Reports

Ghar-i-Mordeh Gusfand (Cave of the Dead Sheep): A New Mousterian Locality in North Afghanistan

Abstract. *The Middle Paleolithic of Central Asia is little known and less understood. Several sites have been excavated in Soviet Central Asia, but few have been adequately presented. Recent excavations in north Afghanistan may throw new light on the problem because of the size of the rock shelter involved and its relative geologic dating.*

During a survey of caves and rock shelters near Gurziwan, Afghanistan (at approximately 35°40′N; 65°15′E), in August 1969, Louis Dupree, Nancy Hatch Dupree, and Sadeq Farasi (representative of the Institute of Archeology, Ministry of Information and Culture, Royal Government of Afghanistan), sank three sondages (all 2 by 3 m) at Ghar-i-Mordeh Gusfand, a huge limestone rock shelter, with an interior surface area of approximately 300 by 100 m. The height at the entrance overhang is about 50 m above the surface. The location of the shelter is indicated in Fig. 1.

The shelter was formed by internal rock falls, apparently initiated in the southern part of the shelter where jointing is more strongly developed. The shelter expanded in a northern direction as larger, less jointed blocks fell. The limestone roof is thick-bedded (about 2 m) and separated by shaley-limestone units that are 15 to 45 cm thick and that exhibit well-developed cleavages. The extent of the shelter, its height above present drainage, and the thickness of the fill are roughly comparable with other shelters in northern Afghanistan for which radiocarbon dates are available. Such a comparison indicates that the shelter and its associated deposits may be 40,000 or more years old.

Although the sun enters the shelter for only an hour or two in August, modern nomads shun the area because of a local legend. About 100 years ago, a massive roof fall in the cave is said to have killed several hundred sheep (hence the name we have given the shelter) and a shepherd. Another shepherd managed to escape to tell the tale.

Sondages 1 and 3, near the center-rear of the rock shelter, yielded only pottery of the historic and protohistoric period (see *1–3*). Loess deposits were encountered above 2.5 m, where rock falls finally forced the termination of excavations in both sondages at a depth of about 3 m.

Sondage 2, near the south-center of the shelter, presented a totally different stratigraphic sequence down to a depth of 5 m, where the workmen could go no deeper because the size of the test pit decreased to 50 by 50 cm. The excavators exposed a series of differentiated cave gravels, which showed evidence of periodic extensive erosion and truncation. No distinct loess levels or major rock falls occurred in sondage 2.

For millennia, loess from Central Asia has been deposited by winds on the northern plains and foothills of Afghanistan. The absence of a thick loess overburden in sondage 2 in the Cave of the Dead Sheep is almost unique among cave sites in northern Afghanistan (*1*, *4*). The geographic location of the shelter may help explain this phenomenon. The shelter is located 9 km north of Gurziwan, well above the perennial river Rud-i-Chashmah-i-Khwab, at the southern end of a narrow gorge. The shelter faces west, and thus the shamal (local name for the north wind that transports the loess) whips past the entrance, occasionally swirling in the low point of the back-center, where it deposits some loess by settling, but leaving the cave gravels on either end relatively free from windblown deposits.

Sondage 2 yielded an interesting series of siliceous limestone cores, flakes, and flake tools, which occurred in two distinct strata: between 2.00 and 2.60 m, and between 3.50 and 4.00 m. Two bones occurred in association with the upper phase. One, an unidentifiable long bone implement, was pointed, with four longitudinal man-made grooves leading to a jagged, pointed end (Fig. 2, No. 33). The second bone was a small, fragmentary sheep or goat mandible.

The implements in both strata varied little typologically, and duplicates can be found in the siliceous limestone industries at such Soviet Central Asian sites as Teshik Tash (*5*), Aman-Kutan (*6*), and Kyzylnura I (*7*), among others. In 1959 and 1962, Dupree examined much of the Russian material and visited Aman-Kutan with the excavator, David Lev. The similarities between the Russian specimens, particularly those from Teshik Tash, are very striking.

Similarities to the Darra-i-Kur Mousterian (*3*) in Badakhshan, excavated by

Table 1. Comparison of illustrated stone artifacts from Gurziwan and Teshik Tash. Numbers listed under Gurziwan refer to illustrations in Fig. 2 of this report. Figure and page references under Teshik Tash are taken from Movius (*5*).

Artifact type	Gurziwan	Teshik Tash
	Cores or nuclei	
Levallois flake core	1–3	
Prismatic flake core	4	Fig. 7: 14, p. 33
	Massive implements	
Hand-ax type	5, 6	Fig. 8: 17, 19, p. 35
Chopper type	7	
	Flakes	
Large oval or elongated	8–15, 17–21	Fig. 9
Limace type	16	Fig. 9: 38, p. 37
Flake blade	22	Fig. 9: 27, p. 37
	Ordinary scrapers	
Scraper on transverse edge	23	Fig. 10: 42, p. 40
	Points	
Levallois type	24–27	
Flake-blade unretouched	28–30	Plate VII: 9
	Artifacts with graver-type retouch	
Snapped angle burin	31	cf. Fig. 11: 59, p. 41
	Trimming flakes	
Small side-struck trimming flake	32	No illustration, see discussion, pp. 42–43

Dupree in 1966, do exist, but the Darra-i-Kur implements are made of an impure, blackish flint, a type unknown in the region south of Maimana.

A comparison of the specimens found at Ghar-i-Mordeh Gusfand (Gurziwan) with the specimens shown in Movius' excellent critique of the Teshik Tash assemblage (*5*) is given in Table 1.

Most of the artifacts have nonfaceted striking platforms. Since siliceous limestone lacks the excellent concoidal fracturing propensities of flint, bulbs of percussion, bulbar scars, and concentric ripples, though present, are not well developed. Two of the Levallois cores (Fig. 2, Nos. 1 and 2) lack well-defined faceted platforms, but all three (Fig. 2, Nos. 1–3) exhibit evidence that preparatory flakes were struck around the perimeters of the cores.

Massive implements included hand-ax types (Fig. 2, Nos. 5 and 6) and cleavers (Fig. 2, No. 7). Both illustrated hand axes are bifacially flaked; the cleaver has a sinuous working edge. The single possible limace (Fig. 2, No. 16) is im-

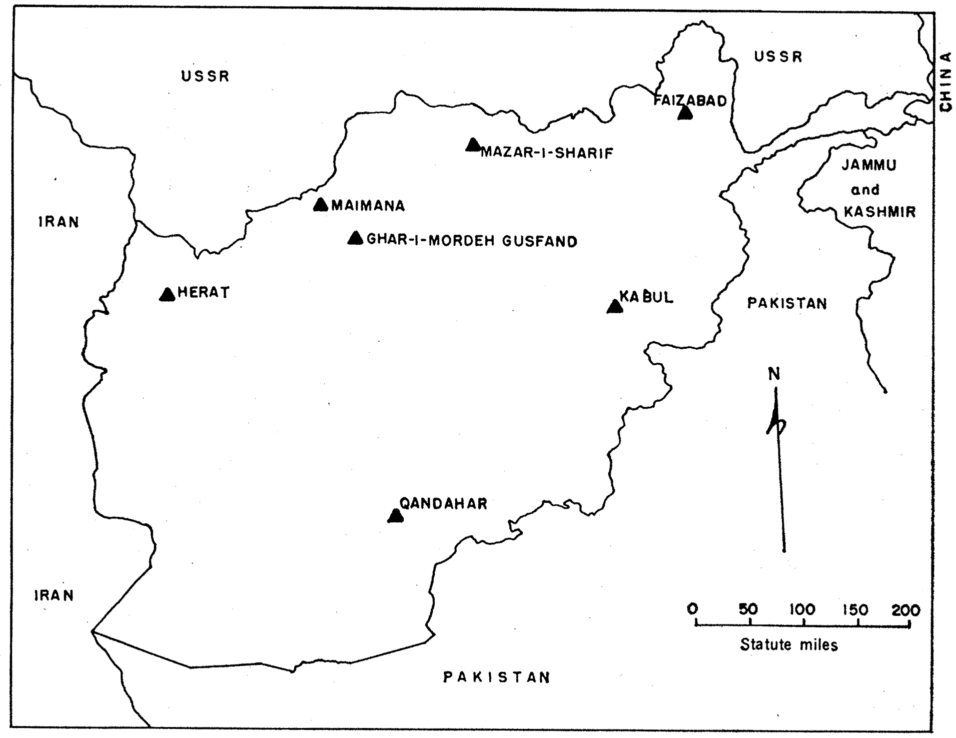

Fig. 1. Map showing the location of Ghar-i-Mordeh Gusfand, a Mousterian site in northern Afghanistan.

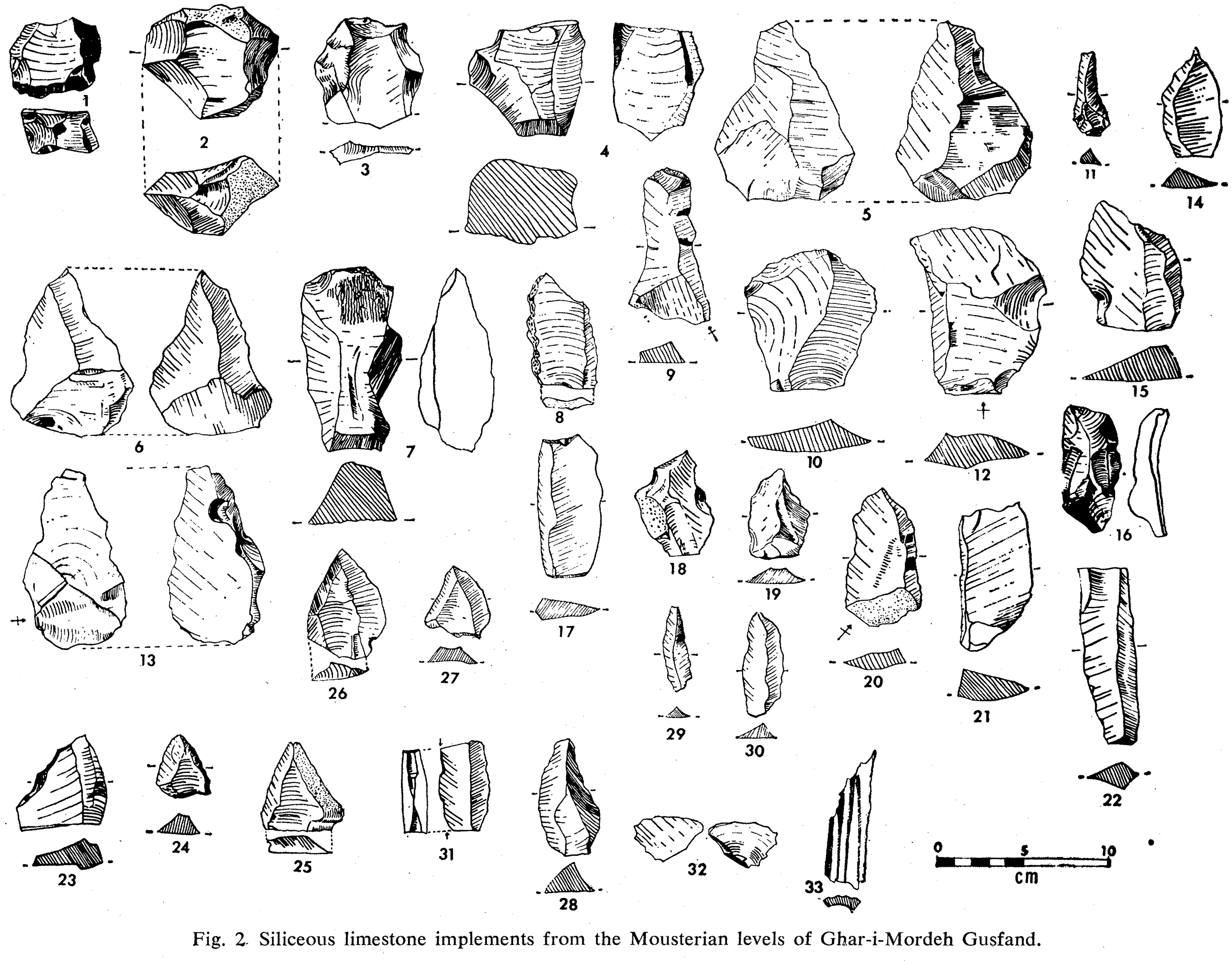

Fig. 2. Siliceous limestone implements from the Mousterian levels of Ghar-i-Mordeh Gusfand.

portant to the assemblage, for it constitutes a diagnostic type in the Mousterian.

The four Levallois points (Fig. 2, Nos. 24–27) have characteristic triangular shapes with triangular flake scars on the dorsal side. Also present were several naturally backed flake knives (Fig. 2, Nos. 14, 17, 20, and 21), a type often found in Middle Eastern Mousterian sites. One burin on a snapped truncation (Fig. 2, No. 31) was found. Also, only one definitely retouched specimen occurred in sondage 2—an oblique scraper on the transverse edge of a flake (Fig. 2, No. 23). The retouch was steep, and the flakes removed were relatively large. The rest of the specimens consisted mainly of unretouched, irregularly shaped flakes with single-faceted striking platforms (Fig. 2, Nos. 8–13, 18, 19, and 32), a few flake-blades (Fig. 2, No. 22), and points (Fig. 2, Nos. 28–30).

No hearths were found in the sondages, but literally thousands of square meters of cave deposits remain to be excavated. Both hearths and flint implements are likely to occur after careful excavation of Ghar-i-Mordeh Gusfand and other sites in the region.

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References and Notes

1. L. Dupree, *Shamshir Ghar* (American Museum of Natural History, New York, 1958).
2. ———, *Science* **146**, 638 (1964).
3. ———, *Amer. Phil. Soc. Yearbook 1967*, p. 504 (1968).
4. Several Middle Paleolithic sites in Soviet Central Asia, such as Teshik Tash, had only superficial surface deposits. The loess may have moved past or from the area and down into Afghanistan. [See H. L. Movius, *Bull. Amer. Sch. Prehistoric Res.* **17**, 11 (1953).] Also, the "Aurignacoid" site of Kara Kamar had a relatively thin surface layer, but the cultural strata consisted entirely of loess. [See C. S. Coon, *The Seven Caves* (Knopf, New York, 1957).]
5. H. L. Movius, *Bull. Amer. Sch. Prehistoric Res.* **17**, 11 (1953).
6. D. N. Lev, *Drevnii Paleolit v Aman Kutane* (Samarkand, 1949).
7. A. V. Vinogradov and E. Mamedov, *Sovetskaya Arkheologiya* **1**, 84 (1969).
8. Supported by National Science Foundation grant GS-2459, administered by the American Museum of Natural History. We thank those connected with the following Afghan institutions for their support of the research: Cultural Relations Office, Ministry of Information and Culture; Culture Relations Office, Ministry of Foreign Affairs; Directorate-General, Institute of Archaeology. Many other individuals, in and out of the Afghan government, who are too numerous to mention, also assisted our research, and they are all thanked collectively.

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Fit between Africa and Antarctica: A Continental Drift Reconstruction

Abstract. *A computerized (smallest average misfit) best fit position is obtained for the juxtaposition of Africa and Antarctica in a continental drift reconstruction. An S-shaped portion of the Weddell and Princess Martha Coast regions of western East Antarctica is fitted into a similar profile along southeastern Africa. The total amount of overlap is 36,300 square kilometers, and the underlap is 23,600 square kilometers; the total mismatch is thus of 59,900 square kilometers. The congruency along the 1000-fathom isobath is remarkably good and suggests that this reconstruction is valid within the overall framework of the Gondwana supercontinent.*

Fitting the morphologic outlines of opposing continents is the classic method for achieving continental drift reconstruction, but it is rarely done with rigor. The close congruency of juxtaposed margins is highly suggestive evidence for drift. If a fit is valid, it provides a precise drift solution, but the result remains relative because presumably both continental plates have moved. Therefore, no absolute geographic coordinates can be applied.

The appearance of a fit between South America and Africa (West Gondwana), apparent from inspection of a globe, provided the basic inspiration for Wegener (*1*), the original expounder of continental drift, and many later advocates. They made no attempt, however, to make a careful test of this congruency, because they believed that the changes of continental outline after rifting were so extensive that no more than a semblance of a fit could be expected. Carey, however, showed by precise cartographic procedures that this fit was precise beyond expectation (*2, 3*). Even secondary undulations in the outlines of the continental slopes dovetailed. Apparently continents rift apart quite cleanly, and post-drift modifications of the continental outlines are small.

In 1965 Bullard *et al.* repeated this closure of the South Atlantic and showed that the entire Atlantic Ocean can be tightly fitted into a reasonable continental drift reconstruction (*4*). This fit is now widely accepted as proof that the Atlantic is a rift ocean.

No similar success had been attained in closing the Indian Ocean and effecting a drift reconstruction of East Gondwana, presumably because this ocean basin is far more complex. There are submerged microcontinents (for instance, the Seychelle Islands Plateau) and possibly missing pieces. For example, it remains unsettled as to whether Broken Ridge and Kerguelen Plateau are sialic fragments. Also, the continental slopes around the Indian Ocean are inadequately sounded, and their true outline remains uncertain. The outline of Antarctica has been particularly in doubt, but, by using new surveys, we found a unique best fit position between Antarctica and Australia, which we regarded as sufficiently good to be a valid reconstruction (*5*).

As an extension of this work, we have found a fit between Africa and Antarctica, which is also remarkably good. We offer it as a further partial solution to the Permian reconstruction of Gondwana within the overall framework of Pangaea.

We chose the 1000-fathom (~1800-m) isobath for making the fit, because it approximates one-half the relief, or isostatic freeboard, of continents relative to the deep ocean floor and thus critically delineates the limit of a continent. We followed Carey's approach (*3*) and reasoned that, when the continental plate is rifted, the resulting rift walls will not maintain vertical faces; instead, they will slump to some stable angle of repose and will create a continental slope with a stable declivity of only a few degrees. In any such adjustment, the 1000-fathom line will best mark the initial position of the rift scar. It will be a hinge line that will undergo little change in position while the initial vertical rift face above this line retreats landward and the rift face below this line extends seaward.

A best fit is obtained by finding a relative position with the smallest average misfit between the two isobaths to be matched. By average misfit we refer to the absolute sum of overlap and underlap of a fit, which is averaged relative to the length of the margin being fitted. The procedure requires the determination of an approximate center of curvature for each continental margin. The two centers are then initially superimposed. Subsequently, one margin and its center are held fixed, while the other margin is adjusted with