

NOTE ON SIR FRANCIS YOUNGHUSBAND'S URDOK GLACIER

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SINCE plotting the map of the Shaksgam valley by the Wild Autograph, I have gone very carefully into the probable position of the Urdok Glacier. I have come to the definite conclusion, from the lie of the ridges as shown by the Autograph, considered with the latitudes and account of Sir Francis Younghusband, that the Indira Col of the Workmans lies at the head of a source of the Urdok Glacier, and that it is shown approximately one mile too far north on the Workmans' map. It is also possible that the Turkistan La is shown about the same distance too far east, on the same map.

A brief summary of my reasons is given below.

As will be seen from the map of the Shaksgam published with my paper on "The Stereographic Survey of the Shaksgam" (*G. F.* 70, 416, October 1927), on which map the watershed of the Muztagh-Karakoram Range has been dotted in according to the Workmans' map (*G. F.* 43, 232, February 1914), we plotted a ridge with a north-north-west trend, and carrying peaks 20,250, 21,300, 20,800, and 20,200. This ridge I then believed enclosed the Urdok Glacier on the east. The alignment of this ridge, if produced, meets the watershed in the vicinity of the Indira Col.

On the same map are shown the graticules of the three latitudes observed by Sir Francis Younghusband, when he was moving up the Urdok Glacier, mainly by its western lateral moraine. It will be seen that the direction of the glacier, where it is west of, and probably parallel to this ridge, and between latitudes $35^{\circ} 48' 05''$ and $35^{\circ} 45' 45''$ is in close accord with that shown on the sketch-map of Sir Francis. The distance between the two graticules is also reasonable, 3 miles in each case.

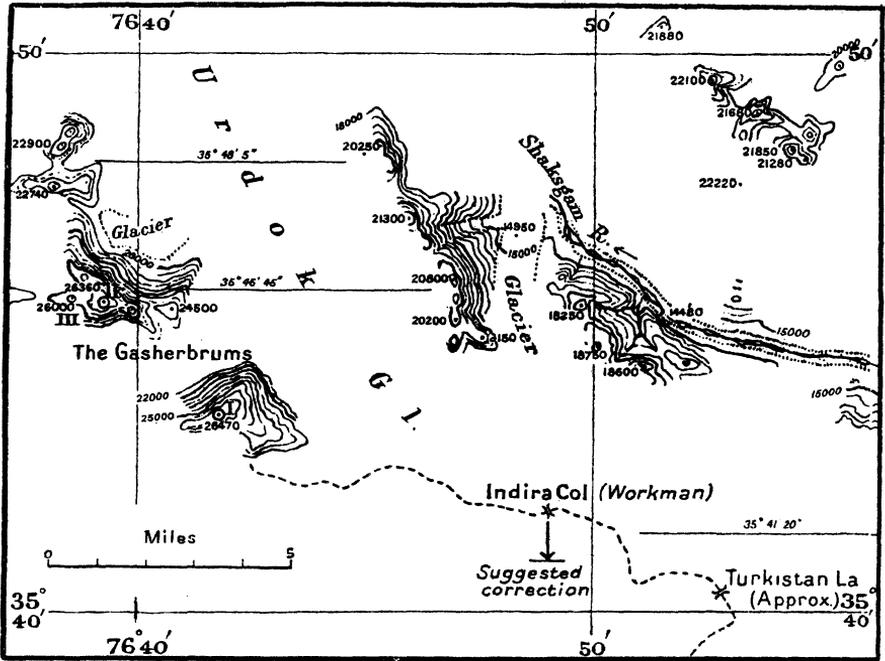
On the other hand, if the dotted line of the watershed is exact, the direction of Sir Francis' route from $35^{\circ} 45' 45''$ must bend east-south-east or almost due east, and must be almost parallel to the watershed. This is neither apparent from his map nor likely from his account. The route between latitude $35^{\circ} 45' 45''$ and $35^{\circ} 41' 20''$ must also be at least 9 miles, which I believe is much too far to be covered in one day on such ground, and in the bad weather experienced by Sir Francis.

The glacier whose lower reach was pinnacled and is shown on my autograph map in longitude $76^{\circ} 49'$, east of the ridge mentioned above, is ruled out of the discussion by the fact that it joins the main valley south of latitude $35^{\circ} 48' 5''$, which was observed by Sir Francis at the end of his first march up the Urdok, whose lower reach is hummocked with moraine.

Now if we assume that the Indira Col is south of the last latitude taken by Sir Francis, viz. $35^{\circ} 41' 20''$, we can fit in the head of the Urdok Glacier to suit all considerations. It must be remembered that the upper

portion of the Siachen Glacier basin was not surveyed by Grant Peterkin, nor by any one else. I have in my possession a note by Peterkin that the Workmans' map here is unreliable, being sketched from photographs. Any one who knows the extreme difficulty of judging distance when walking over soft snow at high elevations, will readily allow that a mile error in the *estimation* of a distance on the ground or from a photograph is very easy to make.

If we accept this position of the Indira Col, then "the large glacier flowing north-north-east," which was seen from it, is the Urdok. The "long splintered rock-ridge" is the continuation of the ridge surveyed



Part of the map illustrating Major Mason's Stereographic Survey of the Shaksgam (G.F. October 1927)

by us and mentioned above.* One source lay about 5000 feet below the Indira Col, at an altitude of about 15,500 feet,† while to the west, on the eastern flanks of Gasherbrum I is another.

The "wide-trunk" glacier, seen from the Turkistan La, and joined by a short crevassed glacier below the saddle, is probably the glacier

* Sir Francis Younghusband describes this ridge thus (*Proc. R.G.S.* 14, 212): "The mountains on either side of the valley (*i.e.* the Urdok), especially on the eastern side, are extremely rugged and precipitous, affording little or no resting-place for the snow, which drains off immediately into the glacier below."

† Workman, whose hypsometer height of Indira Col was 20,860, reported the glacier below to be about 5000 or 6000 feet below. The height of Sir Francis Younghusband's last camp on the glacier was recorded by him as 15,355.

whose lower reach was mapped by the Autograph in longitude $76^{\circ} 49'$.* The "grand group of peaks" to the south-east is, I believe, none other than the Teram Kangri group, looming up through the clouds, and appearing closer than they actually were.

The high ridge containing the three lesser Gasherbrum peaks throws a long spur northwards. We mapped and contoured this with the Autograph for a distance of 4 miles. I have identified points on it in the stereoscope with points in the photograph taken by Sella and shown as Panorama F in De Filippi's book of the Abruzzi expedition. This is the ridge that divides the Urdok Glacier from the glacier which drains the area between the Gasherbrums and Broad Peak, and which was seen by the Duke of the Abruzzi's party from the Sella Pass.

Sir Francis mentions three branch glaciers entering the Urdok from the west. One of these drains the southern slopes of Gasherbrum; the second drains from between Gasherbrum I and Gasherbrum II, III, IV. The head of a third was plotted by us immediately north of Gasherbrum II. We may compare these western glaciers of the Urdok, and its precipitous eastern wall, with those of the Kyagar Glacier which we surveyed accurately on the 1 : 50,000 scale in the Autograph.†

There may be an eastern head of the Urdok swinging round from the Turkistan La and separated from the Indira source by the "triangular massif" mentioned by the Workmans, in the same way that the two promontories—or "triangular massifs"—of the Apsarasas divide the head basin of the Kyagar. But if this is so I am inclined to believe that the Workmans' map shows the Turkistan La too far east by at least a mile. But this last depression cannot possibly be the "Younghusband saddle," for it faces east, and would not be seen until the triangular massif had been rounded by Sir Francis.

I am convinced that Sir Francis was ascending the ice-slope at the northern foot of the Indira Col, when he was finally checked by a crevasse.

* This glacier was seen by Sir Francis, *vide Proc. R.G.S.* 14, 210: "Another glacier could be seen to the south."

† See the reduced map of the Kyagar Glacier on the same sheet accompanying my paper in the *Geographical Journal*.