

time encroached upon by dunes which it rose to bury. We have a value of 17 feet for the growth of the plain since it had risen to the level of the bottom of our shaft; a minimum value for the antiquity of the sand, because it is a long time since the last alluviation of this area. For at least many thousand years it must have been a region of outlying dunes.

ANALYSIS OF SHAFT SECTIONS OF THE DEPOSITS FROM MAN, WATER, AND WIND.

(See Plates 66-69.)

The moment that deeper layers are explored a host of problems arise. In our shafts, ranged on curved lines on plate 2, and on the profiles on plates 66-68, we penetrated four distinct kinds of growth, that of man's débris, that of his irrigation, that of natural alluvium, that of loess, and adding to them the flying sands of outlying dunes we find our plain is built of five divisions of deposition under the forces of man, water, and wind. It will be observed that there is a perfect gradation between the different divisions and subdivisions.

Man.....	{	Culture débris.....	{	Kurgan culture: Slow growth of clay débris rich in pottery, bones, and charcoal.
		Irrigation sediments...	{	Walled culture (that of fortified citadels): More rapid growth of clay débris less rich in pottery, bones, and charcoal. Garden culture: Growth of irrigated fields near a city; contains some artefacts.
Water....	{	Natural sediments (alluvial).....	{	Undifferentiated sandy clay deposited under continuous irrigation of annually plowed fields.
		Wind-swept flood-plain deposits.....	{	Interbedded irrigation and natural sediments (the result of cultivating a naturally flooded area at rare intervals). Series 3: Laminated clays, sandy clays, sand and gravel. Series 2: Pure, hard, banded clays and beds of angular gravel with grit.
		Dune-sand.....	{	Series 1: Interbedded loess, blown sand, and alluvium. Soft, velvety clays, clay-banded loess, grit and gravel.
Wind.....	{	Loess.....	{	Fresh dunes of pure loose sand (drifting). Dune-sand interbedded with the delta margins. Ancient dunes of firm sand mixed with loess particles (fixed). Loess mixed with wind-blown sand. Loess, pure homogeneous, of vertical cleavage, with small gypsum crystals.

Over 150 hours were spent underground in sketching the shaft sections here reproduced, and, in addition, fully half that amount of time was given to the study and comparison of samples taken out. Each shaft was scaled all the way down with levels scratched from a tape line, its layers cut clean by a long knife and studied with the light of an acetylene lamp, and characteristic samples taken out in solid blocks up to a foot high. Afterwards the material in these samples was studied under a microscope.

Culture remains are easily distinguished by their pottery, bones, charcoal, clay bricks, and various artefacts. In amount they vary from isolated artefacts found as fossils in wind and water deposits to the massive accumulations left by towns. It was found that such remains when *in situ* of original deposition were invariably associated with bits of charcoal, whereas those afterwards shifted by water or wind, or gravity alone, are nearly always utterly without charcoal; a truth explained by the fact that a material so light as charcoal is inevitably borne far beyond its heavier associates, such as potsherds or bones.