

of the Āltin-tāgh glacis.¹⁰ It is apparently in this bay that the depression reaches its deepest point, and here it may be supposed in earlier geological times to have received also the drainage from the terminal basin of the Su-lo-ho which adjoins eastward. Down the southern side of this valley and beyond along the clearly marked southern shore-line of the ancient sea, leads the difficult desert track from Tun-huang to Lop, graphically described by Marco Polo and still used by rare caravans during the few winter months when it is practicable.¹¹

Before leaving the Tārīm basin for regions further east a brief account may conveniently be given here of the small but geographically very interesting basin of Turfān north of the Lop depression, to which a good deal of our survey work was devoted in 1914-15. Quite detached from the Tārīm basin it shares so many of its physical characteristics that it appears like a small scale reproduction of it. As Sheet No. 28 shows, it is enclosed in the north by a rugged snowy portion of the T'ien-shan, rising to peaks over 14,000 feet in height, by an outlying range of the same in the west, and by utterly barren hills and plateaus of the Kuruk-tāgh in the south and east. Within these limits it contains a succession of well-defined zones exactly corresponding to the gravel glacis, the belts of cultivation and desert vegetation, and the dune-covered areas of the Tārīm basin.

The terminal sea-bed of the latter has also its pendant in the narrow salt lake, for the most part dry,¹² stretching along the south-eastern edge of the basin. Into its lowest portion at the time of the summer floods gathers whatever drainage from the mountains escapes evaporation. To the east of it we have a miniature edition as it were of the Taklamakān in the plateau-like area covered by high ridges of dunes known as *Kum-tāgh*, the 'Sand Hills'.¹³ Its position seems to be determined by the direction of the prevailing winds which as a result of 'aspiration' sweep down from the cooler region in the north-west when the great heat of the spring and summer causes the air to rise from the lower parts of the basin. A very remarkable feature of the Turfān basin is the depth of its terminal depression. Along the lake-bed above mentioned it descends to a level which according to our mercurial barometer observations lies in places close on 1,000 feet below the sea, while most of the principal oases lie also about or below sea-level.¹⁴

To the very high summer temperatures resulting from this low position may be attributed, at least partly, the peculiar conditions affecting the water supply of the basin and in consequence the cultivation in its oases.¹⁵ The streams which carry down the melting snows of the T'ien-shan in the spring and summer lose most of their water on the descent over the bare glacis of gravel. A portion of the water absorbed in the ground, it is true, comes to light again, like the *kara-su* of the Khotan region, in marshy springs at the northern foot of the low and utterly arid hill range stretching across the middle of the basin from east to west and dividing its cultivable area into two unequal belts.¹⁶

But this water supply, too, would permit of irrigation only over very limited ground were it not at the present time supplemented on a big scale by means of sub-terranean channels or '*Kārēzes*' which catch the subsoil water beneath the gravel slopes and carry it, protected from evaporation, over considerable distances to ground otherwise hopelessly sterile but under irrigation extremely fertile. The use of *Kārēzes* is unknown elsewhere throughout Chinese Turkistān, and in the Turfān district, too, it can apparently not be traced further back than the 18th century. Yet

¹⁰ See Sheets Nos. 32. C, D. 4; 35. A. 4.

¹¹ See *Serindia*, ii. pp. 549 sq., 560 sqq.

¹² See Sheet No. 28. C, D. 3.

¹³ See Sheets Nos. 28. D. 3; 31. A. 3.

¹⁴ See Sheet No. 28. C, D. 3.

¹⁵ These and other physiographical aspects of the Turfān oases have been lucidly discussed in Professor E. Huntington's *Pulse of Asia*, pp. 306 sqq.

The physical features of the Turfān basin as a whole will be fully treated in the paper which I hope to prepare for publication along with a detailed map based on the one-inch survey of the central area of the territory.

¹⁶ See Sheet No. 28. C. 2, 3, D. 3, for springs near Murtuk, Singim, Su-bāshi, Lamjin; Sheet 31. A. 3 for those in the bed above Pichan.