

into the Yeh-ma Ho, one of the tributaries of the Tang Ho. The great volume of the latter is sufficiently proved by the fact that on April 5, 1907, its bed, where it passes outside the town of Tun-huang, carried no less than about 2,100 cubic feet of water per second, even though at that time the big canals of the oasis, which take off above the town and close to the river's debouchure, were all full to overflowing.¹¹ They were equally full during the latter half of May when I returned from the Limes, by which time the volume of unused water passing down the river-bed had appreciably risen. Yet this is just a period when the rivers irrigating the southern oases of the Tārīm Basin, e.g. in the Khotan region, fall very low after the passing of the spring flood, and do not suffice to fill more than a small proportion of the canals at one time.

Extent of
cultivable
area.

It may, I think, be safely concluded from these and kindred observations, rough as they necessarily are, that the amount of the water-supply in the Tang Ho at present available for irrigation is considerably larger than is required for the now cultivated area of the oasis. It would also more than suffice if this area were extended so as to include the large strips of ground, both within the oasis and outside its present limits to the north and east, which have only been abandoned since the time of the Tungan inroads. From the depopulation which they left behind the oasis is but slowly recovering, and want of labour still retards the reoccupation of considerable tracts obviously fertile and well commanded by existing canals. Without more detailed surveys, for which there was not adequate time, it would be impossible to give the approximate extent of all the lands thus abandoned in the sixties of the last century, and still awaiting reclamation. It would be equally impossible to arrive at any conjectural estimate as to the total area outside the present oasis which might have been cultivated during ancient times, when there was a population large enough to make full use of the available resources for irrigation, and when political conditions were such as to assure safety and economic development.¹²

Alluvial fan
of Tang-Ho.

There are two more physical features favouring Tun-huang cultivation to which attention may be drawn here in conclusion. It is a great advantage that, owing to the slope, soil, etc., of the alluvial fan, the large volume of water brought down by the Tang Ho can be utilized for irrigation almost from the river's debouchure. This makes the safe construction of canal heads much easier, and at the same time prevents the serious loss of water through evaporation and percolation which must take place wherever canals, owing to the configuration of the ground, have to be carried over considerable distances of bare gravel 'Sai' before they reach soil suitable for cultivation. The other important advantage is that the alluvial fan formed by the Tang Ho extends sufficiently far, before meeting the Su-lo Ho bed at right angles, to afford adequate space for using most, if

¹¹ I measured the discharge at the bridge facing the western city gate. The width of the bed actually carrying water was about 120 feet, with an average depth of three to four feet. The current flowed 100 yards in 52 seconds. The width of the river above and below the bridge was far greater, indicating the much increased volume of the summer flood.

¹² Peculiar conditions on the surface of the ground adjoining the present limits of the oasis make it difficult to trace remains which might help to mark its earlier extension. To the east, where the ground would have made it likely in ancient times, being composed of fertile alluvial loess, subsoil moisture is abundant, and this, together with the luxuriant scrub which it supports, does not favour the survival of remains of such structures of sun-dried bricks and timber as Chinese villages and towns usually contain. The almost total disappearance of structural remains within the walled

towns of the An-hsi tract, abandoned only in the last century or two, affords striking evidence of this. The same cause prevents wind-erosion on this ground and the appearance of 'Tati' remains on the surface.

To the north, in the delta of the Tang Ho, remains of earlier occupation may have disappeared through inadequate drainage of the canal ends, which has caused the ground to be water-logged at certain seasons and produced the bare salt-encrusted steppe shown on the map (No. 78. D. 3). When in March, 1914, I traced the continuation of the Limes over the previously unsurveyed gap (Map No. 78. C. 3) to the west of the Tang Ho, I came upon fertile strips of ground, with old towers and ruined farms, between freshwater marshes formed by the overflow of the canal ends and inundations from the Tang Ho. Here, too, no structural remains of ancient date or traces of earlier canals could be expected to survive.