

the Tarim basin has been uptilted in Quaternary time, and it may be said that this tilt gradually increases mountainwards, so that a horizon nearly flat in its far-out extension is bent up to 10° or 15° and more near the mountains. Besides this general marginal tilt, there have been more local movements in the form of broad anticlinal arches nosed up, each with a transverse fault-scarp facing mountainwards and surmounted by its anticlinal surface sloping gently back into the plain. These "up-nosed" piedmont strata, bent behind and faulted out in front, some of them rising as high as 500 feet out of the plain, range about parallel to the bordering mountains and are found even as far out as Kashgar.

EVIDENCE OF RECENT CHANGE TO EXTRA DRY.

The last great change over the Tarim basin has been one of desiccation. Of this we have both physiographic and historic records, which tell that it became serious about a thousand years ago, when some hundreds of cities were overwhelmed by sand. Some of these ruins were excavated by Stein, and Mr. Pumpelly found mention of them in Chinese literature in the imperial archives of Peking. It is also believed there were then expansive bodies of water of which Lob-nor and other shrunken lakes and brackish tarns are the withering survivals. During the time of greater precipitation much of the great area of dunes throughout Tarim was doubtless grassed over, and we may thus ascribe its burial of cities to sand set free when rainfall had so seriously decreased that grass failed and left the dunes bare and free to drift.

TENTATIVE RECONSTRUCTION OF THE PAST IN TARIM.

First cycle (Pliocene).

The Tarim basin defined with high border ranges eroding to mature topography and building immense piedmonts of gravel, sand, and silt.

Second cycle (Quaternary).

Uplift of border ranges, with deep gashing of old topography and sinking of plains, with upbending margins worn down by streams beveling their tilting strata, with an erosion plain and the building of a later piedmont over that.

Third cycle (Quaternary).

Second uplift of border ranges, with terracing down of valleys partially alluviated ere the close of the second cycle, and marginal tilting up of plains with dissection of their second-cycle piedmonts? Shrinkage of alluviation at close of the glacial period and recession of silt zone over gravel zone.

Fourth cycle (Postglacial).

Third uplift of border ranges with stream-channeling of valley flood-plains of glacial alluviation during the third cycle, and more sinking of plains with tilting and dissection of their third-cycle piedmonts.

Recent decrease of precipitation, shrinking of rivers and lakes, and desolation of dune pastures, setting free the sand that buried the cities of Tarim a thousand years ago.