

Irrigation sediments are of course far more widespread than culture, while between them there is a gradation which may be termed garden culture—sediments arising from the concentrated irrigation of gardens in and near a city and thus more rapid in growth than those of ordinary fields and containing many artefacts. These are all well exposed in gullies near the citadel of Anau. Irrigation stuff proper is at first hard to distinguish from natural alluvium, its stratigraphically differentiated equivalent, and even after long experience utmost care must be given to their separation. If all fields of cultivation had been continuously irrigated till abandoned, there would be no trouble, but this was not always so. In the graveyard shaft, we see how an area, after having aggraded 9 feet under irrigation, was abandoned to natural forces long enough for 2.5 feet of laminated clays to accumulate, after which it was again cultivated during the upper 11 feet of growth. It took about 10 hours' hard work to make sure how deep irrigation was in that shaft. No stratification can result on a cultivated area unless it be abandoned long enough for natural sediments to accumulate a greater thickness than is disturbed by subsequent hoeing or plowing, which is 4 inches and more. At its base irrigation stuff is often found containing fragments of natural sediment, below which are remnants of the original plow or hoe trenches. A characteristic mass of irrigation stuff contains all sediments utterly undifferentiated except for the gravel and coarser grit concentrated here and there in bottoms of canals from time to time abandoned and buried by irrigation through new canals. It is thus a homogeneous mass of sandy clay. The limits of such accumulations, both ancient and modern, have been described. Though varying in thickness from 10 to 25, the average appears to be 15 feet.

Natural alluvium directly underlies irrigation sediments. Of that penetrated by our shafts there appear to be three epochs of growth, differing in structure and kind and separated by two erosion intervals as indicated in sections of unconformity. During the first of these, our delta appears to have been a wind-swept flood-plain, which through inequalities of growth from time to time gave rise to shifting grassy areas left isolated from alluviation for so long that wind-blown material accumulated on them in various degree. Such appears to have been the first epoch state with its resulting interbedded gravels, grit and clays and homogeneous loess, which were penetrated with two shafts at the North Kurgan and two at the South. Some change took place and the delta was divided by a valley, how deep we do not know. Then began our second-epoch growth of pure, hard, laminated clays interstratified with beds of gravel. Probably ere the North Kurgan was founded this new epoch had aggraded its valley flood-plain and refilled its delta valley to within about 8 feet of the delta's old first-epoch surface, as traces of culture are found in all shafts down to this horizon, but nowhere below. This growth was of pure, hard clay, banded and finely laminated; blue when wet and yellowish when dry; it appears to bottom on a basal bed of semi-angular gravel, and to have ultimately risen nearly high enough to overflow the whole delta; that is, till the delta valley or channel was filled practically flush.