

fully rounded and polished grains, such as only long-continued subaerial attrition can produce, clearly distinguishes the substance of the dunes around Khotan (and I may at once add, at all the ancient sites examined by me elsewhere) from the true drifting sand of other Central-Asian deserts¹⁵.

Natural
fertility of
drift-sand.

Whether the material constituting these dunes has always been gathered and shifted by the winds directly from the alluvium of the river-beds, or whether a considerable portion of it may have to be traced back to beds of alluvial loess eroded by the action of the desert winds, is a question which, however interesting from a geological point of view, we need not consider at present¹⁶. It is only important to note here that the danger which these dunes represent for cultivation on the outskirts of the Khotan oasis does not arise from any sterility in the 'sand' itself, but from the obstacles which its appearance in great masses necessarily offers to continued irrigation.

Zone of
desert
jungle.

The desert of drift-sand which so abruptly skirts the northern edge of the oasis is for a considerable distance not altogether devoid of vegetation. As the subsoil water, especially during the time of the summer floods and the periods immediately following, is relatively near the surface, tamarisks and some scrub manage to grow between the dunes. Where occasional inundations from the rivers or the canals penetrate into this zone their beds remain clothed with the hardy Kumush grass for years. The wild poplar (Toghrak), too, would no doubt manage to grow plentifully in this adjacent belt of desert did not the constant demand lead to the speedy cutting of any young trees that can serve for fuel or timber. Thus it is only several marches below the northern edge of the oasis that we meet, on the banks of the united Khotan river, with that luxuriant belt of jungle which flanks the river bed down to its junction with the Tārīm. It is probable that the same causes had already in ancient times made the desert in the vicinity of the great oasis look even more bare and desolate than it would be by nature.

Mountain
region S. of
Khotan.

Turning now to the south, we find the oasis bordered by a mountain region which in some respects is more barren and forbidding than the true desert itself. The account contained in my Personal Narrative of the expedition I made towards the headwaters of the Yurungkāsh¹⁷ renders unnecessary any detailed description of the inhospitable ranges which succeed each other from the gravel-covered slopes of the outer hills to the glacier-crowned watershed towards the Ak-sai-Chīn and the high plateaus of the Upper Kara-kāsh. Nor do the views of scenery which are included among the illustrations of the present work stand in need of much explanation. That they are truly typical of this sombre mountain world, which looks as if

¹⁵ Prof. Lóczy notes particularly the striking difference in this respect between all my 'sand' specimens from the Khotan region and those he collected himself from the dunes of the Gobi near An-si-fan and Tung-huan-hsien in Kan-su.

¹⁶ I regret that my want of previous geological training prevented me from collecting on the spot such observations and specimens as would suffice for a full determination of this question. As points which may possibly have a bearing on the question, I may note that in the vicinity of the Khotan oasis, and elsewhere, too, in the Taklamakān, I found the dunes usually highest along the river courses (see below my accounts of Ak-sipil and Rawak; also *Ruins of Khotan*, pp. 329, 412, 447, 451); and further that the appearance to

the naked eye of the sand of the high dunes around Rawak and Ak-sipil suggested the prevalence of coarser grains and a still greater abundance of mica than in the 'sand' composing the dunes at other old sites.

In view of the geological problems to which my attention has been called since those explorations, it is a matter of special regret to me that the small collection of specimens which I was able to submit to Prof. Lóczy does not include any sand from dunes situated in parts of the Taklamakān far away both from the rivers and the ancient sites. It thus remains doubtful whether the above noted absence of true drift-sand applies to the whole of the desert region visited by me.

¹⁷ See *Ruins of Khotan*, pp. 206-43.