

yet I found wild poplars still vigorously growing about the site, and the aspect of the desert beyond suggested that during the summer floods the water of the Chīra river must reach, either in small open channels or as subsoil water percolating close to the surface, much further northward. Dandān-Uiliq lies about 36 miles beyond Uzun-Tati, but I do not think this distance alone would have prevented effective irrigation, seeing that both the Chīra river and those now watering Gulakhma and Domoko come down from a snowy range rising to over 21,000 feet. Being all glacier-fed they must carry a volume of water which, if properly caught and united, would, perhaps, even now suffice to penetrate the desert to the latitude of Dandān-Uiliq. That south of the latter and at no very great distance stretches of ground still receive surface moisture at times was plainly indicated by Turdi's statement, who, when endeavouring to procure fodder for his starving pony, had come within half a day's march, say 6-8 miles, upon depressions with Kumush grass. I much regretted at the time that regard for the heavily-laden camels, and for the men who had suffered from a month of privations in the wintry desert, did not allow me to attempt the long march due southwards on leaving the site; for I have little doubt that the observations to be gathered in that direction would materially aid in deciding the question just discussed.

Other
solutions of
problem.

In the absence of detailed surveys and levellings even an expert in irrigation engineering might well hesitate to express an opinion as to the possibility of bringing a canal to Dandān-Uiliq from either the Yurung-kāsh or the Keriya rivers as they exist at present. Still less could we hazard an opinion in regard to earlier periods, when the conditions of the rivers, the desert sand, the climate, &c., may have differed materially. Yet so much may be safely asserted that, given river courses approximately the same as they are now, the distance over which any canal taking off from them would have had to be carried could not have been less than the distance between Uzun-Tati and Dandān-Uiliq.

Suggested
old course of
Keriya
river.

The settlement of the question at issue would be greatly simplified if it were possible to accept the assumption put forth by Dr. Sven Hedin according to which the Keriya Daryā flowed in old times in the immediate vicinity of the ruined site⁹. This assumption of the distinguished explorer was, so far as the record of the scientific results of his journey enables me to judge, based solely on the 'traces of old riverine terraces (Uferterrassen)' which he thought to have recognized quite close to the ruins, and on the observation of a present tendency in the Keriya Daryā to shift its course eastwards. The careful survey I was able to make of the whole site renders it certain that by the 'traces of old riverine terraces' can only be meant the shallow depression previously referred to, extending along the eastern groups of ruins in the general direction from SSE. to NNW. In regard to this depression I have already had occasion to adduce evidence showing that it is manifestly due to wind erosion¹⁰. Numerous similar depressions, bordered by sharply-marked loess terraces and also showing the same general direction, were crossed on the route between the Yurung-kāsh and Keriya Daryā in positions where their frequent recurrence excludes the possibility of a riverine origin¹¹.

Difference
of levels
between site

I do not think it necessary to examine in detail whether the tendency of an eastward shifting of the Keriya Daryā can be shown to be of old date, since there is a plain topographical fact

⁹ See *Reisen in Z.-A.*, p. 37.

¹⁰ See above, p. 242.

¹¹ Dr. Hedin himself, with his unfailing eye for all topographical detail, has duly noticed these regularly recurring terraces on the marches west of Dandān-Uiliq; see *Reisen in Z.-A.*, p. 36. He has there, however, also correctly stated

the reasons which make a riverine origin of these terraces distinctly improbable. The true explanation of these depressions and bordering terraces has since been furnished by Prof. de Cholnoky's observations on wind-cut trenches as recurring topographical features; see above, p. 242, note 1.