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GEOLOGY AND PREHISTORIC ARCHÆOLOGY OF THE GOBI DESERT¹

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55.1, 79(51:7)

The Third Asiatic Expedition, from the beginning of explorations in the Gobi desert region, has hoped to find somewhere the record of prehistoric man. Finds that could be linked definitely with features or deposits of known age were not discovered on the first reconnaissance. But the geologic factors that enter into the problem were partially solved, and it was fully appreciated that in the absence of caves and cave deposits, and in the absence also of glaciation and glacial deposits, it would be necessary to search for regularly formed sedimentary strata of late geologic time, which might carry the record. Such formations had not been clearly identified before, although there was reason to believe that they might exist, so the Expedition determined to give special attention to this problem during the field season of 1925.

GEOLOGY

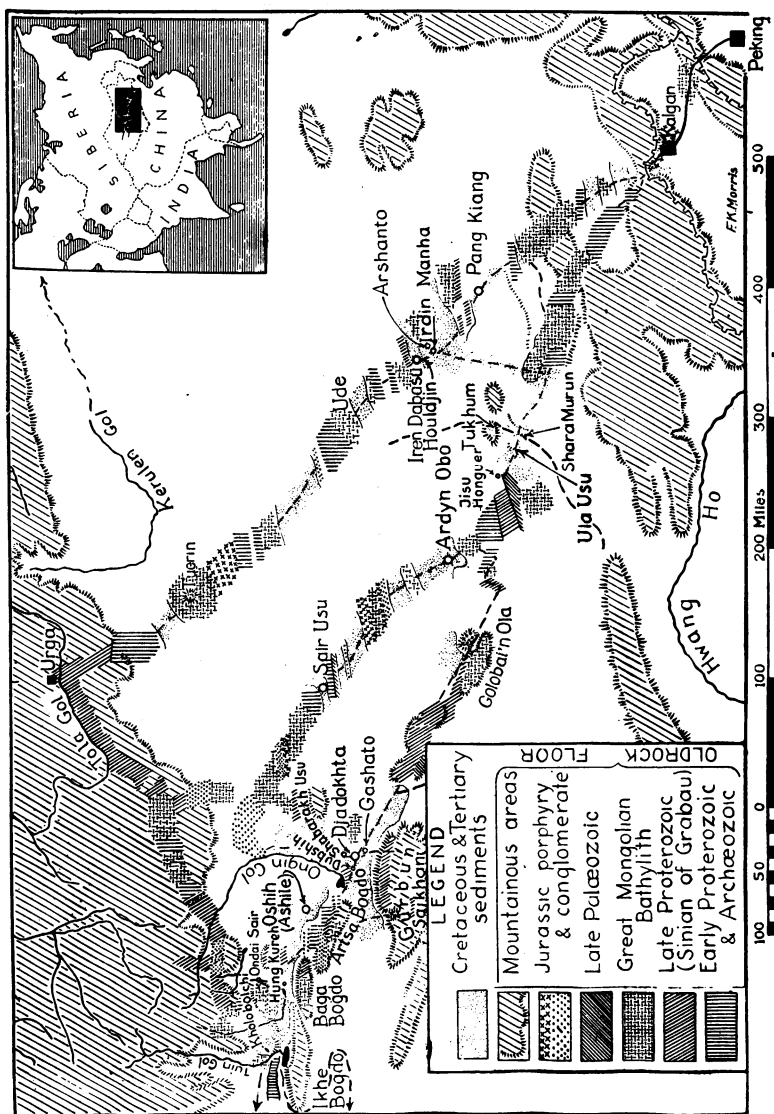
BY CHARLES P. BERKEY

In earlier announcements,² attention has been called to the dominance of Pleistocene and Recent erosion. Valleys made by former streams and hollows made by the wind may be seen on every side. Erosion on so large a scale must have been accompanied by deposition of the same material elsewhere; yet if such deposits were found they might furnish little evidence. Localities exhibiting recent deformation must be sought because only such places present the special conditions favorable to dissection and exposure.

Selective erosion, especially erosion by wind, would, of course, favor the residuary accumulation of heavy indestructible materials on the surface, including both those permanently exposed and those formerly covered. Any of the present-day surfaces, therefore, could

¹Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 67.

²Berkey, Charles P., and Granger, Walter, 1923, 'Later Sediments of the Desert Basins of Central Mongolia,' American Museum Novitates, No. 77, May 25. Berkey, Charles P., and Morris, Frederick K., 1924, 'The Peneplanes of Mongolia,' American Museum Novitates, No. 136, October 16. Berkey, Charles P., and Morris, Frederick K., 1924, 'Basin Structures in Mongolia,' Bull. Amer. Mus. Nat. Hist., LI, Art. 5, October 7.



carry traces of man; and a mixture of artifacts, representing a succession of cultures, is likely thus to be found together without any means whatever of separating them into definite stages or attaching them to definite horizons. Where the underlying strata are old, no special problem arises, but in places where Quaternary or Recent deposits form the floor, the additional problem is presented of determining how much of the surface find is residuary and therefore to be dated with the strata of the floor.

On account of these possibilities few of the finds have a simple history. The great majority are mixed lots, and at some of the most prolific sites several depositional horizons are represented in the residuary material left from extensive selective denudation. In places, however, where erosion has left a particularly irregular surface, exposing considerable thickness of deposits, the geological conditions are favorable for artifacts to be found in situ.

By all means the most promising localities for such finds, accompanied by adequate geological evidence, lie in the basins bordering the north side of the Altai ranges from the Gurbun Saikhan on the extreme east to Ikhe Bogdo 200 miles farther west. This is a region of very late deformation resulting in repeated renewal of mountain uplift and local depression, both of which tend to increase erosion and corresponding deposition. Here deposits of Pleistocene age were laid down under especially favorable conditions.

In addition there are other deposits, not related to deformation at all, wholly due to the work of wind and water under varying conditions of changes of climate. Such deposits link the story with the present time, for the same processes are still operative, shifting from deposition to erosion or from erosion to deposition with each cyclic swing of the pendulum of climatic change.

These are the general geologic conditions under which all of the human traces have been found in the Gobi. Deposits that bridge the time interval of major archæologic interest have been found, and their geologic relations and meaning are determinable, so that the physical conditions of the time can be read. There are no caves or shelters. Every artifact is either in the open or involved in deposits of regular sedimentary formation.

Under more detailed analysis one can distinguish five types of conditions presented by these features as follows:

TYPE 1.—Localities of ancient strata characterized by surface finds only.

All areas underlaid by ancient rocks and by strata older than the Pleistocene, or possibly the Pliocene, belong to this type. These strata were accumulated before

human artifacts were available, so that there was never any chance of their being buried in the sediments of the time. No matter how many successive peoples may have occupied these localities, the different cultures must be mingled in a more or less confused surface accumulation whose thread of history is so tangled that it cannot be unraveled. There is no way of associating the different elements with definite geological formations so as to determine their age.

Such a locality is that of Jisu Honguer, about 300 miles northwest of Kalgan. The rock floor is Paleozoic strata and the still more ancient graywacke series. There are no Tertiary, Quaternary, or Recent deposits except the thin patches of soil. There are traces of human cultures on the surface, but there is no geological way of determining their age, because the present surface is the product of very much longer time than is represented by the whole succession of cultures.

TYPE 2.—Localities characterized by surface finds only, but where the immediate floor consists of Pleistocene deposits.

In localities where strata of late geologic age form the floor, surface finds have a greater potential significance. This is especially true where the present surface has been produced by long erosion, for it is clear that artifacts found on such a surface might have been exhumed by the agents that have been removing the strata. In that case the artifacts must be at least as old as the strata of which they formed a part. It is equally true, of course, that such materials might always have been on the surface, not having been at any time a part of the sedimentary formation. In the latter case they are younger than the strata, and may belong to any age from that time down to the present day.

It is of prime importance, therefore, in this type of locality to discover, if possible, whether or not there are artifacts of this kind still buried in the undestroyed portion of the strata. Failure to find such content in situ does not necessarily prove that they do not belong there, but it leaves one in a state of uncertainty as to their age.

Kholobolchi Nor is a locality of this kind. Very primitive forms (eoliths) and paleolithic artifacts were found here on the surface. The underlying strata are of Pleistocene age. The area has been undergoing erosion probably ever since mid-Pleistocene time. There are great numbers of residuary fragments left lying on the present surface, mixed of course with other fragments that were never buried. The primitive character of the artifacts, together with the known Pleistocene age of the strata, lead one to believe that this culture material may have been covered up there with the sediments as they were deposited. It would be a most important step in age determination if some of the artifacts could be found in place, but thus far in this locality they have been found on the surface only. Because of the age of the strata and the primitive character of the finds, this is one of the most important localities yet found in the Gobi region. It deserves a more extended inspection directed specifically to finding these artifacts in place in the Pleistocene strata. The probabilities are that they belong there, and that those found on the present erosion surface are essentially residuary.

TYPE 3.—Localities characterized by surface finds only, where sedimentary deposits of Recent age form the floor.

In occasional places with special surroundings, deposits of Recent age have been accumulated. By reason of a change of physical condition, some of these deposits are undergoing erosion at the present time. Many of these localities furnish artifacts on

the surface. It is clear that here again there is more or less uncertainty about the age of the materials. They are necessarily all Recent because even the floor is of that age; but whether the finds belong to the deposit and have been exhumed, or belonged originally to the surface, and have been let down, as the floor was etched out beneath them, one cannot determine unless an occasional artifact can be found in place. Evidently the surface finds may have any age from that of the sedimentary deposit itself down to the present day.

There are many small localities, or sites, of this kind, especially along the bottoms of ancient valleys where a portion of their later history includes a stage of valley filling and sand dune development. Such a locality is Dubshih, north of the Gurbun Saikhan on the Kobdo trail, 20 miles west of Djadokhta.

TYPE 4.—Localities characterized by separable Pleistocene members and Recent deposits where as yet no artifacts have been found.

The type locality for these conditions is the north side of Baga Bogdo mountain range in the Hung Kureh district. There, some of the vicissitudes of Quaternary times have been registered in a striking series of reversals of geologic processes. There have been epochs of deposition, marked by the development of enormous alluvial fans derived from Baga Bogdo extending many miles out into the bordering basins, alternating with corresponding epochs of erosion and dissection when trenches and even large valleys were carved into and across the deposits. Deformation accompanied some of these changes and this aided materially in producing the critical structural conditions that now make interpretation possible.

With these factors one can make out at least two epochs of prominent deposition alternating with epochs of erosion or dissection. The earliest of these alluvial deposits as thus defined carries early Pleistocene fossils. Both of the deposits must be of Pleistocene age, but the second has not thus far furnished faunal evidence. The epochs of erosion are believed to correspond to the times of the ice advance, or principal glacial epochs of Europe and America. These ought to be times of cooler and more humid climate on the whole in northern Asia also. But the interglacial epochs are believed to correspond to the times of maximum alluvial fan development due to reduced stream flow and greater aridity. The last important erosion epoch in central Asia is judged to represent conditions corresponding to the last glacial advance of the Ice age. The deposits formed since that epoch, which have partly covered the valley bottoms of that time, are judged to be Recent, and they carry the record to the present day.

Here at the base of Baga Bogdo is a great series of deposits probably more than 2000 feet in total maximum thickness, physically separable into at least three members, covering portions of the Age of Man, distributed from early Pleistocene time to the present, which offer exceptional opportunity for exploration. If man lived there during this time, the geologic conditions were favorable for recording his history. Nowhere else in the Gobi region have we seen such a readable display of modern geological deposits.

TYPE 5.—Localities characterized by finds both on the surface and in situ.

Such conditions are rare, but they have greater interpretative possibilities than all others together. The type locality for this region is Shabarakh Usu, 700 miles northwest of Kalgan on the Kweihwating-Kobdo caravan trail, in the Djadokhta district in the central Gobi. Others of less prominence were inspected.

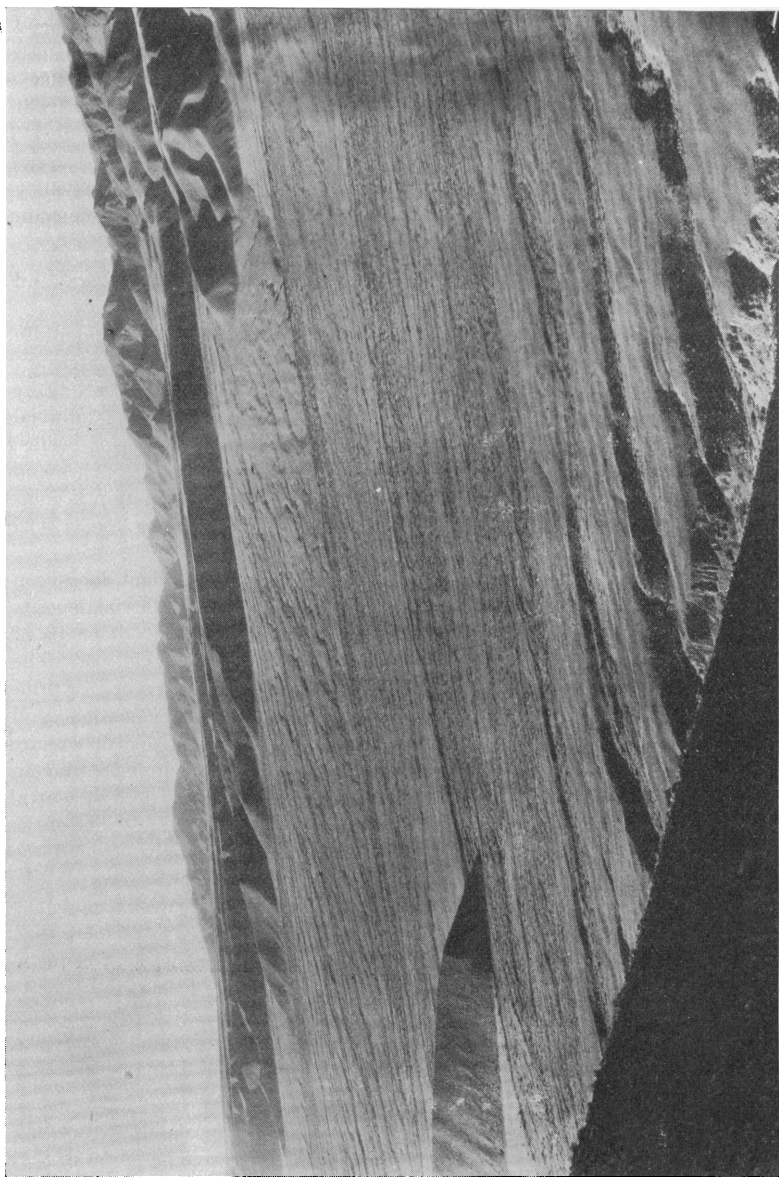


Fig. 2. Alluvial fans of the north side of Baga Bogdo. Hung Kureh lies on the outer margin of these fans. There are three epochs of fan building, two of Pleistocene age and one Recent, separated by two epochs of erosion. No artifacts have as yet been found in these deposits.

At Shabarakh there is an ancient river valley eroded to a depth of over 400 feet below the general level of the Gobi planation surface. It could not have been made under present climatic conditions. There must have been enough of a stream in some former time to do this work. Now there is no stream at all. Closer inspection shows that the sediments, now well exposed by present-day erosion, which is accomplished chiefly by the wind, are not the same as those forming the sides of the valley into which the river trench is cut. Whereas the strata of the valley side carry dinosaur bones of Cretaceous age, these sediments in the valley bottom carry only fragments of modern forms and human artifacts. The differences in lithologic character of the two lots of sediments throw further light on the matter. The valley bottom material exhibits evidence of deposition under rainwash and torrential conditions alternating with spells of wind action, and with development of dune sands as time went on. The lower beds are therefore dominantly torrential sands, alternating with silts laid down in small ponds of standing water, whereas the higher beds show more and more the features of wind-blown material.

Topographically the valley bottom shows certain abnormalities also. The cross profile of the valley is not regular, and the longitudinal profile and gradient are likewise more irregular than one would expect for a valley eroded in uniform sediments. These irregularities suggest obstruction of the valley by deposits of some kind.

Clearly the whole series of observations, coupled with those made in the adjacent Altai Mountains, which there is not space to discuss, support the following explanation. The original Shabarakh valley was eroded to its maximum depth under much more humid conditions than the present. There was enough rainfall to maintain an active river, and to support vegetation on the valley slopes, which were thus protected from excessive rainwash and under these conditions maintained a smooth outline. But there came a permanent change of climate that has prevailed with only minor variations ever since that time. The region became more and more arid and there was insufficient water to maintain enough of a stream to continue valley erosion. Increasing aridity resulted in destruction of vegetation, so that the valley slopes became bare and thus lost their protection against attack by the infrequent rains and the more constant winds. The occasional rain storms therefore caused excessive wash of soil from the steep valley sides, and this debris collected in the valley bottom, whence it could not be removed by the reduced stream. In the intervals between storms, the winds whipped the dried sands about and piled them into dunes and shifted them along the valley bottom, thus adding to the irregularity of distribution. This combination of processes must have continued for a long time, for the valley bottom became more and more heavily covered and obstructed with these deposits.

The increasing aridity resulted first in the loss of permanent stream flow, but for a time there were still struggling intermittent streamlets and transient pools dammed in by the obstructing wash from the valley sides. In these pools the finer sediments were collected, but ultimately even these ponds were dried up, so that there was water only occasionally after a storm or during the rainy season. Finally, after layer upon layer of such deposits had been accumulated, the climate became so much more arid that even the rainwash from the valley sides was not sufficient to balance the destructive work of the wind, which, with perhaps increasing vigor, continued its attack on the lower sands. So effective and dominant had wind erosion become by this time that the finer sands were carried entirely out of the valley, and the attack continued on the underlying deposits. Thus erosion has continued with

short periods of reversed conditions down to the present day. This deposition history, followed by the reversal of operations from deposition to erosion, is fully recorded in the bare and much-dissected remnants of strata, where one can see every structural detail.

These are the deposits in which and on the surface of which the artifacts registering the occupation of man have been found at Shabarakh Usu. A primitive race of men lived in the valley bottom along the course of the ancient stream. As the conditions changed on the last great cyclic swing toward a warmer and more arid climate, they gathered into the valley bottom, the only place where water could be obtained, and in this way they held out for a long time against the increasing privations of the encroaching desert. Repeatedly the sites of their hearths and workshops were flooded and overstrewn with wash from the hillsides due to a sudden storm, and the products of their workmanship were covered to become part of the permanent sedimentary deposits. Such experiences must have continued for some thousands of years, until the accumulation filled the whole valley bottom to a depth of probably a hundred feet.

The deposits formed during this time, therefore, carry evidences of the culture of a long period of time. In this connection it is especially important to note that the artifacts of the lower beds are of a much more primitive type than are those in the upper layers. Not by any means all of the original deposits are exposed to inspection; the oldest and lowest beds are still covered and the highest ones have been destroyed; but a cross section of the intermediate members is open to inspection. As a consequence, of course, the earliest stages of the human history of the locality cannot be read here because the records are still buried; but the later steps are marked by finds still in place in successively higher and higher layers of deposits; and the very latest stages, which must have been recorded in overlying beds that are now destroyed, are mixed together in the jumble of residuary débris left from the selective erosion work of the wind. At such places these relics of the handiwork of prehistoric man may be found literally by the thousand.

This is the geologic situation at Shabarakh, and it is duplicated more or less fully, but usually very imperfectly, at many other places. When the conditions represented here are compared with those of the Altai range, where former alpine glaciation gives some clue to geologic age and structural relations, the following order of events seems to be established:

1ST STAGE.—Deep valley erosion during the last Glacial epoch whose influence was felt in central Asia. This process came to a halt with the advent of Recent climatic conditions. If we may accept the European estimates of time and assume that the last alpine glaciation in Asia corresponds to the last great ice advance in Europe and America, these climatic changes must have been introduced at least 25,000 years ago. They may indeed date back very much farther.

2D STAGE.—Establishment of Recent climatic conditions with change also from processes of valley erosion to those of deposition by rainwash in the valley bottom, covering relics of man's workmanship.

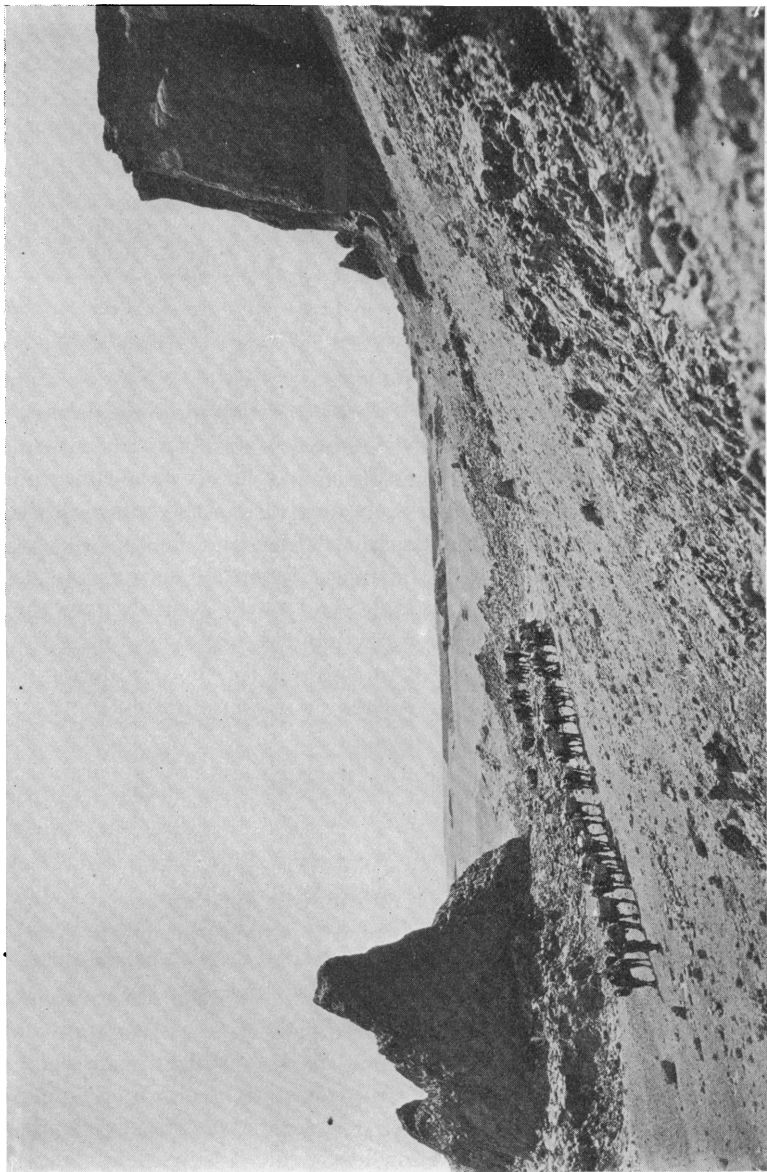


Fig. 3. The south margin of Shabarakh valley showing the red Cretaceous sandstone cliffs of the Djadokhta formation in the foreground and some of the Recent valley fill in the middle ground.

3D STAGE.—Gradual development of so great aridity that the processes were reversed and wind erosion was established on large enough scale to expose a considerable thickness of valley bottom deposits. During this stage the Dune Dwellers of Shabarakh disappeared.

4TH STAGE.—From that time to the present day many minor changes are recorded with epochs of deposition alternating with epochs of wind erosion. In the surface material many other evidences are recorded, including the cultures of all the races that have peopled and repeopled the Gobi region since it was abandoned by the Dune Dwellers of Shabarakh, who occupied it at the close of the Ice age.

ARCHÆOLOGY

By N. C. NELSON

The Gobi Desert probably never offered any outstanding material attractions to primitive man. Dependent as he was largely on the natural resources of his immediate surroundings, he could scarcely have ventured into the heart of a region so comparatively destitute of the bare necessities of life—edible plants and animals, water, fuel, and shelter—except perhaps for brief intervals during the most favorable seasons of the year, such as late summer and early fall. And at the best of times the adventurer could hardly have come empty-handed, not even during the Stone age; for the rock substances at all suitable for the production of tools and weapons were almost entirely lacking or were limited to a few pebbles of argillite, quartzite, and some rather brittle and intractable quartzes. The sparse native population of to-day, in spite of appearances, has in reality most of its wants supplied from the outside. Yet even so, our Expedition on occasion traveled as much as seventy-five miles across barren black waste without observing the slightest indication of human existence; and in this type of environment our own party, short of ammunition and the other contrivances with which our culture furnished us, would have quickly perished.

Nevertheless, leaving out of account for the moment the present mobile and partially self-sustaining Mongol inhabitants, we were not the first explorers to enter this great arid inland basin. 'Almost' everywhere along the one thousand miles of the Expedition route, from the Khingan mountains on the southeast to the outlying ranges of the Altai system on the northwest, we discovered more or less evident superficial traces of one or two prehistoric cultures; and once within sight of the Altai, not only did workable artifact materials, such as jasper, chalcedony, and agate, become in places very abundant, but the evidences of

long-standing occupation became gradually more and more apparent. The bulk of the archæological remains still lay scattered for the most part on the geologically ancient land surfaces, out of which they could not have weathered; but the types of things occurring were sufficiently differentiated to be distinguished as belonging to a succession of cultural horizons, some of which had ranged practically over the entire territory covered by the Expedition. Before long, however, we discovered, in no less than seven widely separated localities, the industrial remains of two of these horizons, more or less deeply imbedded in old stratified wind deposits, as described by my colleague; and ultimately, at Shabarakh Usu, about seven hundred miles out on the route, we obtained these two closely related cultures in stratigraphic juxtaposition, proving beyond a doubt their time relationship and also their approximate antiquity.

In attempting now to differentiate and to characterize the archæological data found in Mongolia this season, I have no choice but to follow the European systems of classification and terminology, and in this place a mere inventory must suffice as to actual description. All told, we found traces, in the Gobi desert and its border regions, of six cultural horizons, five of which are of commonly recognized prehistoric date, as follows:

I. **EOLITHIC.**—This commencement stage—in which I personally take little stock—appears to be well represented in a number of places in Mongolia, especially in the region of Orok Nor. Here, on an old erosion surface, composed of Quaternary gravels, lie thousands of fractured boulders and pebbles, more or less weathered but showing successive stages of flaking. A large number of these splintered pieces assume artificial form and character, even to the extent of now and then showing the bulb of percussion. In addition, nearly all of them exhibit more or less retouched margins, a succession of chips having been removed much after the manner of true Mousterian technique. Yet the obviously varying ages of the chip beds leave no doubt that the specimens are the veritable product of natural forces still at work.

II. **UPPER PALEOLITHIC.**—Implements of this and earlier epochs were looked for in vain in the eastern and central portions of the Gobi, where, if present, they should have been visible on the surface, as no Pleistocene deposits were there identified. As it turned out, no positive traces were found except in the Orok Nor region, in fact on the same Quaternary plateau surface mentioned above in connection with the eoliths. There is this difference, however, between the occurrence of the eoliths and the paleoliths, viz., there is some reason for believing that

the latter may have weathered out of the gravel formation on which they rested; though none were actually removed from any appreciable depth. Another probable site is the high plain lying between Ulan Nor and the Artsa Bogdo mountains; but identification is here complicated by the fact that the region was a great source of raw material in later times, and thus our problem becomes one of distinguishing crude but finished implements of an early date from unfinished implements of a late date. The identifiable objects include:

1. Choppers or large scrapers of Mousterian type.
2. Oblong primitive flakes of Mousterian type.
3. Double end-scrapers of Aurignacian type, besides
4. A number of unfinished nondescript forms.

III. MESOLITHIC.—This stratum alone yields a combination of traits which, so far as known, may be termed distinctively Gobian. Moreover, its normal occurrence in old, dead, and indurated sand deposits, named by Messrs. Berkey and Morris the Shabarakh formation, is so striking and distinctive that we venture to designate it the Shabarakh culture. The stratigraphic position of this Shabarakh culture makes it positively pre-Neolithic; and the chipped stone (mostly red jasper) artifacts, by which alone it is known, in several specific details conform closely to the Azilian flint industry of western Europe. The inventory is as follows:

1. Hammerstones, mostly roundish adaptations. Scarce.
2. Cores, or nuclei, crude, multifaceted, angular, and spherical. Numerous.
3. Cores, or nuclei, slender, oblong, cylindrical to conical in outline with sometimes a sharp projection on one side adaptable for cutting purposes. Numerous.
4. Flakes, various forms, broad angular or subtriangular, with no retouch or indication of use; serviceable as knives, etc. Derived from Core No. 2. Very numerous.
5. Flakes, long, slender, prismatic, and often very delicate, with little or no retouch or sign of use; suitable as drills, graters, knives, etc. Derived from Core No. 3, by pressure process. Very numerous.
6. Perforators, produced by trimming or secondary chipping of flakes from either of the above groups. Rare.
7. Retouched flakes, various forms, of uncertain purpose but of use as knives or scrapers. Moderately numerous.
8. End-scrapers, small, mostly thumbnail size, round to oblong, some double-pointed, distinctly Azilian. Very numerous.
9. Disk beads of *Struthiolithus* egg shell (occasionally dinosaur egg shell) in all stages of preparation, from rough angular fragments to drilled and ornamented examples. Finished forms scarce.

IV. NEOLITHIC.—This stage is an outgrowth, with modifications and additions, of the preceding Mesolithic. The two agree also, for the

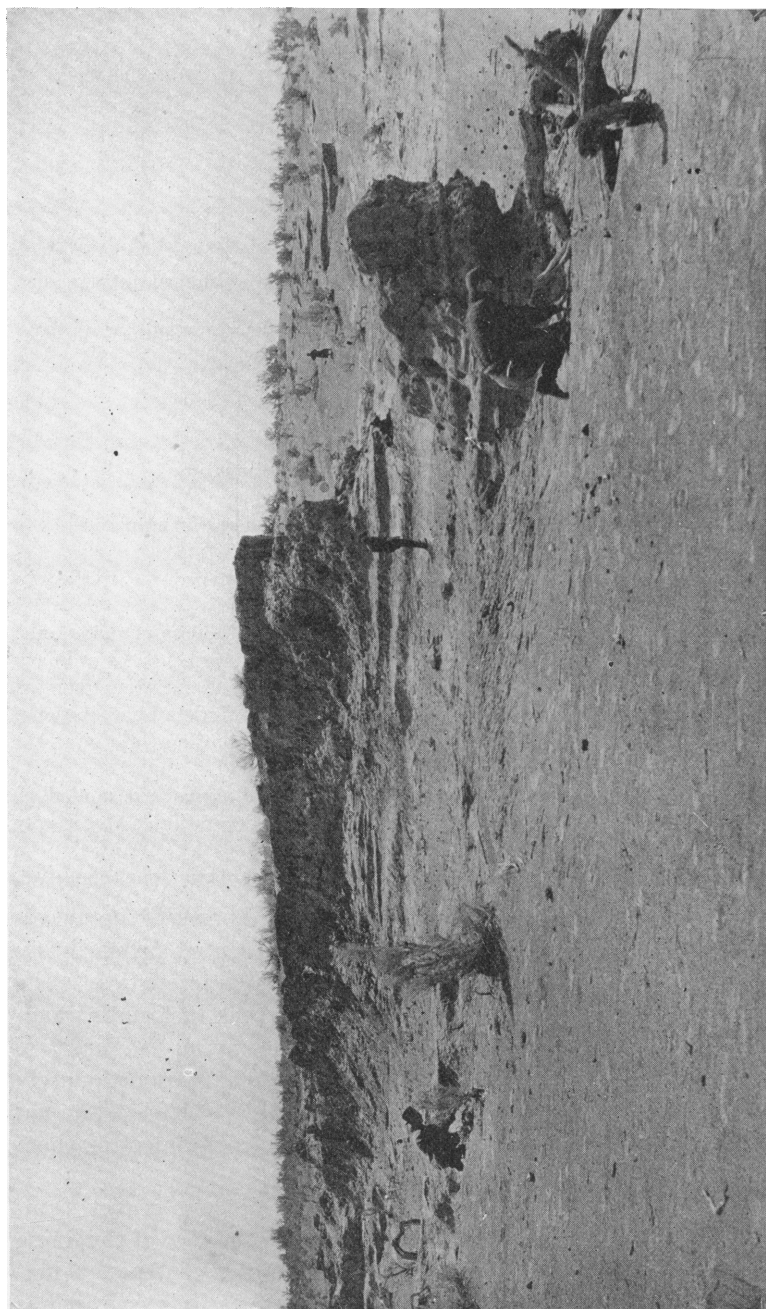


Fig. 4. The Shabarakh formation at Shabarakh Usu in the Djadokhta district.

This is the spot where the first artifacts were found in place. The light sandy sediments represent Recent valley fill due to change of climate from humid to arid conditions. These are now being removed by the work of the wind, leaving thousands of artifacts on the surface as residuary materials.

most part, in mode of occurrence; but the geographic range of the later Neolithic horizon would seem to be considerably greater. The outstanding traits include the following:

1. Hammerstones, ordinary, roundish. Scarce.
2. Grinding slabs of stone, thin, rubbed surface. Scarce.
3. Rubbing stones, flat, oval outline. Scarce.
4. Mortars, globular. Scarce and even doubtful.
5. Celts or axes, flaked surfaces with slight amount of polish near cutting edge. Scarce.
6. Adzes or gouges (perhaps scrapers with curving edge), chipped surface. Scarce.
7. Cores—as under III, 2. Numerous.
8. Cores—as under III, 3. Moderately numerous.
9. Flakes, ordinary—as under III, 4. Numerous.
10. Flakes, prismatic—as under III, 5. Moderately numerous.
11. Perforators—as under III, 6. Moderately numerous.
12. Worked or retouched flakes—as under III, 7. Moderately numerous.
13. End-scrapers—as under III, 8. Rather scarce.
14. Side-scrapers or choppers, elongated and disk-shaped. Moderately numerous.
15. Blanks or roughly flaked but unfinished implements. Moderately numerous.
16. Spear-points or knife-blades (mostly represented by fragments) of ordinary Neolithic form and finish, i. e., chipped in Solutrean style on both surfaces; more or less lanceolate, with straight, convex, or stemmed butt ends. Moderately numerous.
17. Arrow-points of small, often delicate, subtriangular outline, with straight, concave, convex, or stemmed butt ends. Rather scarce.
18. Potsherds, color gray to brick red; surface plain, string-marked, incised, or stamped with geometric patterns, some laid on or modeled decoration. Moderately plentiful.
19. Hearths, with the usual accompaniments of ashes, broken stone, bone, etc.

V. METALLIC.—This final, somewhat detached phase of the successive prehistoric developments in the Gobi is represented primarily by remains of distinctly monumental and pictorial characteristics. The “monuments” consist of rectangular and circular rock inclosures, ranging in dimensions from 3 to 150 feet across. Occupying the larger of these inclosures are cairns or conical rock-heaps of proportionately smaller diameters, but with heights varying from 3 to 8 feet. Actual investigation of several of each of the four types proved most of them to be or to have been burial places.

The pictorial feature, obviously associated with these graves, comprises a series of interesting pictographs, pecked on the face of the living rock, usually in the immediate vicinity of the tombs. Although uniformly crude in execution, these representations are easily recognized as of the realistic type, and include delineations of human beings, camels,

horses, and cattle, as well as of the stag, antelope, ibex, and mountain sheep—some of which game animals are now absent from certain of the localities under consideration. Perhaps the most suggestive figures, recurring in a number of widely separated places, are those of a man holding or leading a horse by a cord and of a man shooting with the bow and arrow. The legitimate inference seems to be that the people who raised these stone structures, or at any rate those who made the rock pictures, used the bow and arrow and that they had at least the horse domesticated.

For some time this strange combination of cultural traits constituted a puzzle. Petroglyphs of the type indicated usually belong to the Stone age; yet there were never any stone artifacts lying about near either the rock pictures or the burial structures. Also it was difficult to believe that man of the Stone age had had the horse domesticated. The only sane conclusion seemed to be that we were dealing with a culture based on wood and metal, like that of the present Mongol inhabitants. But the Mongols consistently denied all claim to both pictures and mounds. Sometimes they called the latter "bolosha," or treasure places, and admitted that they occasionally dug into them and found vessels and other objects of gold, etc. Our own efforts in this respect proved fruitless, however. We found skeletal remains of a brachycephalic people, but no artifacts whatever by which to date their culture. Not until the last week in the field, at a point barely 300 miles out on the route, did we open up a grave in which a number of normally perishable objects had been preserved. The list of accompaniments follows:

1. Wooden bowl of the type used by the present-day Mongols.
2. Saddle, neither Chinese nor Mongol in form but strangely like our McClellan.
3. Iron and leather (?) trimmings for saddle, almost completely decayed.
4. Quiver, of birch bark.
5. Bow, small, of compound type, made of three pieces of wood lashed together.
6. Arrows of solid wood and of reeds tipped with wood at both ends.
7. Arrowpoints of iron, mostly large, celt-shaped, with cutting edge forward. Badly corroded.
8. Textile fabrics, from body cover and also from turban-like headdress.
9. Animal bones, evidently remains of food placed with the corpse; etc., etc.

These meager data do not warrant any precise conclusions about this interesting culture. But some things are certain. The cairns marking its graves range over at least the larger portion of the Gobi, while the petroglyphs are found only in places where fine smooth rock exposures occur and therefore as a rule only in localities of at least moderate relief.

The more conspicuous rock tumuli are also naturally to be found in the mountainous districts, particularly in the piedmont regions of the Mongolian Altai. Strange to say, these remains give all the appearance of very considerable antiquity, yet must be of relatively recent date. For the culture is obviously not an outgrowth of the preceding localized Neolithic horizon of Shabarakh affinities, but is rather a foreign importation and probably an expansion of the remarkable mound culture of Bronze and Iron age times uncovered by Russian investigators in the Upper Yenisei country across the Altai. As such, its Mongolian antiquity can scarcely exceed 2000 years, and it may well have served to give character to the present Mongol culture.

VI. MONGOL.—It is only for the sake of a certain completeness that one ventures any remarks on the earlier stages of this surviving culture. The Mongol complex, whatever the date of its local beginnings, is presumably in no strict sense to be regarded as prehistoric. Moreover, its material traits were based so largely on perishable media that practically no important elements have been preserved. Even skeletal material is not available because the dead were seldom if ever interred, so that no cemeteries exist.

Certain sections of the Gobi landscape, to be sure, are dotted with dark brown spots, often marking long-abandoned winter camps. Semi-circular and sometimes rectangular corrals, made of heaped-up stones or brush, are not uncommon. Hearth-sites, represented by a few small boulders in close juxtaposition, are seen everywhere on the steppes. Small open shrines of stones laid in a rough circle and furnished with various magic-working paraphernalia occur in specially selected places. Natural cave-shrines, furnished sometimes a little more elaborately, are occasionally met with. And, outnumbering all other items, are the ever-present obos, ranging from small shapeless rock heaps to large and moderately well-formed structures. But all of these typically Mongol features, while doubtless of some antiquity and commonly in an advanced state of neglect or abandonment, are being reproduced at the present time and therefore have little that is new to tell about past times. The same is true of the old camp sites. Fragments of worked wood, antler, broken glazed crockery of Chinese manufacture, an occasional whetstone, etc., lie around. That is all. In the course of the season a single small cave was excavated, which proved to have been occupied for a brief period by the Mongols. But although the time of occupation may well have been quite distant, the few objects found were of strictly modern type. The archæology of the Mongol culture in the Gobi is simply non-existent.