

IRANIAN PREHISTORIC PROJECT

Abbas Alizadeh, Mohsen Zeidi, Alireza Askari, Lili Niakan, and Ali Atabaki **Excavations at Tall-e Bakun A and B, Jari A and B, and Mushki: Reconstruction of the** **Prehistoric Environment in Marvdasht**

With an average elevation of 1,650 m above sea level, Marvdasht, the locus of Persepolis in Fars, is one of the most fertile regions in southwestern Iran. This small alluvial plain is bounded by the Sivand (or Pulvar) and Kur Rivers from the northwest and southeast, the Rahmat Mountain from the east, and the badlands just northwest of Lake Neiriz, a brackish lake about 60 km northeast of Shiraz (fig. 1). Today, Marvdasht is devoid of any river and the numerous springs and *qanats* (subterranean aqueducts) that irrigated the plain for centuries before the introduction of deep well drilling and mechanical pumps are all dried up. Today, almost all the farmsteads have their individual deepwater wells, with perhaps dire environmental consequences for the future. Most of the land is under wheat cultivation with occasional plots of barley and hay, primarily for local domestic use. While all the farmers believe that dry agriculture is a viable option, though risky, they invariably rely on artificial irrigation, if not over-irrigation.

The quality of the soil in Marvdasht is clearly reflected in the spatial distribution patterns of both modern-day villages and ancient mounds, especially the prehistoric mounds, as they are all concentrated in the north and southwestern parts of the plain. Outside this area the soil is grayish brown and is encrusted with salt crystals. Towards the southwest of the plain, the number of modern-day villages drops sharply and a few kilometers past Char Taq and Esmailabad, almost no villages or cultivated land are found. Also, no pre-fourth-millennium B.C. occupation has been found in the southeastern part of Marvdasht.

Marvdasht was settled by small groups of farmers and hunter-gatherers from early Neolithic times. The first systematic efforts to provide a chronological framework for Fars were undertaken by Louise Vanden Berghe in the early 1950s. Based on a series of trenches in a number of sites in the Marvdasht area, Vanden Berghe considered the occupation at Tall-e Jari B, characterized by a soft, straw-tempered decorated buff ware, as representing the earliest Neolithic cultural phase in Fars, followed by that of the neighboring site of Mushki, characterized by red-burnished decorated pottery. A decade later, based on large-scale excavations at Jari A, Jari B, and Mushki, the Tokyo University Iraq-Iran Archaeological Expedition, directed by Namio Egami, argued that Mushki is the earliest Neolithic phase in Marvdasht. The Japanese reports also proposed that the primitive coarse, heavily straw-tempered plain ware that was first discovered at Tall-e Bakun B by Donald McCown of the Oriental Institute, followed the Jari phase and thus was considered the third Neolithic cultural phase in Fars.

The archaeological material from Tall-e Mushki was fully published, but the results of the Japanese excavations at Jari A and B were treated in only two very brief articles without presenting any convincing stratigraphic evidence for the proposed chronological framework. Nevertheless, because the Japanese chronological argument was based on large-scale excavations with the results published in much more detail than those by Vanden Berghe, most archaeologists accepted the Japanese chronological order for early Neolithic Fars. William Sumner, who conducted a series of systematic surface surveys in Fars in the late 1960s and early 1970s and has made important contributions to an understanding of Fars' archaeological sequence, also accepted the Japanese chronological framework primarily because he found it in agreement with his survey data on the frequency and spatial distribution of early Neolithic sites in the region.

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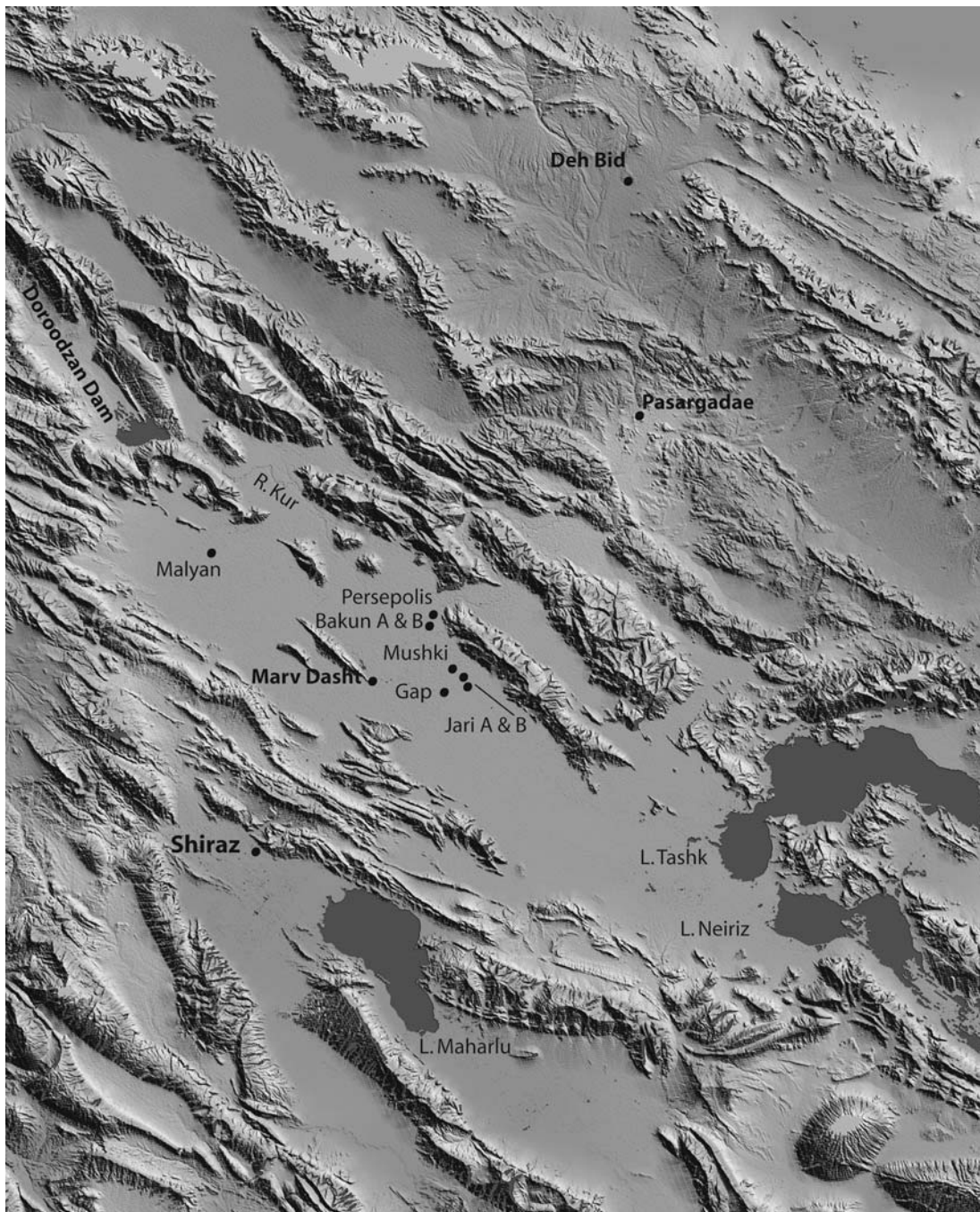


Figure 1. Map of the region

The current chronological framework for Fars is problematic, however. First, not a single example of Mushki red ware has been found at Jari B, whereas Mushki contained a number of Jari B painted sherds, as well as pieces that are clearly transitional, i.e., straw-tempered buff ware with typical Mushki painted motifs. Second, if Jari painted pottery followed that of Mushki, or developed out of that, as it is believed, one expects to see the transitional style at the end of the Mushki phase in the upper levels of the site. Third, while the specific decorated potteries of Jari and Mushki are easily distinguished from one another and therefore sites can be assigned to either phase with certainty, attributing sites to the third Neolithic phase that is represented by the soft, straw-tempered plain ware of Bakun B1 is difficult and not as certain. This plain and primitive pottery is found associated with all these cultural phases, much the same as the straw-tempered smoothed ware that continued alongside the various painted styles of the entire Archaic Susiana period in lowland Susiana. In addition, some of the sherds of the early stages of the Jari phase are painted with simple and often fugitive designs that can readily fade, especially when exposed on the surface of mounds, and as such could be taken as belonging to the presumed third phase of the Neolithic period in Fars. And finally, unlike all other Neolithic regions in the Near East where a clear long-term progression of crafts, especially pottery, trends towards artistically more sophisticated and technologically more advanced stages, the standard chronological order in Marvdasht points to a regression of pottery manufacturing techniques. This regression is also evident in the assemblage of material culture as a whole.

The apparent ambiguous beginning of the development of Neolithic village life in the region notwithstanding, prehistoric cultural processes in the region culminated in the appearance in the late fifth millennium B.C. of the earliest administrative center in the ancient Near East at Tall-e Bakun A. Nevertheless, important data on the climate, fauna, and flora during the various prehistoric phases have not been available. This lack of certain fundamental data on the early Neolithic subsistence economy and environmental features has weakened any analysis aimed to formulate prehistoric cultural developments in Fars. Also important was the lack of sufficient and reliable calibrated radiocarbon dates for the region's prehistoric sequence.

In the spring of 2004, I was offered the opportunity to collect data on all the phases of Fars' prehistoric sequence. In late February of 2004, Mr. Hasan Talebian suggested that I conduct some archaeological work in Marvdasht. Mr. Talebian is Director of Parse-Pasargadae National Research Foundation and the Bam Citadel Reconstruction Project. I would like to thank Mr. Talebian for giving me this golden opportunity to address some fundamental questions in Marvdasht. I am also grateful to Mr. M. Beheshti, Director of the Iranian Cultural Heritage Organization (ICHO), Mr. J. Golshan, Research Deputy, and Dr. M. Azarnoush, Director of ICHO Archaeological Research Center, for their encouragement and assistance.

I feel fortunate to have had the opportunity to work with some reliable field supervisors and some forty bright and talented students of archaeology from four Iranian universities. Mr. Mohsen Zeidi (Tehran University), Mr. Alireza Askari (the Persepolis Project), Mr. Reza Norouzi (Fars ICHO), Miss Lili Niakan (ICHO Archaeological Research Center), and Mr. Ali Atabaki (Chair of Department of Archaeology at Kazeroon University), supervised the various trenches at the five sites of Bakun A & B, Jari A & B, and Mushki (fig. 2). The logistics of excavating five sites simultaneously are daunting, but the close proximity of the sites made our plan



Figure 2. Marvdasht 2004 expedition staff. Standing from left: Mohsen Zeidi, Alireza Askari, and Reza Norouzi; sitting from left: Ali Atabaki, Abbas Alizadeh, Lili Niakan

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very feasible. Tall-e Bakun A and B are only two hundred meters apart and both were within walking distance from our camp, near Persepolis. Jari A, Jari B, and Mushki are about 10 km southwest of Persepolis and all the three sites are located within 200–300 m from one another. With this ideal situation, we started our work on March 28 and continued work until May 8, when I went back to Khuzestan with three expedition members to draw the contour maps of the two sites (KS-108 and KS-04) we hope to excavate in August and September 2004.

Our research was primarily designed to collect the much needed stratified faunal, floral, charcoal, and phytolith (fossilized pollen preserved in soil) samples from the five major prehistoric sites in Marvdasht, i.e., Bakun A, Bakun B, Jari A, Jari B, and Mushki. These sites are the primary basis for prehistoric cultural interpretations of highland Fars; they were excavated by the Oriental Institute and Japanese expeditions in the 1930s and 1960s when archaeologists paid little attention to collecting such data. The few available radiocarbon dates were uncalibrated and thus unreliable. Moreover, the results of the Oriental Institute excavations at Bakun B had been lost at sea and the Japanese had published only two very brief reports on their works at Jari A and Jari B.

Tall-e Bakun A

At Bakun A (UTM 0682034/3310805), we excavated three stratigraphic trenches in the central and west-central parts of the mound. Because of Mr. Talebian's request that we re-excavate and reveal the administrative quarters at the site so this very important early administrative center could be reconstructed and made available to the public as a tourist attraction, we also opened large 10 × 10 m areas in the northern sector of the mound. The administrative center at Bakun A had already been excavated and exposed by the Oriental Institute in 1932. At that time the walls of the various buildings had been preserved up to 1.5 m with bases about 1 m above virgin soil. When excavations were resumed in 1937, D. E. McCown chose the center and southern sectors of the mound, leaving the northern part the lowest and most extensively excavated part of the site. We quickly discovered that the remains of the administrative center here had been completely destroyed. After a few days of fieldwork together with the information gathered from the local farmers, we came to the conclusion that since this part of Bakun A had already been excavated and thus was the lowest part of the mound, it had been leveled, plowed, and planted between the turbulent revolutionary years of 1978–1981.

In the meantime, we were making progress in our stratigraphic trenches at the site (fig. 3:B). We initially had hoped to be able to document the stratigraphic interface between the Lapui phase that is characterized by a plain red pottery and the Bakun A phase with the famous beautifully decorated buff pottery, a stratigraphic marker not reported in the original publication by A. Langsdorff and D. E. McCown (OIP 59). But we realized that down to about 1.0–1.5 m from the surface of the mound, the entire site had been pierced by late Sasanian–Early Islamic graves, most of which were furnished with a column of grayish mudbricks at the foot. Thus it became apparent to us that here at Bakun A we would not be able to address the transition of the late prehistoric phase to a later one.

We excavated all our trenches to virgin soil that was almost at the level of the present plain. Beside the sophisticated, beautiful Bakun A pottery and a number of lithics and other artifacts, our three stratigraphic trenches yielded large samples of bones, seeds, charcoal, and phytoliths. These previously unavailable samples will be of utmost importance for the reconstruction of the physical environment, its biota, the subsistence economy, and the absolute calendrical dates for the various levels of occupation at Bakun A.

Lapui Pottery from Tall-e Bakun A

Since the Bakun A pottery has been superbly presented and described by McCown, here we only offer a detailed description of the Lapui plain red ware that marks the end of occupation at Bakun A and many other sites in Fars.

At Bakun A we found two types of Lapui red ware: fine and common wares. Lapui fine red ware is a well-fired, hard, and sand-tempered pottery with occasional pieces of straw and chaff mixed in. The fine sand is often invisible to the naked eye, but small to medium calcite particles appear on both surfaces. The pottery has a wide color spectrum; the color ranges from yellowish red (5YR-5/6) to red (2.5YR-5/8-5/6), and reddish yellow (7.5YR-6/8). Some pieces that are mottled exhibit two to three colors. The surface is usually polished and very smooth. Some pieces have a brownish (7.5YR-5/4-6/4) or grayish (5YR-5/8 yellowish red) slip on the exterior surface. In open vessels with pedestal or ring base, sometimes both sides have a reddish buff slip (7.5YR-6/4 light brown), in which case the core is red. All pieces have a clinky ring to them and break with straight edge.

Interior irregular striations indicate the pottery is handmade or at least turned on a slow wheel. In jars with an overhanging or an everted rim, the rim is separately made and attached to the body, where seams are clearly visible. No intentional burnishing is evident except in cases where scoring was strong. The exterior surface is almost always scored with stripes 3-4 mm wide and applied horizontally or diagonally, but does not usually show any sheen. In such cases it is impossible to say if the pottery has a slip, although in a few cases a slight difference in the tone of the surface and its immediate background is observed. The core is usually the same color as the surface, but some pieces, whether thick or not, have a layer of reddish gray sandwiched between two layers of red. Rarely some pieces have a dark red slip, or even wash. Examples of rare burnished and painted with simple geometric motifs are also reported from other Lapui sites but not found at Bakun A.

Lapui Common Ware

Dark grits are the primary inclusion in this ware, but occasionally calcite particles and chaff are mixed in. Both on the surface and in the core air pockets are visible. It breaks with an uneven edge; pieces with cracked surface also occur. The core is usually dark or light gray and changes abruptly to about 2 mm of reddish, brown, etc. surfaces. The surface color ranges from brick red (10R-5/8) to reddish brown (2.5YR-4/4) to light red (2.5YR-6/6) and even mottled buff. Some pieces have dark color on the interior and red, brown, or even reddish yellow on the exterior. Some thinner pieces do not have a gray core at all. Some have a deep red or pink color as wash/slip.

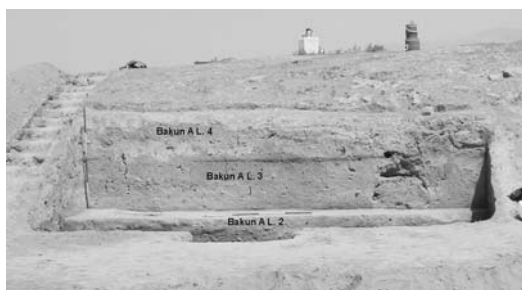
Tall-e Jari A

About 10 km southwest of Persepolis, we excavated four trenches at Jari A (UTM 0689017/3304410) and four at the nearby Mushki (UTM 06886587/3304381), just 200 m to the northwest of Jari A (see map). We chose Jari A first because the Japanese reported the site contained three phases of occupation with associated architecture, that is, Jari A painted (Level 3), Bakun B1 (Level 2), and Gap (Level 1). The latter is an intermediate phase between Bakun B2 and Bakun A and dates probably to the first half of the fifth millennium B.C. Thus, we thought, we can easily sample all three phases at one site and study their stratigraphic relationships.

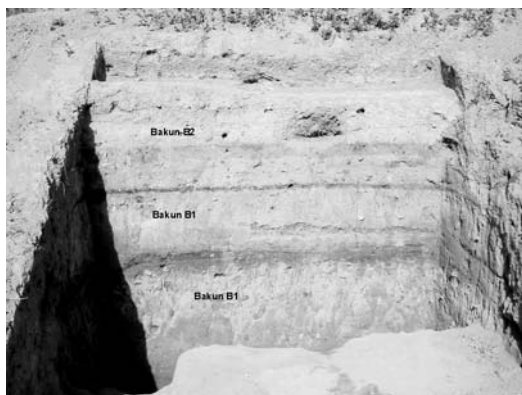
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A



B



C

Figure 3. (A) North, south, and west sections of the main trench at Jari A; (B) North section of Square BB 27–28 at Bakun A; (C) North, south, and west sections of the main trench at Bakun B

to produce similar results.

In two of these trenches, close to the surface of the mound, we found sporadic pieces of Bakun B2 painted buff ware, but no architecture. Below this uppermost, disturbed level about 50 cm thick, we found nothing but ovens, burnt surfaces, stone pavements, pisé and mudbrick walls and bins, and thick and thin greenish gray clay deposits in between occupational levels (fig. 3:A). These levels contained nothing but the coarse, heavily straw-tempered and plain buff to pink ware of Bakun B1. While we were fortunate to be able to collect large samples from these levels, it seems inconceivable that the Japanese report was almost completely erroneous in presenting the site; surely a logical reason must explain why our four trenches failed to reveal the thick architectural phases and potteries of Jari painted and Bakun B2/Gap. One possible explana-

We chose the highest point on the mound, but away from the previous trenches and excavated dirt. Here, immediately below the surface we reached occupational layers with only the coarse Bakun B1 pottery, even though the surface of this trench was only 0.5 m lower than that of the central Japanese trenches, where they had reported about 2 m of architectural deposit from the Gap phase. We continued this main 3 × 6 m trench to virgin soil, which was reached at almost the same level as the present plain, even though the Japanese had reported that the base of Jari A was about 2 m below the plain level. Moreover, no occupation of any type, let alone architecture, had Jari painted ware below the Bakun B1 level, as reported in the very short Japanese reports. In fact, an intensive surface survey of the site also failed to reveal any Jari painted ware, and the few potsherds of buff painted ware we found on the surface and in some disturbed upper levels of the mound belonged to the Bakun B2 painted tradition (fig. 6) and not to that of the following Gap phase.

The findings of our main trench were difficult to reconcile with the Japanese report. We began to assume that perhaps our main trench was opened in a part of the site that did not have the two other cultural phases the Japanese had reported from the site, so we opened three more trenches. We placed one at the eastern edge of the mound, another on northwest of the mound, and for the third we chose the unexcavated balks of the Japanese trenches, right in the center and therefore at the highest part of the mound. We assumed that if the Japanese reached the levels they had reported, a trench right in the center of their excavation area would have

tion is that the reported Level 3 architectural phase at the site was limited to the area of the Japanese excavations and that Jari A had a very limited occupation during this phase.

Jari A/Bakun B Common Coarse Ware

At both Bakun B and Jari A we found two classes of pottery, which we have designated as common and medium wares. The common ware is soft, porous, and light in weight. It breaks with an uneven edge. Fragments made of this ware are heavily straw-tempered and straw-faced on both sides, and most show in the break an obvious layering technique in manufacture (fig. 4). The pieces of straw on the surface seem to be of at least five types of vegetation, based on the size and absence or presence of certain numbers of stem grooves that are clearly visible on the surface (fig. 5:F). In a large number of fragments where the thin inner layer is damaged, clear impressions of basket are visible. This indicates that vessels were first shaped using a basket and both the interior and exterior surfaces were then coated by thinner, usually 2–3 mm, layers and wet smoothed. Nevertheless, in some cases no attempt was made to cover the basket impression as seen in figure 4.

The core varies in color from completely oxidized buff, a layer of buff and gray, to a layer of gray sandwiched between two layers of buff; sometimes the gray core grades into buff or vice versa. The surfaces are predominantly buff with varying shades, but brick red and pink also occur. On larger sherds, the surface appears mottled either dark or reddish. The surface color ranges from pinkish gray (5YR-7/2–6/2) to very pale brown (10YR-7/3), pale brown (10YR-6/3), and reddish brown (5YR-6/4–5/4). Most pieces from the upper levels at Jari A are covered with an off-white or whitish buff slip or wash and carefully smoothed. The lips are invariably very simple; beaded lips occasionally occur. While an attempt was made to smooth the surfaces, they are usually uneven. Bases are usually dimpled or concave; hole-mouth and straight-sided bowls are common.

Medium Ware

This ware is found primarily on the upper levels at Jari A. This is a chaff-tempered, often chaff-face, warm buff ware. The walls are much thinner than those of the common ware; the surfaces are wet smoothed but uneven. Examples of this ware are often covered with a very pale brown, light yellowish brown (10YR-7/3–8/3) slip on both sides. The manufacturing technique is the same as the common ware, though fewer examples show a basket impression. Sometimes the slip is almost cream white. While the common ware primarily has a dark core, the medium ware is almost always completely oxidized. In the upper levels at Jari A, the color of the slip is almost exactly that of the typical white slip/wash (10YR-8/2) and becomes increasingly more frequent by the end of the sequence. Rare examples of this ware are decorated with a simple solid band or a simple geometric register just below the lip (fig. 5:C, E). The medium ware also occurs at Jari B and Mushki.



Figure 4. A basket-molded bowl from Jari A

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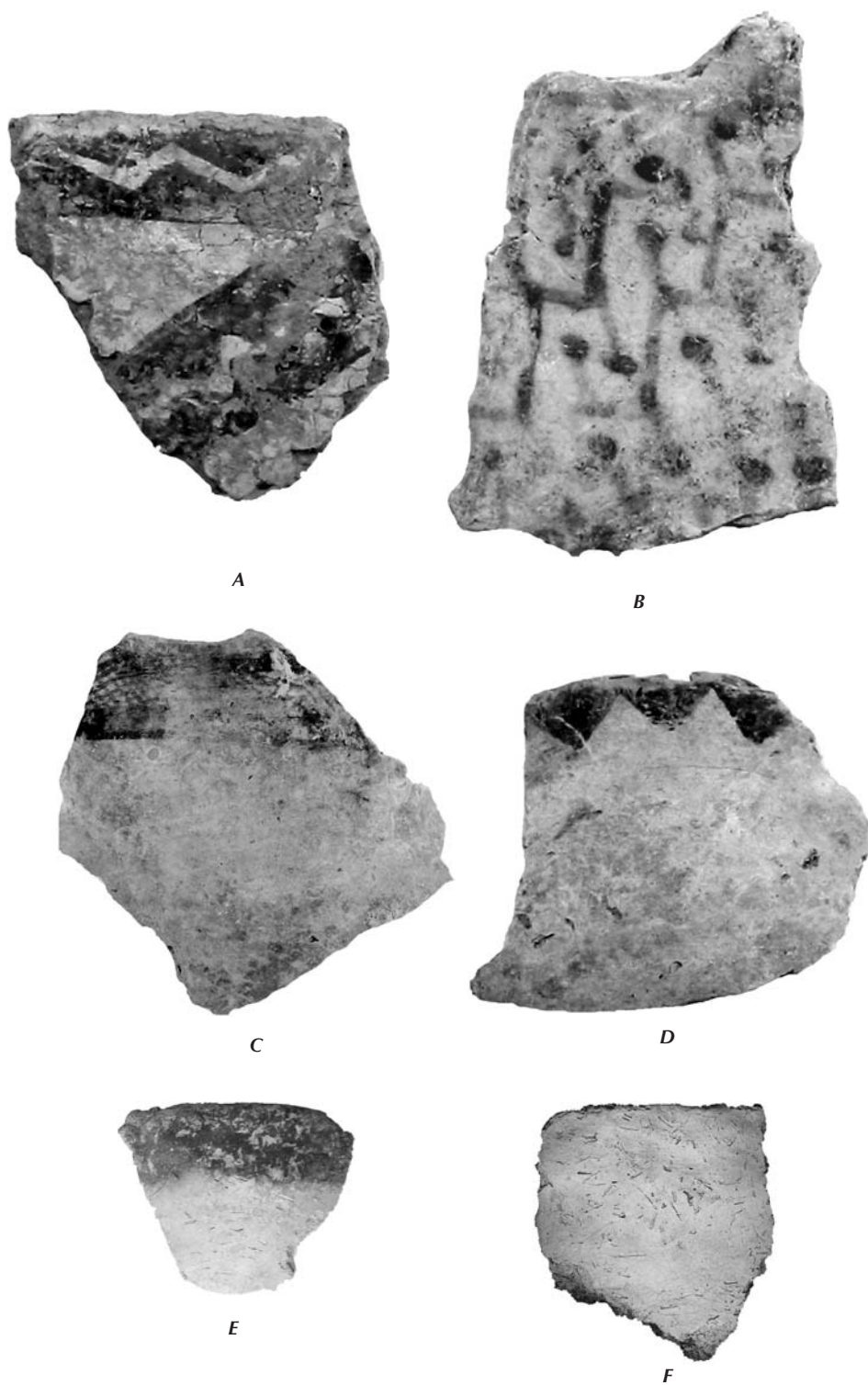


Figure 5. (A–B, D) Painted buff potsherds from Jari B; (C, E–F) plain and simple painted sherds from Jari A. Pottery not shown to scale

Tall-e Jari B

With the findings at Jari A, our decision to excavate Jari B (UTM 0689162/3304262), about 200 m to the south of Jari A, now had to include steps to address the discrepancies between the Japanese report of Jari A and the actual material and stratigraphy of the site. An intensive surface survey at Jari B revealed only Jari painted and plain wares, with no traces of Bakun B2 or Bakun B2/Gap painted buff ware. We excavated three trenches at this site and continued all of them to virgin soil and below. The earliest occupational levels are, as at Jari A, on the same level as that of the present level of Marvdasht. Moreover, while in our trenches we encountered pisé and straw-tempered mudbrick structures, the material culture, including pottery, was homogeneous from the top to the bottom and we found no traces of occupation datable to either the Bakun B2/Gap phases with painted buff pottery or to the Bakun B1 phase with only a coarse plain buff and pink ware.

Pottery from Jari B

Two types of plain wares and one prominent painted buff ware were found at this site. The plain wares are much the same as those discovered at Jari A and Bakun B1. The painted fragments are very similar in color and surface treatment to the medium ware of Jari A. It is a chaff-tempered pottery with occasional small dark grits. The surface color ranges from light yellowish brown (10YR-6/4) to pink (7.5YR-7/4) and white (10YR-8/2). The paste usually consists of a layer of light gray sandwiched between two thinner layers of light brown or even pinkish buff. Often the thinner, upper walls of vessels have no gray core but change into gray towards the base. The surface layers are often cracked and in the lower levels at Jari A and Mushki the simple paint is very thin and almost fugitive. A variety of painted style with a thick brown horizontal band (figs. 5:A–B, D; 6:H) occurs rarely with the white wash common of the standard painted ware (fig. 6:G).

Wide shallow and bell-shaped bowls with a flat or slightly concave base are common; as are tall, cylindrical beakers with straight or slanting walls. Bowls with a square, triangular, or even oval base also occur but are rare. Also extremely rare are bowls with carination, similar to those typical of the Mushki painted red ware.

Tall-e Bakun B

Our excavations at Tall-e Bakun B (UTM 0682302/3310685) revealed cultural deposits and stratification similar to those of Jari A, that is, a shallow Bakun B2 deposit and a much thicker cultural deposit of Bakun B1. In our two trenches here, Bakun B2 deposits were completely disturbed by late Sasanian-early Islamic graves. Below Bakun B2 deposits, we excavated layers consisting of ovens, fire pits, ashy layers, pisé walls, postholes, stone pavements, and intermediate very hard green gray clay deposits (fig. 3:C). The only pottery we found in these lower levels was the coarse, heavily straw-tempered Bakun B1 pottery. As at Jari A, this is a primitive pottery that is mold-made using baskets, the impression of which is clearly visible on many pieces discovered at Bakun B and Jari A. We also learned that this technique was often, but not always, combined with a layering technique where finer clay layers were applied to both surfaces after the core became solid.

Excavations at both Jari A and Bakun B, however, revealed stratified evidence that is of utmost importance in the chronological order of early Neolithic Fars. While we still do not know how to reconcile our archaeological data with those reported by the Japanese, our evidence sug-

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gests that the coarse, primitive Bakun B1 pottery may represent the earliest phase of the Neolithic occupation in the region and that it was followed first by Jari B (with buff painted) and then by Mushki. We suggest this because at Jari A we noticed a progression towards a finer buff ware that sometimes has the white slip/wash signature of the typical Jari painted pottery. Almost all these finer pieces are plain, but towards the end of the sequence, simple dark painted vertical or horizontal bands appear on some simple bowl fragments. At Bakun B, the end of this sequence is marked by a thick greenish gray clay deposit. Above this, the buff painted pottery of Bakun B2 appears, just as at Jari A. Since Bakun B2 pottery has many similarities with that of the Middle Susiana phase (fifth millennium B.C.), a large temporal gap must exist between the two occupations at Jari A/Bakun B1 and Bakun B2.

Tall-e Mushki

We were hoping that excavations at Mushki (UTM 0688658/3304381) will not only provide faunal and floral evidence, but also stratigraphic evidence that could be used to address the chronological problems involved in the order of Mushki and Jari cultures. As mentioned before, Vanden Berghe, who first proposed the chronology, argues that Jari B is older than Mushki. The Japanese, however, argue the reverse. Neither had any convincing stratified evidence for their interpretations, but since the Japanese published the results of their excavations at Mushki and presented a number of section drawings and associated data, most archaeologists, including me, accepted their argument, although with some reservations.

Vanden Berghe and the Japanese expedition had already published some specimens of the typical Jari B ware with typical Mushki designs from Jari B itself. But neither of the reports contained stratigraphic information on the vertical and horizontal distribution of what we came to conclude was a transitional phase between Jari B and Mushki. At Mushki, we opened a large 3 × 6 m stratigraphic trench close to the center of the mound but away from the previous excavation areas. We also opened three smaller 1.0 × 1.5 m trenches on the western and southern parts of the mound. All the excavated areas produced pisé and mudbrick walls and domestic structures, such as ovens, fire pits, and storage bins. The most important finding, however, was the presence of a class of pottery in the lowest levels of the site that combined the typical Jari ware with typical Mushki designs, mixed with some genuine Jari B potsherds. This and Jari B types are completely absent from the upper layers at the site.

We have taken ¹⁴C samples from all these levels, but the stratified materials indicate that Mushki red-burnished painted ware developed out of Jari B painted buff ware and that the material culture assemblage of Mushki was much richer than that found at either Jari A or Jari B. Based on our excavations at Jari A, we also concluded that the Bakun B1 phase with a coarse, mottled buff and pink plain ware represented the earliest Neolithic occupation in Marvdasht and that Jari B painted ware developed out of the Bakun B1 phase. We hope that radiocarbon analysis of the samples we collected will corroborate our stratigraphic observations.

Mushki Pottery

Three distinct wares are found at Mushki: a plain coarse ware, a painted red wash ware (fig. 6:A–B, E), and a painted buff ware (fig. 6:D). While the red surface of the standard painted Mushki red ware is referred to in the literature as “slip,” it is actually a thick red wash because of its smeared appearance and varying thickness of the pigment. The plain coarse ware appeared in all the levels in association with the painted wares; but in our main 3 × 6 m trench the painted buff ware appeared in the basal levels and continued up to Layer 15, where it disappeared.

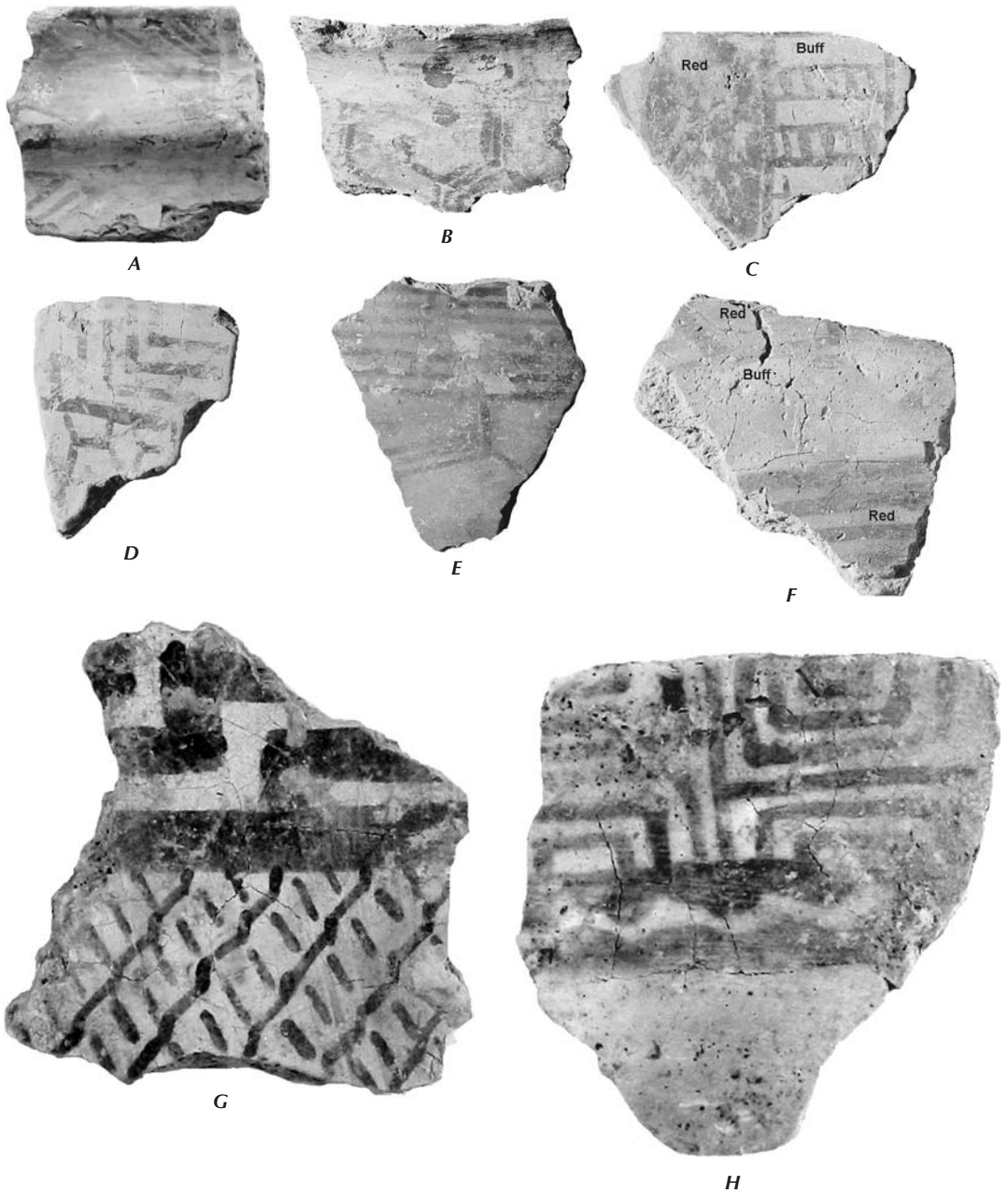


Figure 6. (A–F) various styles of painted pottery from Mushki; (G–H) painted buff sherds from Jari B. Pottery not shown to scale.

The coarse plain pottery consists of common and medium wares very similar to those found at Bakun B1 and Jari A. The painted red wash ware has a paste that is usually dark gray to light gray with chaff and occasional small grit inclusions. Completely oxidized cores exist, but depending on the thickness, a single sherd can have both gray and buff cores.

The surfaces consist of a 1–2 mm layer of pale to light orange buff that abruptly changes to gray. This layer is usually covered with a burnished red wash that ranges from yellowish red (5YR-5/8), reddish yellow (5YR-7/8), yellowish red (5YR-5/6) to red (2.5YR-4/8), and even

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purple. Unlike the painted red ware, examples with a purple wash usually, but not always, have simple decoration unlike the standard Mushki painted red ware. In cases where the wash is worn off, the surfaces are pitted with air pockets and appear crackled. Some varieties have a red wash or slip inside and a buff wash or slip outside. In these cases the painted patterns are most un-Mushki, such as zigzags, crosshatches, and triangles. In some cases, wide vertical areas with red wash separate simple geometric vertical panels painted on a buff to light orange buff surface (fig. 6:C). In yet another variety, both the reserved buff and red wash areas have simple painted decoration (fig. 6:F). The painted buff ware is very similar in ware, surface treatment, and decoration to the painted buff ware of Jari B. While the Japanese final report considers this type as a late development, we found this ware primarily associated with the lower levels at Mushki. The upper ten layers (about 1 m below the surface) in our main square yielded only painted red ware.

Sharply single or double-carinated vessels (fig. 6:A) with simple or everted lip and flat and concave bases are common. In such cases, the painted panel is applied to the upper part of the vessel. In a few examples, one or two pronounced ridges are molded below the lip. It is reported in the original publication that coiling was used to manufacture Mushki pottery. While this technique is evident on the examples of the coarse ware, we found no evidence of coiling in either the red painted or buff painted varieties at the site. Most probably the carinated red-painted vessels were made in two parts and joined together at the carination.

Marvdasht Geomorphology

In all our trenches in the five sites, we reached virgin soil almost at or 10–15 cm below the level of the present plain. Just to be on the safe side, we excavated virgin soil another 60–70 cm. This fact requires some geoarchaeological explanations. I am hoping that in the future we will have the opportunity to address this problem, but for now our archaeological observations indicate that, oddly enough, the Marvdasht plain has not received any alluvial deposit for at least 9,000 years, if not much longer ago.

The alluvial intermontane plain of Marvdasht is one the most fertile regions in Iran. The two major Kur and Sivand (or Pulvar) Rivers empty into the brackish Lake Neiriz after passing Marvdasht from the north and southern margins of the plain. No river flows through Marvdasht. Before the introduction of mechanical pumps, the region was primarily irrigated by *qanats* (subterranean aqueducts) and several springs that issued from the foot of Rahmat Mountain. The natural meandering dry courses of the streams could still be seen in Schmidt's aerial photographs of the plain and the meandering course of one that passed Mushki and Jari can still be seen today, although according to the locals the spring has been dry for more than a generation.

Since *qanats* and springs cannot be the agent of sedimentary deposits in Marvdasht and no flash flood wadis are in the region, nor does a river run through it now — both the main agents of vast alluvial deposits — the question arises as to what natural processes were responsible for the fertile sedimentary deposit in Marvdasht and why this process stopped in the early Neolithic period. A strong possibility is that the Sivand used to run through Marvdasht and emptied directly into Lake Neiriz about 30 km south of Persepolis, where the land is now infertile and salt crusted. The river then changed course sometime during the early Holocene period (10,000 years ago) and joined the Kur. Needless to say these are all speculations based on archaeological observations. This question can only be addressed by geoarchaeological investigations and we hope to be able to conduct a geoarchaeological survey in the region soon.

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In summary, while our findings at the Neolithic sites in Marvdasht are difficult to reconcile with those reported by the Japanese expedition, much detailed analysis will have to be done before we are prepared to offer our final conclusions.
