

down from the mountains, it is evident that irrigation dependent on them can nowhere suffice for the creation of a large oasis.

Irrigation of
Khotan
oasis.

Irrigation within the Khotan oasis has to contend with none of these difficulties and losses. It begins as soon as the deep-cut valleys of the two rivers widen out sufficiently for strips of cultivation on either side.¹¹ The large canals, taking off from the rivers at points as close below their *débouchement* as the situation and level of the tracts to be irrigated demand, lie throughout within the cultivated area and can thus be kept in working condition without great efforts. The relative height at which the heads of these canals are established, and the marked slope of the great loess beds, make it possible for their water to be distributed not only over the whole area between the two rivers for a length of close on twenty miles, but also to be carried for considerable distances to the east and west of this 'mesopotamia'. Thus the large village of Lop on the eastern edge of the oasis lies fully sixteen miles from the nearest point of the Yurung-kāsh which supplies its irrigation. Similarly on the west the water of the Yawa-Üstang, a more or less natural channel fed from the Kara-kāsh, could easily be utilized for irrigation at a lateral distance quite as great, if only there were a sufficiency of population for such extended cultivation.

Abundance
of available
water-
supply.

With the exception of a few enclaves left uncultivated either through want of agricultural labour or else owing to the appearance of springs, which when inadequately drained render the soil marshy¹², the whole of the area extending from Zawa in the west to Lop in the east, and varying in width from eight to twenty miles, presents the appearance of a fertile and thickly populated oasis. But it is certain that the cultivation of this tract, large even within its present limits, does not by any means absorb the whole supply of water available. Even in the early spring, when the rivers are at their lowest and water is particularly needed for the first crops, irrigation demands never quite exhaust the river-beds. Little if any of the spring water (*kara-su*) which comes to the surface in the above-mentioned marshes, and in the numerous 'Yārs' to be discussed below, is used to irrigate fields. Of the water carried in the enormous floods which descend the two rivers from June to August, only an insignificant amount can be utilized in the extant irrigation canals, while the rest is allowed to fill the broad beds of the rivers and to pass on into the desert.

Wider limits
of ancient
cultivation.

How much of this abundance of water might be spread by flood-canals over the sandy expanse north of the present oasis, and how much of this great area might be thus reclaimed for cultivation, must in the absence of systematic observations and surveys remain a matter for conjecture. But in view of the extensive ruined sites examined by me to the north-east of the present oasis, up to a distance of fully sixteen miles from the nearest point of the latter, and of similar traces towards the north-west, it is certain that the extent of cultivated ground in the ancient oasis of Khotan must have been very much greater¹³. Taking the conditions of the present day it may be safely asserted that it is not deficiency of water, but mainly the inadequate number and slow growth of the population, coupled with certain shortcomings of

¹¹ Popuna on the Kara-kāsh and Kara-yantak on the Yurung-kāsh, respectively, are the villages from which continuous cultivation begins.

¹² Marshy ground is found, e. g., at Uzun-sholok, west of Khotan town; at Halāl-bāgh (*Aiding-Kul*), south of Hanguya; and north of Zawa. Waste patches of ground overrun by light (and fertile) 'sand' are, e. g., the Palamās-kum near Tasmache and the ground about Hanguya-Langar.

Traces of earlier cultivation are plentiful in both the latter localities, and re-colonization is now slowly proceeding.

¹³ See below, chapter xiv, regarding the extensive and almost contiguous 'Tatis' of Ak-sipil and Hanguya spreading over square miles; also the ruins of Rawak and the débris area of Jumbe-kum. For the 'Tati' of Kara-döbe to the north-west, see chapter xv.