

opinion as to the age of cultures which have as yet yielded to us no equations that are solvable solely by archeology. Further on I shall attempt to show that this region of primitive civilizations had a very early and wholly independent evolution.

The copper culture of the South Kurgan (culture III) ends at 60 feet above the base. Its upper limit is well shown in Dr. Schmidt's sketches (fig. 37), where there seems to be evidence of a conflagration followed by a period during which the hill was not occupied and the ruined clay house-walls were dissolved and washed down to effect a rough leveling of the surface. Our geologico-physiographic observations show that the climatic oscillation was then near the arid extreme, and that a long period ensued during which the kurgan was not occupied.

#### CULTURE IV.

Overlying the remains of the copper culture (III) on the main part of the kurgan there are layers aggregating 12 feet in thickness which form the present capping of the South Kurgan. On the northern extension there is an aggregate of 20 feet of strata above the copper culture. In both places the lower 8 feet is represented by material of a different character from that both below and above. This material differs in character from the culture-strata. On the top of the kurgan much if not all of it seems to represent the products of wastage during abandonment. Upon this *débris* was built the later settlement of the iron culture. Since the final abandonment of the site the progress of wastage has covered the declivities of the kurgan with the products of wastage in which are represented material from the iron period, from the copper period, and from the intervening period of non-occupation. This 8 feet of intermediate *débris* contains some rough, hand-made pottery, which in places is associated with wheel-made pottery of the kind that is peculiarly characteristic of the overlying iron culture (IV). For this reason Dr. Schmidt has designated this lower member the "mixed layers." He adds that the relatively small amount of finds from this zone on the northern extension seems to indicate a period with little or no occupation. Overlying this "mixed" member there are on the summit of the kurgan 4 feet of pure iron culture still remaining, while on the low northern extension this is represented by 12 feet rich in artefacts. Iron was found in a considerable number of fragments, but, with perhaps two exceptions, they were too much wasted by oxidation to make their use evident. The exceptions were apparently parts of sickles, and on them we find the first evidence of the use of rivets for securing the tang to a haft. Among the few objects of copper or bronze that were found was the three-edged copper arrow-point that is fully discussed in Dr. Schmidt's concluding chapter. The lateness of the appearance of iron in the series of Anau cultures is due, I think, to a period of alternating abandonment and occupation by barbarians following upon the end of the copper culture. According to Herodotus the nomads of that region did not have iron in the fifth century B. C.

I have shown in the sketch of physiographic events that toward the end of the copper culture there existed a climatic change towards aridity, and that a reaction in the opposite direction was in progress before and during the period of pure