

type Ia. But the significant features in this section that may be comprehended at a glance are, first, the order of succession; second, the stratigraphic unconformity; and third, the relatively small thickness of water-laid deposits.

Beginning with culture-strata, we come face to face with several problems. Ghiaur Kala was a great city and one of fame. Its ruined walls inclose an area of more than 1.5 square miles, wherein there still remains a plateau of the débris of civilization rising to a height of over 50 feet above the surrounding desert, while the citadel itself attains a height of nearly 90 feet. Did occupation of this whole area begin on virgin ground, or was a part already occupied by some more ancient town when the greater city was laid out? Or, in either case, was the inner city founded at the same time as the whole? And after the whole city was laid out with its present outlines, was it occupied continuously till abandoned, or was it abandoned and reoccupied one or more times?

In the shafts, as in the main excavations, there was found no sharp transition showing change of culture, and no one of them passed from culture into irrigation. Moreover, if there had been a town there before, we should expect to find its pottery or some trace, such as charcoal or ashes, in the natural sediments under irrigation and culture-strata, as was invariably the way at Anau; but such is not the case. Though our evidence is in part merely negative, the city of Ghiaur Kala seems to have been founded on a desert surface of sand-invaded loess-steppe, partially buried in alluvium, and irrigation seems to have started simultaneously with it. And the fact that genuine culture-strata attains the same thickness above the citadel's foundation as it does in the plateau of the outer city is evidence pointing to a simultaneous occupation of both.

With irrigation deposits we find that 12 feet is apparently the average depth, surprisingly little when considering the antiquity attributed to Merv; 15 feet was the average at Anau and we had thought of Merv as an oasis of such ancient importance that it must have introduced irrigation long before, and, with the whole Murg-ab to draw upon, been able to maintain bountifully rather than sparsely watered gardens from the beginning. Then what is the explanation of its shallowness? Obviously we must choose between three possibilities—either the rate of growth was less, or irrigation was introduced later, or it was in no given area carried on so uninterruptedly here, as at Anau. Surely there is silt enough in the river to give a growth as rapid as the Anau, and Ghiaur Kala was founded earlier than irrigation is supposed to have been introduced there. We are driven to the conclusion that the gardens of Ghiaur Kala were of a wandering sort, shifting out and back and sideways around the city, according to complications in the canal system and conditions of soil. Large areas are in our days from time to time abandoned for fresh land on account of the efflorescence produced by prolonged irrigation with saline water.

Natural sediments fall next in the order of antiquity. They lie directly under culture and irrigation silt and over dunes and loess. Here, again, we are surprised by shallowness. Except for the interesting masses of obviously rapid formation that appear to fill depressions of the old loess topography in shafts 6 and 7, the