the mountaineer. Professor Dainelli is a member

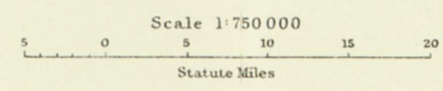






## Glaciers of the EASTERN KARAKORAM

To illustrate the Journey in 1930  
of  
Prof. Giotto Dainelli



From sheets of the Survey of India on the scale of 1 inch to 4 miles, with corrections by Prof. Dainelli. Contour interval 2000 feet.

of the Academy of Italy, and that in itself is a great distinction. He was educated at the University of Florence. In 1914 he was given the Chair of Geography at the University of Pisa. From Pisa he went to Naples, and has now returned to the University of his native town, Florence. His journeys in Eritrea with Marinelli resulted in more than one volume on the geography and geology of those regions, and these have become standard text-books: In 1913-14 he was in Asia with our very old friend Dr. Filippo De Filippi, and has written several of the volumes on the geography and the kindred sciences of those regions resulting from that expedition. In 1930 he undertook the expedition of which he will give us an account to-night.

*Professor Dainelli then read the paper printed above, and a discussion followed.*

The PRESIDENT: We find ourselves to-night very fortunate. Not only have we had a most charming and interesting lecture, but there are three men whom I am going to ask to speak, all Gold Medallists of this Society. The first has been absent from our platform far too long. Now that he has been, shall I say, moved from one legislative assembly to another I hope that he will find time to come and speak to us a great deal more. I will take this opportunity of offering him, on behalf of the Royal Geographical Society, our very sincere congratulations on the honour which has been bestowed upon him by His Majesty.

Lord CONWAY: Our lecturer has said that when he went amongst the mountains of the Eastern Karakoram, of which he has spoken to us to-night, he had the illusion of being fifty years younger than he really was. I can assure you that there is a much greater defect than that that makes me feel exactly fifty years older. I am sure we have all been delighted by the lecture to which we have listened. To me, and perhaps to most of us, the greatest charm was not its importance as a piece of geographical exploration, but as a revelation of beauty. I do not think it often happens, beautiful as are the visions that are thrown upon this screen from time to time, that we have shown to us in one evening a series of not merely beautiful slides, but slides taken of beautiful scenery from the best point of view, one after another. We were so enraptured that sometimes perhaps we failed to realize all the difficulties of the journey.

My own travels in the Karakoram happened so long ago, are so far away, that though they are not forgotten by me they might have ceased to be really vivid memories. But, as a matter of fact, it is a quality of the Karakoram Mountains to a very peculiar degree, when I think of them as compared with other mountains of the world, to fix themselves in detail with extraordinary firmness in the mind, so that they become possessions for the whole of the rest of one's days. The part of that great mountain region that I visited is to the west of the part we have seen to-night, and it consequently happens that the exploration of those mountains that I have been able to read about and to follow in the pictures has just missed the junction between where I went and where the travellers who visit the Siachen and that district generally go. I noted that the long glacier about which we heard to-night stretches up somewhat west of north and appears to draw its original ice-flow from the back of that great mountain, Gasherbrum. I only saw the western side of Gasherbrum and its neighbouring peak, which appears to be part of the same mountain mass, called the Hidden Peak. Gasherbrum is one of the finest mountains in Asia, but I always wondered what it would be like on the other side and whether there was a way over the saddles that seemed to beckon one to try to cross it. I believe that there is a possible way across from the Baltoro glacier eastwards over what I called the Probable Saddle, and, if there is, then it would be one of the very finest passes in the world for any explorer to discover.

Personally, I do not believe peak climbing is worth very much in the Himalaya.

It is a great feat to have accomplished, but for enjoyment and pleasure give me the Himalayan passes, those great passes with their wonderful views, with their great upper snowfields, so large, so wide, so white, and so placid, and beyond them, rising towards the horizon, white peaks of no great relative elevation in themselves but almost like Arctic peaks. There, on the upper levels, you find such beauty and such loveliness in light, shade, form, and colour that you win a greater reward, I feel sure, in investigating and following passes than any peak in the Himalayas can give you. The great peaks, we hope, will be explored. Kangchenjunga is hopeless, but there is Nanga Parbat and there are other great mountains which it would be a memorable feat to accomplish and I think may be accomplished; but if I were to have my life to live over again it is not peaks but passes which I should choose.

Well, we have listened to our lecturer with great interest and delight, and we thank him most cordially for having come amongst us. We can assure him that he will have left behind him in the minds of those who have listened to him this evening memories of a most delightful kind which will last as long as we can think.

The PRESIDENT: If, when you go out, you will look on the board at the other end of the corridor you will see a map of the region of which we have heard to-night. That map, which I believe I am right in calling a sketch-map, was made in the year 1889 by Sir Francis Younghusband.

SIR FRANCIS YOUNGHUSBAND: I have listened with extraordinary interest to the lecture by Professor Dainelli because, quite unconsciously, he discovered the pass that I had been looking for forty-two years ago—that pass which he has very appropriately called the Colle Italia. In the year 1889 I was sent by the Government of India to examine all the passes that might lie across that range between the Karakoram Pass and the Pamirs. In the year 1888 a Russian traveller, Captain Grombchevsky, had crossed the watershed into the little state of Hunza. Now news had come to the Government of India that he was about to start from St. Petersburg to come again into that region. So at the beginning of July 1889 I was commissioned by the Government of India to proceed as rapidly as I could to the Karakoram Pass, thence to the Shaksgam river, which I had discovered in 1887, and then find my way into Hunza. The main idea was to discover the passes into Hunza. But we also had heard of a mysterious pass which some called the Saltoro pass, which led into Baltistan, and it was that pass that, if I had time, I was asked to try to find. It might be such a pass that small parties of Russians could use to penetrate into Indian territory.

I went down the Yarkand river, and over into the Shaksgam valley. All this country was very badly and erroneously marked on the maps in those old days. The Siachen glacier was not known until Dr. Longstaff discovered it many years afterwards, and I tried a pass which I thought was the Saltoro pass and found it quite impassable for anything in the way of a military party, however small. And there the matter rested for many years, until one day in London I heard of a British officer who had been shooting in Chinese Turkistan. His leave was very nearly up, and instead of coming back from Turkistan by the well-known route of the Karakoram pass his shikari said that he knew a short way into Baltistan and would take him by it. The shikari took him by the short route, and I happened to meet the officer one day in Piccadilly and asked him by what pass he had returned to India. He had not the least idea. All he knew was that it was not the Karakoram pass and that it was not the Muztagh pass which I had crossed in 1887. It was somewhere in between, and it had brought him into Baltistan, but where it was he had not the faintest idea. There the matter rested. I am sorry to say I have forgotten the officer's name, though I believe it was Knox Niven.

Now we know that there is a pass, the Colle Italia, which does lead from Turkistan into Baltistan, though whether that is the one that the British officer crossed I do not know. At any rate, to-night we have had the mystery of forty years ago cleared up. Also we have seen most beautiful photographs of that pass and the wonderful region in which it lies. And I can join with Lord Conway in thanking Professor Dainelli for having brought back to us some of the beauty of that marvellous region.

One word in conclusion. The Italians seem to have annexed that part of the Himalaya for their explorations, and as an ex-Resident in Kashmir I should like to testify not only to the value of the work that they do there, but to the good name which they have established in those regions. Anybody who has been in the position of Resident in Kashmir knows that travellers can be divided into two classes: good travellers and bad travellers. The bad travellers are those who get themselves horribly disliked by the people of the country and give the officials an infinity of trouble. The other class, the good travellers, are those who get on with the people of the country, who bring back valuable scientific results, and so make it worth while for the officials and the people of the country to have helped them. I need hardly say that the Italians belong to the latter class. I had the pleasure of being Resident in Kashmir when the first Italian expedition, led by the Duke of the Abruzzi, came out. He established a tradition there of the way to treat the people, and that tradition was carried on by Dr. De Filippi, the Duke of Spoleto, and Professor Dainelli. I wish to thank you very much, Professor Dainelli, and congratulate you on the work you have so successfully accomplished.

The PRESIDENT: Dr. Longstaff's name in connection with these regions is one to conjure with. Dr. Longstaff.

Dr. T. G. LONGSTAFF: I had the pleasure of reading Professor Dainelli's paper before I came here, and there is very much more that he might have told us, and that we should have been glad to hear. It is too late to deal with most of the more technical and geographical points, but there are one or two which really must be emphasized.

The first point is that the one-hundredth part has not been told. It is a very remarkable achievement indeed to have spent two months on the greatest glaciers of the Karakoram, completely cut off for the whole time from all extraneous sources of supply. This demands extremely good preparation beforehand, and fine organization is evidenced by the achievement of landing the party, with all its supplies, on the Siachen glacier only two months after leaving Florence, quite apart from having maintained that caravan on the glacier for two months. One of the points that Professor Dainelli has not made is that the Nubra river rises in flood behind you. You get up there in June, if you are lucky, and then the Nubra river rises and you cannot get down. Therefore all supplies must be on the glacier for the whole season's work. Another difficulty was that Professor Dainelli had every intention of sending back twenty coolies, and keeping even fewer men than he did in fact keep. I am pleased that my friend remembered that, when he last saw me in Florence, before he started, he showed me the most beautiful sets of instruments in wonderful cases, and asked me what I thought of them. I advised him to leave them behind and take more food. If he had not done so I am sure he could not have succeeded. But the odd thing is that he seems to have done both, because if you read the paper you will find he took the instruments as well as the extra food.

The whole expedition exemplifies the advantage which a small party has over a large one in country where the difficulties of food supply are very great. I hope the President will not pull me up, but I must confess that I often feel rather

superciliously inclined when I hear about European transport officers and English-speaking interpreters. There are exceptional cases, of course, but there is to me a personally conducted tourist element about that. Unless you can penetrate somewhat into the lives of the native peoples it seems to me you lose half the delights of travel. Professor Dainelli's previous anthropological work had given him the entrée to an unusual extent. His expedition was a piece of real travel. Professor Dainelli had already wintered in Ladakh and Baltistan, as a member of De Filippi's expedition. He was his own transport officer and his own interpreter. He knows and likes the local people; and if they did not like him he could not have got such excellent service out of them. And what a compliment to Miss Kalau's character and capacity! To be the sole conductor of those subsidiary caravans over such glaciers and over ground which they did not know proves that she must have gained the confidence of those Ladakhs to a very remarkable extent. Those people will only follow some one in whom they have complete confidence.

I have been on part of the ground and it has been an extreme pleasure to see it again in those very wonderful photographs. It is, as Lord Conway has said, really as big an achievement to open one of these big Himalayan passes as to climb a big peak. The opening of this 20,000-foot pass between the Siachen and the Rimo glaciers is a fine alpine achievement. The Workmans, approaching from the Siachen side in 1912, declared that it was impossible. They denied the possibility of this route having been previously crossed by natives, as I had suggested in 1909, following of course the tradition recorded by Vigne in 1835, for the pass was not *known* to anybody. Dainelli has not only proved its practicability for capable mountaineers, but he found those tell-tale cairns which show that the pass had at some time or other been used by natives, probably in the time of Ahmed Shah or earlier. Nevertheless, for all practical purposes it is a new pass. I therefore consider the crossing of the Colle Italia to be just as great an achievement as the ascent of a great peak. I would draw attention to the fact that this is the first time that the main range of the Karakoram has been crossed between Younghusband's Muztagh Pass and the Karakoram itself—or, if you prefer it, the Saser—in either case a distance of 100 miles. It is really a remarkable achievement of Himalayan exploration, and I ask Professor Dainelli to accept our most hearty congratulations on the safe accomplishment of a difficult feat and on the solution of a puzzle which has intrigued us for so long. You continue, Professor Dainelli, the tradition of successful exploration and friendliness with the local people which the great expeditions of the Duke of the Abruzzi, of De Filippi, and of the Duke of Spoleto have accustomed us to expect from your compatriots.

The PRESIDENT: Professor Dainelli, you have heard three men pre-eminent in this country, mountaineers and geographers, speak with unqualified praise of the work which was done by the expedition of which you were the leader. It would perhaps be hardly becoming for one bred and almost born on the low level of the seas to attempt to paint those vivid colours as they have painted them, but I do, on behalf of the Society, wish to give you an expression of our admiration and thanks for what you have done.

I should like to take the opportunity of saying with what great admiration we all regard the fine Atlas of the Touring Club of Italy. If you will look at an enlarged map in the corner of Nos. 93 and 94 you will see a map of these parts. I was looking at it with the Professor yesterday afternoon and said, "That's an admirable map," and he replied, "Thank you very much. I made it." And that shows that what he brings back enables him to turn out excellent results; that his observations are recorded with great accuracy.



Dr. Longstaff, in that way in which he approaches the precipice of indiscretion and then stops, asked whether I was going to pull him up. I did not, but I have a small bone to pick with him, for he took from me the first mention of one who was the collaborator and the companion of the professor in his great expedition. That is some one whom I invite, if she will be so kind, to come and stand by me on the platform, Miss Kalau. When the flying caravans were organized and went out in various directions, Miss Kalau led one of them, and I am sure the ladies present will all applaud the fact that her caravan went much faster than anybody else's. The lovely photographs were all taken by her; and when all the collections of flowers are got out and tabulated the results will be mainly due to her care and energy in making the collections.

Professor Dainelli, I have one more duty to perform, and that is an extraordinarily pleasant one. It was unanimously resolved in Council this afternoon to invite you to become what we, perhaps in our conceit, may think is somewhat of a distinction, and what we know will be an honour to us, that is, an Honorary Member of our Society. I have the very greatest pleasure in offering you the thanks of this audience and of the Society, and of presenting you with this record of the fact of your Honorary Membership.

Professor DAINELLI: It is my duty to speak for various reasons, but all of these meet in the wish to express my gratitude. First of all to the President of the Royal Geographical Society, for the flattering words with which he has presented me to the audience. Secondly, to Lord Conway of Allington, to Sir Francis Younghusband, and to Dr. Longstaff, for the approbation they have given publicly to the expedition I have led in the Eastern Karakoram. It is an approbation of which I am particularly proud, as they have great experience of those mountain regions where my activity as a traveller has lain. It is therefore superfluous to remind the members of the Royal Geographical Society of the great explorations and topographical achievements of Lord Conway on the large Biafo and Baltoro glaciers. I am particularly grateful to him for saying that to-night's lecture has revived in him the remembrance of his explorations of forty years ago and has given him the impression of returning to that time; but this is probably not my own merit, but that of the pictures of those marvellous mountains which I was able to show you. It is also superfluous to remind any one of the successful explorations of Sir Francis Younghusband, who, about twenty-five years ago, after crossing a large part of Asia, near the end of his journey, encountered that yet unsurmounted obstacle, the Karakoram Range, and found in himself the courage to still more arduous exploration; he climbed the Shaksgam valley and the Urdok glacier until he came in view of the unknown Indira Col, then crossed the range by the unknown Muztagh Col, the first European to do so, and moreover without high-mountain equipment. I am glad if he thinks I have followed, though very modestly, in the tracks of his exploration. And to Dr. Longstaff I owe more particular thanks still: he is the real discoverer of the Siachen, and, by means of his great topographical sense, he was able to draw the sketch for a map of that immense glacier which, considering the brief time he spent there, seems a marvel of accuracy. He can realize above all others the difficulties of an exploration journey in that immense glacier world; and for this reason he has wanted to place in relief some of those he considers the merits of my expedition in meeting and overcoming these obstacles: a stay of two and a half months on the glaciers, the complete isolation towards the outer world in which I found myself, the persistence in my programme, namely to leave by a new way, which I had reasons to consider difficult. Of his approbation I must feel very proud indeed; but I must add that—if also in other circumstances I have always followed the rule to bring with me really everything that I considered

possibly necessary—in the case of my recent expedition I have followed this rule also on account of the recommendations of Dr. Longstaff, when, before my departure, he encouraged me to bring abundant quantities of food for the caravan.

But if all these were not reasons more than sufficient for my gratitude, another has now been added by the President in letting me know that the Council of the Royal Geographical Society, in to-day's meeting, has decided to make me an Honorary Member. And this I feel, and must say, is a greatly coveted prize for the activity which for more than thirty years I have dedicated to Geography, according to my feeble means, but, I can affirm, with great and never diminished ardour.

And, as many words cannot, I believe, express better this feeling of gratitude, I now have ended. But allow me to make still a kind of confession, which I might call a psychological one. When I left Florence to come to London, I felt some emotion: an emotion made of some anxiety and uncertainty, as must be felt by any one who, as a foreigner, is coming to speak in this Royal Geographical Society, which has so long and so glorious a tradition. And now that I must leave London to return to Florence, I also feel a deep emotion; but it is no longer one of anxiety and uncertainty, but consists only of that sorrow which is felt when parting from old friends. And also for this I want to thank the President and all his colleagues of the Royal Geographical Society, whose welcome and courtesies have taken from me the feeling of being a foreigner and have given me instead that of being a friend amongst old friends.