

ment on the South Kurgan and the city of Anau were both founded during the last aggrading. The arid period between the two last aggradings coincides with the long abandonment of the South Kurgan between the copper and iron cultures, and the previous arid period coincides with the interval between the North and South Kurgans. Lastly, in addition to the agreement shown in the rise and decline of civilizations, we have confirmation from the biological side in the progressive stunting of the breeds of domesticated animals, as shown by Dr. Duerst, which, according to him and to Nehring, is due to insufficient food and to desert conditions.

We have no direct observations as to whether the valleys are now deepening on the zone of tilting in the present period of aridity, because under irrigation the silts are all held up, and alluviation is artificially maintained up to the apex of the deltas.

It would be of great interest to know whether these cycles were of proximately equal periodicity. Unfortunately, the two critical factors in the problem, depth and rate of valley-cutting, are wanting. Penck has shown that the last of his four ice-epochs of the glacial period was followed by a series of lesser though great oscillations of diminishing intensity; and it is thought that the oncoming and passing of each glacial epoch was marked by climatic oscillations of respectively increasing and decreasing intensity. Our cycles at Anau covered periods of between 3,000 and 4,000 years' duration. Oscillations of such magnitude would seem to belong in the order of phenomena of mundane extent and possibly of astronomic relations. The question may be risked, I think, whether they may not be fainter vibrations in a series, diminishing in intensity since the last of Penck's oscillations.

The argument contained in this chapter, and represented graphically on plate 5, is based on observed facts and on the writer's inferences drawn from these facts. As facts of observation, we have in three neighboring sites an aggregate of 170 feet of culture-strata of uniform character belonging to the distinctly different cultures of five separate and successive occupations. That part of the argument which establishes the parallelism between the physical and human history of the region, rests upon observed parts of three periods of aggrading with two intervening periods of cutting-down of the valley. The aggradings are drawn in full lines in each case opposite that part of the culture-strata during the accumulations of which the aggrading took place. These full lines represent, therefore, the minimum depth of valley deepening, the observed amount and maximum height attained by aggrading, and its duration measured in feet of contemporaneously accumulating culture-strata. It will be observed that the essentials of this part of the argument consist in the observed aggradings, represented by full lines, and length of cycles. Plate 5 tells us the history of the oasis of Anau free from the writer's inferences, but it is desirable that some things previously stated be repeated at this point.