Investigating Cultural and Socioeconomic Change at the Beginning of the Pottery Neolithic in the Southern Caucasus: The 2013 Excavations at Hacı Elamxanlı Tepe, Azerbaijan

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Recent research on the Neolithic period of the southern Caucasus situates the emergence of an established food-producing economy at the beginning of the sixth millennium B.C. This article reports on the 2013 season of excavations at Hacı Elamxanlı Tepe, western Azerbaijan, currently one of the oldest sites providing evidence of early agriculture, which represents the earliest stage of the Shomutepe-Shulaveri culture. Excavations yielded a rich archaeological record that confirmed the intensive exploitation of domesticated cereals and animals over a period ranging from ca. 5950 to 5800 cal B.C. Excavated artifact assemblages have a distinct character, differing from those of later settlements, indicating rapid cultural changes in the first half of the sixth millennium B.C. The assemblages also comprised a small number of elements reminiscent of the Pottery Neolithic traditions from the eastern wing of the Fertile Crescent, suggesting cultural contacts during the earliest stages in the development of an agricultural economy in the southern Caucasus.

Keywords: Neolithic; southern Caucasus; Shomutepe-Shulaveri culture; early food-producing socioeconomy; northern Mesopotamia

The Neolithic of the southern Caucasus, encompassing the modern territories of Azerbaijan, Georgia, and Armenia, has been relatively poorly studied in comparison with the advanced state of research in neighboring regions in the Middle East (Munchaev 1982; Narimanov 1987; Chataigner 1995; Chataigner et al. 2012; Lyonnet et al. 2012). However, important new data were provided in the last decade by excavations at Aratashen and Aknashen in the Araxes Valley (Badalyan et al. 2007; 2010), Aruchlo (Hansen, Mirtskhulava, and Bastert-Lamprichs 2007; Hansen and Mirtskhulava 2012), Mentesh (Lyonnet and Guliyev 2012), and Göytepe (Guliyev and Nishiaki 2012; 2014), along the Middle Kura Valley, and Kamiltepe on its lower reaches (Helwing and Aliyev 2012). These international collaborative research projects, which introduced modern excavation techniques and research strategies, have demonstrated that the Shomutepe-Shulaveri culture of the Pottery Neolithic marks the earliest agricultural economy of this region. They also date its emergence to

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Fig. 1. Location of Hacı Elamxanlı Tepe, Middle Kura Valley, Azerbaijan, and other Neolithic sites referred to in the article. (Map by T. Miki)

the first half of the sixth millennium B.C. (Nishiaki, Guliyev, and Kadowaki 2015).

Drawing on the foundations established by a newly constructed chronological framework, current research interests focus on investigating the origin and development of Shomutepe-Shulaveri culture. This research would greatly benefit from efforts to search for earlier "aceramic Neolithic" settlements (Kiguradze 1986; Arimura et al. 2010; Meshveliani 2013). At the same time, the project seeks to document the diachronic developments of this culture and determine its earliest stage. The latter aims have been a major research target of a joint Azerbaijan-Japanese mission, and its latest results are presented in this article.

The mission has been conducting a series of field investigations in the Middle Kura Valley, western Azerbaijan, since 2008 (Guliyev and Nishiaki 2012; 2014). While the major focus has been on excavating the large Shomutepe-Shulaveri settlement of Göytepe, dated from ca. 5650 to 5450 cal B.C. (Nishiaki, Guliyev, and Kadowaki 2015), the mission also started excavating a neighboring Neolithic site, Hacı Elamxanlı Tepe, in 2012 (**Fig. 1**). Preliminary excavations in 2012, along with extensive radiocarbon dating, indicated earlier occupational horizons during ca. 5950–5800 cal B.C. (Nishiaki et al. in press). This is, at present, one of the oldest series of dates for the Shomutepe-Shulaveri culture. It thus provided a valuable opportunity to define the nature of assemblages of the earliest stage of this culture and to explore its later development through comparisons with records from Göytepe. In addition, the 2012 excavation yielded two painted ceramics resembling the northern Mesopotamian tradition, noted for the first time on the northern side of the Lesser Caucasus Mountains. These finds reignite old issues related to a possible cultural link with Pottery Neolithic communities of the Middle East (Abibullayev 1959; Munchaev 1982).

The second season of excavations at Hacı Elamxanlı Tepe was from July 22 to August 17, 2013. This involved

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Fig. 2. Hacı Elamxanlı Tepe, from the northwest. (Photo by Y. Nishiaki)

the enlargement of the excavation trench from a square of 5 × 5 m, initiated in 2012, to a larger one of 10 × 10 m. In this article, major findings on the architecture, cultural assemblages, and subsistence practices are described. We then discuss implications for the origin and development of the Shomutepe-Shulaveri culture.

Excavations of the 2013 Season

Hacı Elamxanlı Tepe is a small Neolithic mound situated about 8 km east of Tovuz, western Azerbaijan, at the altitude of ca. 405 m (**Fig. 1**). It is located in the contact area of two main alluvial fans produced by the Zayam River to the east and the Asrik River to the west, both of which are right-bank tributaries of the Kura River, running northward from the Lesser Caucasus Mountains. The surrounding region, called the Qazakh-Ganja Plain, receives annual precipitation of 300–400 mm, allowing for farming that is supported by the great availability of ground and river water on the alluvial fans. A dozen Neolithic sites have been identified in this plain, including the major Shomutepe-Shulaveri settlement of Göytepe, situated about 1.5 km to the southeast (Narimanov 1987; Guliyev and Nishiaki 2012; 2014).

The mound of Hacı Elamxanlı Tepe occupies an area of approximately 60 × 80 m, with a height of 1.5 m from the surrounding field (**Fig. 2**). It was discovered during a reconnaissance survey in 2011. The very rare occurrences of potsherds and the abundance of Neolithic flaked stone artifacts on the surface strongly suggested its earlier chronological position, and this estimate was tested in the 2012 season (Nishiaki et al. in press). The preliminary excavation resulted in defining four Neolithic architectural levels in a 5 × 5 m area (Square M10). Although virgin soil was not reached, the lowest level (Level 4) seemed to have been close to the natural surface. This first season of excavation confirmed the general characteristic of the artifact assemblages suggested from the survey. Further, as mentioned earlier, the radiocarbon dates verified our chronological estimate for this mound as an earlier Neolithic settlement than Göytepe.

The second season of excavation had two main aims. The first was to verify our initial characterization of archaeological levels (Levels 1–4) excavated in the 2012 season (Nishiaki et al. in press). The second was to extend the horizontal exposure of Neolithic architectural remains in order to document their spatial extent and organization. These aims are related, as we define

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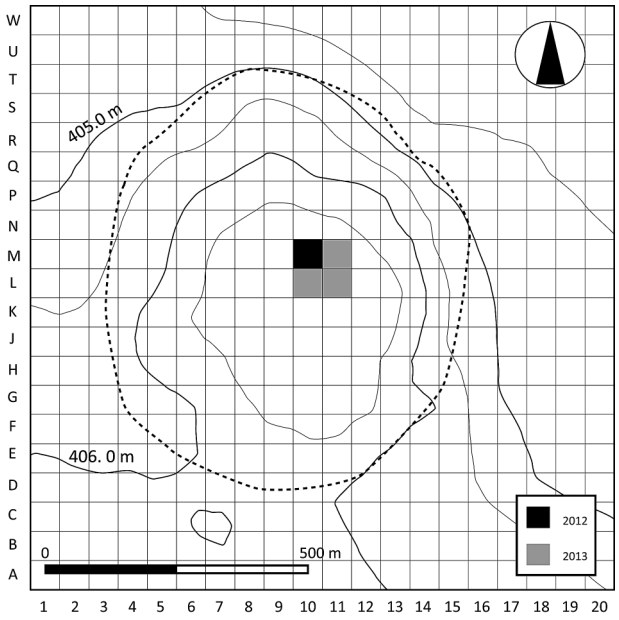

Fig. 3. The three excavation squares at Hacı Elamxanlı Tepe (L10, L11, and M11) excavated in the 2013 season. The square marked in black (M10) was excavated in the 2012 season. (Drawing by Y. Hayakawa)

archaeological levels on the basis of the stratigraphic relationships between architectural remains. Increasing the sample size of architectural features and their stratigraphic relationships would aid in refining our definition of archaeological levels. The latter constitute the basis for the analyses of occupational history and diachronic changes in material culture, subsistence practices, and settlement organization at this site.

We excavated three 5 × 5 m squares at L10, L11, and M11 adjacent to Square M10 (**Fig. 3**). This led to the exposure of archaeological deposits and architectural features over a 10 × 10 m square area. We employed the same excavation methods utilized during the previous season, except for the fact that we did not sieve deposits from Squares L10, L11, and M11 in order to hasten the wider exposure of architectural remains, subject to a constrained field schedule. However, we continued sieving in Square M10, as in the last season, for a thorough sampling of artifacts and ecofacts.

As a result of the 2013 season, our initial definition of architectural levels in Square M10 was found to be applicable to the archaeological deposits and architecture in the adjacent squares of L10, L11, and M11. Here, we describe newly uncovered architectural features and notable artifacts in the latter squares. When we refer to specific architectural features or deposits, we identify them by their context numbers, which are consecutive numbers in each of the excavation squares. For example, "L10-30" indicates feature or deposit no. 30 in Square L10.

Stratigraphy and Architecture

Neolithic Level 1 (**Fig. 4**). This architectural level includes occupational surfaces resulting from the reoccupation of buildings that were originally constructed in the underlying Level 2. In Square L11, a curvilinear mud wall (L11-15) forms a round building of ca. 5 m in diameter. This round structure appears to have an entrance at its western side, from which another wall (L11-32) extends at least 3 m to the northeast, forming an interior partition. An occupational floor in this room was composed of ashy sediments and was associated with flaked and ground-stone artifacts and animal bones, including a single horn core.

In an outdoor space immediately to the north of the round structure, we discovered a pit oven (L11-60) of ca. 1 m in diameter and 30 cm in depth. The interior surface of the pit was coated with burned clay arising from use of the oven. Although the pit was filled with rocks, they were not burned, indicating that they may not have served in the original use of this feature.

Another notable find in this area was a large single-platform obsidian core (L11-47), with a series of regular blade scars and the potential for further blade detachment. The core was lying flat on its flaked face, within yellowish brown sediments with little ash or refuse.

The round structure in Square L11 was associated on its western side with another smaller round building (ca. 2 m in diameter) in Square L10. A curvilinear wall of the latter (L10-14) abuts the wall of the former larger structure, and the two round rooms are connected via a passage. The floor of the smaller round house also yielded lithics and animal bones. In Square L10, we uncovered a small round structure (L10-20: ca. 1.5 m in diameter), which appears to have been used for storage rather than as a dwelling. The structure contained refuse, including conjoinable fragments of a stone mortar (**Fig. 5**) as well as animal bones. These items probably represent secondary use of this structure as a refuse receptacle, as they were deposited in the middle of the fill. The base of the fill was ashy and contained little refuse.

To the north of these structures in Square L10 was an open space with various ground-stone artifacts, ash deposits (L10-11), and a small pit oven with burned cobbles (L10-19). This outdoor space continues to the north in Square M10, where ashy sediments decrease inside a semicircular structure (M10-9).

Neolithic Level 2 (**Fig. 6**). This architectural level is marked by the construction of several mud-brick struc-

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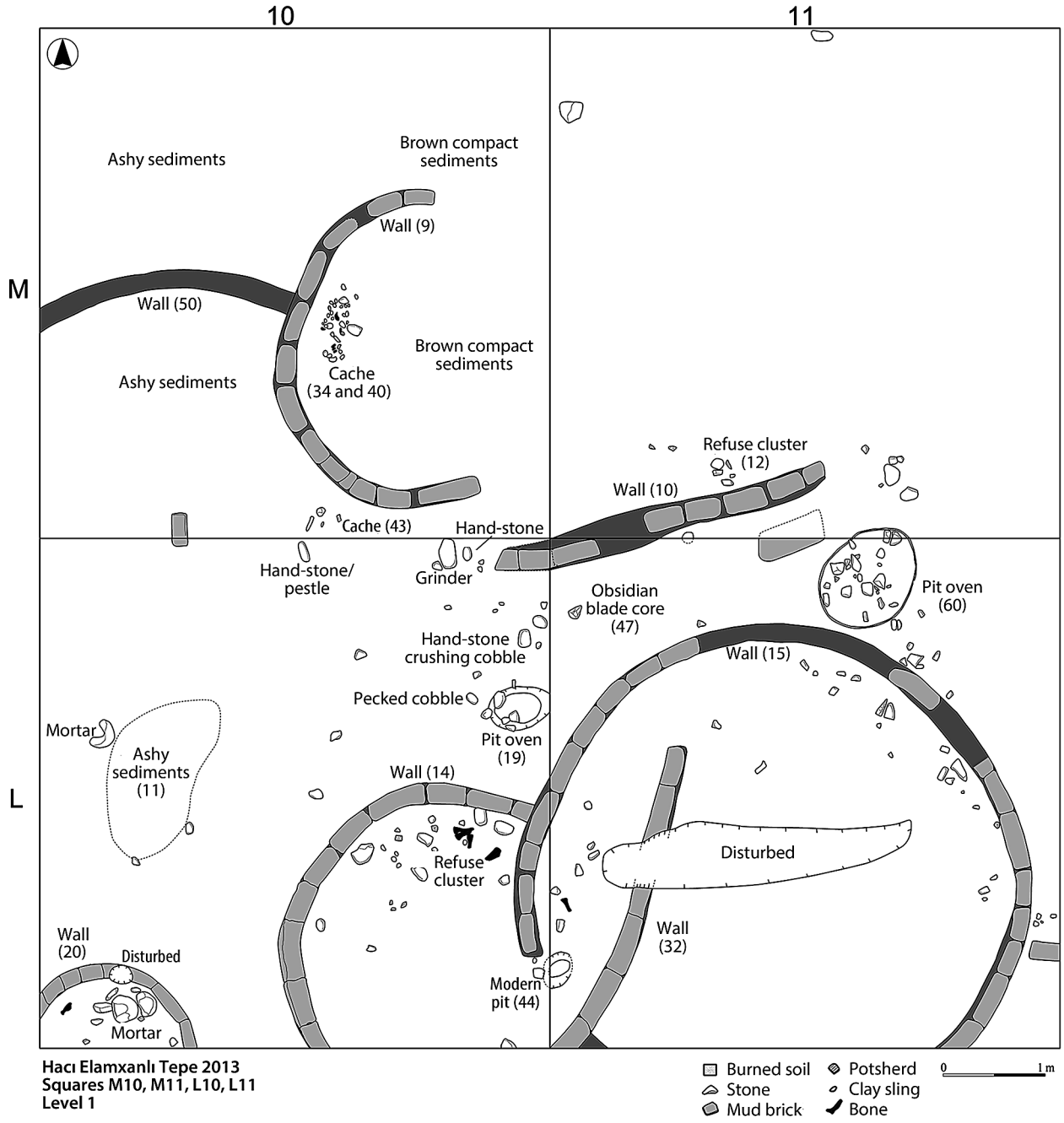

Fig. 4. Architectural plan of Level 1 at Hacı Elamxanlı Tepe, showing a "snowman-shaped" building and other important features with their context numbers. (Drawing by T. Miki and S. Kadowaki)

tures that continued to be used or reused in Level 1. As such, architectural plans between Levels 1 and 2 are similar. Buildings in these levels in Squares L10 and L11 characteristically include two circular buildings attached to each other, forming a figure-eight called a "snowman-shaped" building (**Fig. 7**). A curvilinear wall of the smaller round structure (L10-14) abuts the western side of the larger round structure (L10/11-15). The two rooms appear to be connected via a passage. An internal area near the entrance of the larger room is partitioned by a wall (L11-32). In addition, there is an even smaller round structure (L10-20) to the west of the house. This possible

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Fig. 5. Conjoinable stone mortar fragments recovered from the middle part of the fill inside the round structure (L10-20) in Square L10, Level 1, from the south. (Photo by S. Kadowaki)

storage feature is also likely to have been used through Levels 1 and 2. These observations are consistent with our previous finds in Square M10, where a semicircular structure (M10-9) was built and originally inhabited in Level 2 and then reoccupied in Level 1. Thus, we suggest that the occupations of Levels 1 and 2 in this part of the site were more or less continuous, or separated only by a brief temporal hiatus.

Despite the overall similarity in architectural layouts between Levels 1 and 2, the latter phase is associated with a greater number of features, particularly clay-lined bins and indoor hearths. For example, the "snowman-shaped" house in Squares L10 and L11 has four clay-lined bins (L10-33, L11-30, 33, and 35) in Level 2 that appear to have been abandoned and buried in Level 1. In addition, a pit oven (L11-22) occurs in the larger room of this house. Although the Level 1 floor of the building is composed of ashy sediments, we did not detect any in situ firing feature. This pattern is consistent with that noted in Square M10, where our previous excavations uncovered a hearth (M10-17) inside a semicircular structure (M10-9) in Level 2 but not in Level 1.

Levels 1 and 2 also differ from each other in the distributional pattern of refuse. Reusable artifacts, such as ground stones and obsidian blade cores, tend to occur inside the houses in Level 2, while in Level 1 they are largely distributed in outdoor spaces. For example, in Level 1 we recovered a number of complete ground stones and an obsidian blade core in the northern outdoor space in Squares L10 and L11, where two pit ovens (L10-19 and L11-60) were also found. This was also associated with a cluster of flaked stone artifacts, including blades and a core, in the southern part of Square M10 (M10-43). This suggests that in Level 1 major activity areas in this part of the site were located outside of buildings. In Level 2, on the other hand, the larger room of the "snowman-shaped" house contained two obsidian blade cores (L11-49) (**Fig. 8**), a cluster of flaked flint artifacts (L10/11-50), and many ground-stone tools. In Level 2, an outdoor area north of this house appears to have been used mainly for discarding domestic refuse, including ash, animal bones, and broken tools.

Neolithic Level 3 **(Fig. 9).** The architectural plan of this phase clearly differs from those of Levels 1 and 2, suggesting an occupational hiatus between Levels 3 and 2. This accords with our previous observations of changes in architecture in Square M10, as indicated in the stratigraphy, as well as with a small hiatus suggested by radiocarbon dates between Levels 1–2 and Levels 3–4 (Nishiaki et al. in press). However, in the 2013 season, we detected a pattern of continuous architectural organization over this occupational hiatus between Levels 3 and 2. For example, Level 3 revealed a "snowman-shaped" house plan similar to that noted in Levels 1–2 (**Fig. 10**). The "snowman-shaped" house in Level 3 is also composed of two round structures, measuring ca. 5 m and ca. 2 m in diameter, respectively. The wall of the smaller structures

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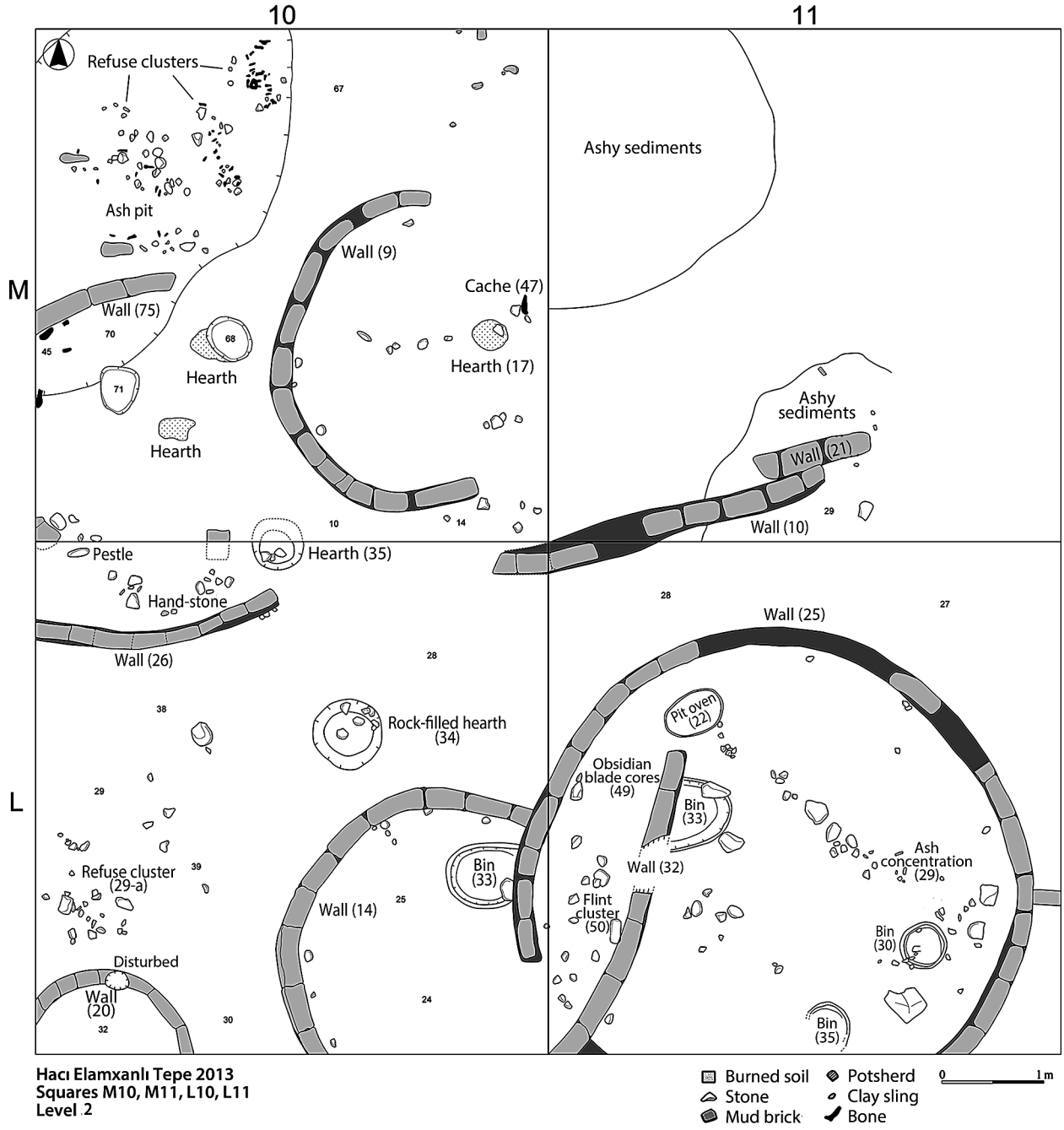

Fig. 6. Architectural plan of Level 2 at Hacı Elamxanlı Tepe, showing major features with their context numbers. (Drawing by T. Miki and S. Kadowaki)

abuts the larger one. In addition, the "snowman-shaped" houses in Levels 3 and 2 are commonly associated with smaller round structures (L10-20 in Level 2, and L10-63 and 78 in Level 3). These are possibly storage features and contained caches of ground-stone artifacts.

In Level 3, we also uncovered another round structure (M11-20) that stretches over Squares M11 and L11 (**Fig. 11**). Although it has not been fully excavated, it measures at least 4 m in diameter. If this is also a part of the "snowman-shaped" house, it would correspond to a larger round room. The interior of this structure has a clay-lined bin (M11-17) and a mud-walled feature filled with ashy sediments (M11-23/24).

The outdoor space of Level 3 had a dense concentration of domestic architectural features (i.e., hearths and bins) and refuse. Such areas occur both on the western

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Fig. 7. Two circular structures, forming a "snowman-shaped" plan, and other architectural features in the Neolithic Level 2, Squares L10 and L11, from the south. Scale is 1 m. (Photo by S. Kadowaki)

Fig. 8. Two large obsidian blade cores placed near the wall inside the large round structure (L11-15) in Level 2 in Square L11, from the east. Behind the cores lies the inner surface of the wall. (Photo by S. Kadowaki)

and eastern sides of the "snowman-shaped" house. On the eastern side (Squares L11 and M11), we recovered three clay-lined bins (L11-81, 83, and 105) and five hearths (L11-58, 80, 82, 106, and 107). One of the latter was lined with angular, burned cobbles (L11-106). The bins were filled with ashy, loose sediments that are not very different from the surrounding outdoor deposits, indicating the secondary depositional nature of the fill.

Among the abundant refuse in these areas, particularly notable are a number of clusters (at least nine) of flaked obsidian artifacts distributed in Squares M11 and L11 (M11-37 and L11-98, 108, 109, 110, and 114). Each cluster is tightly concentrated (less than 10–20 cm in diameter) and consists mainly of flakes with apparently few chips, indicating their deposition by secondary disposal, which in turn suggests the practice of cleaning lithic knapping areas that are located somewhere else. In addition, we noted that complete ground-stone artifacts were distributed in locations distinct from the areas with flaked stone clusters. The former tend to be located in the western part of Square L11 and southeastern corner of Square L10—that is, west of the obsidian clusters.

Level 3 represents a reoccupation of buildings that were constructed in the underlying Level 4. This is similar to the occupational history noted in Levels 1 and 2, with the former representing reoccupation of buildings originally constructed in the latter phase. In this sense, it is interesting that Levels 1 and 3 are similar in the spatial organization of architectural features and activity areas. In Levels 1 and 3, we found no clay bins or hearths inside the "snow-

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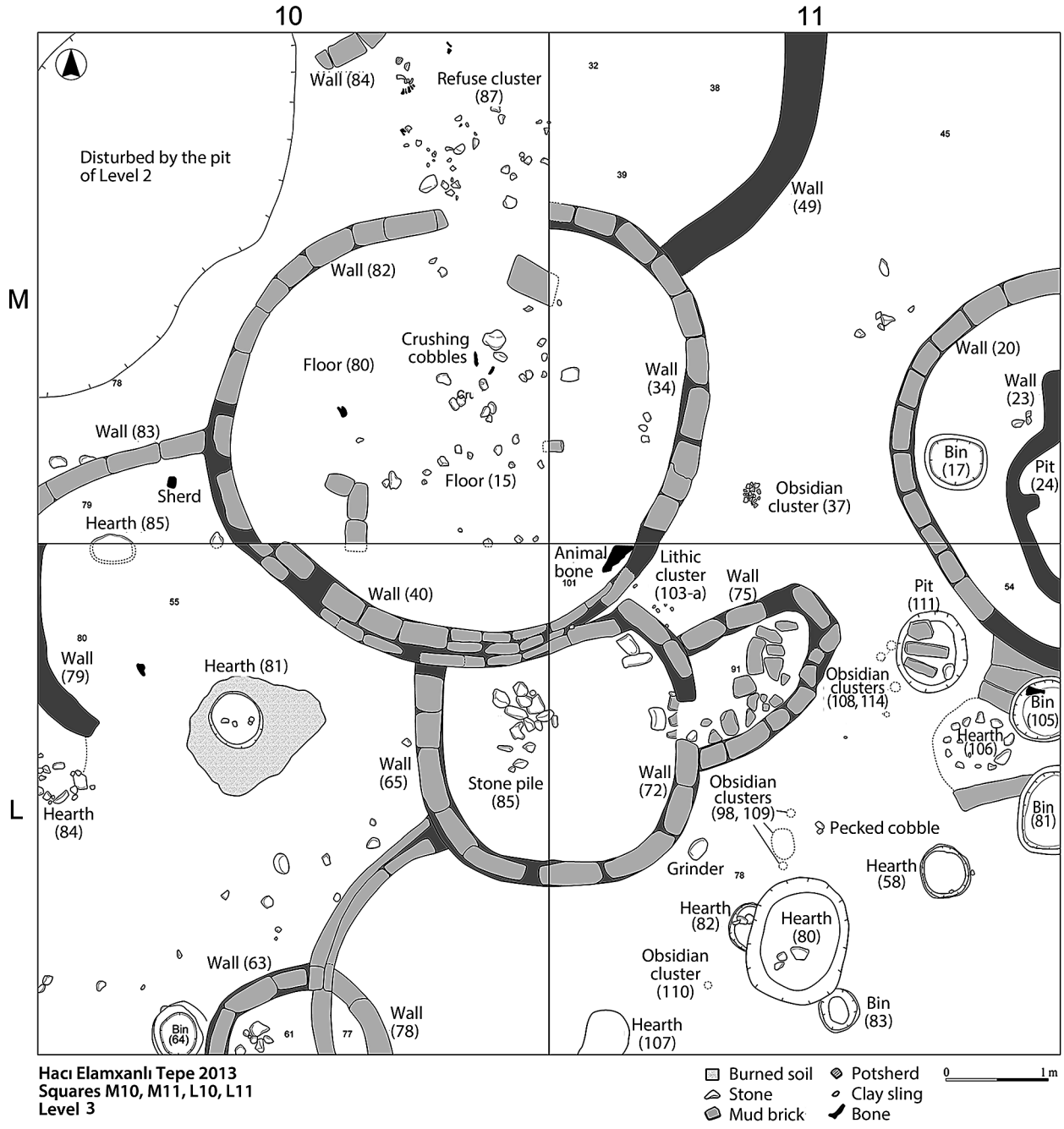

Fig. 9. Architectural plan of Level 3 at Hacı Elamxanlı Tepe, showing major features with their context numbers. (Drawing by T. Miki and S. Kadowaki)

man-shaped" houses, although these features frequently occurred in the outdoor space. On the other hand, four clay bins and one pit were found in the "snowman-shaped" house in Level 2, and two hearths were recovered inside the house in Level 4 (Nishiaki et al. in press).

Neolithic Level 4. In the 2013 season, we did not reach the occupational surface of Level 4, which is defined by the floor of a large round structure (M10-105) in Square M10, excavated in the 2012 season. However, in the 2013 season, we partially excavated deposits immediately above this floor in Squares M11, L10, and L11. This is a continuation of deposits from Square M10. These deposits consisted of numerous mud bricks fallen off a circular wall (M10-105). We also found a similar deposit of fallen mud bricks inside the newly found round structure in

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Fig. 10. A "snowman-shaped" building in Neolithic Level 3 at Hacı Elamxanlı Tepe, from the west. Note that the smaller round structures for storage are seen at the bottom right. (Photo by S. Kadowaki)

Fig. 11. A round structure in Level 3, Square M11, from the north. It contained a clay bin (M11-17) and a mud-walled feature filled with ashy sediments (M11-23/24). (Photo by T. Miki)

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Square M10 (M10-20). This deposit is located below the floor of Level 3, and we expect to find a lower floor under the fallen mud-brick deposits, as seen in Square M10.

Post-Neolithic Occupations. This season, we exposed post-Neolithic features and artifacts in deposits stratigraphically overlying Level 1. For example, we recovered a stone cluster (M11-3) in the northern part of Square M11. Although this feature appears to continue farther toward the east, it consists of ca. 100 boulders measuring around 20 cm in size. As this feature was associated with no artifacts, its date cannot be determined. Immediately southwest of the stone cluster, we found a complete pot of the Antique period, buried in a standing position (M11-8), although its relationship to the stone cluster is unclear.

Other, probably modern features are human burials in Squares L10 and L11. We recovered seven skeletons, of which four were children. Three skeletons were facing southwest, probably toward Mecca, and are most likely of the Islamic period or later in age. On the other hand, the arms of the other two skeletons were crossed over their chests and may be representative of burial customs of other religions (Christianity?). In any case, the highest part of the *tepe* appears to have been used for human burials in relatively recent time periods.

To summarize, in the 2013 season we extended the excavation area over a 10 × 10 m square in order to refine our understanding of occupational levels at the site and expose further architectural remains. As a result, our initial characterization of Neolithic levels (Levels 1–4) in Square M10 was found to be applicable to adjacent areas (Squares M11, L10, and L11), where four architectural phases were also recognizable. We also noted a similar pattern of occupational history over the excavated areas—that is, the main occupations in Levels 4 and 2, and reoccupation in Levels 3 and 1, which constitute the two main occupation horizons (Levels 1–2 and Levels 3–4).

Another notable find in this season was the repetitive occurrence of a similar architectural organization characterized by the "snowman-shaped" plan and its adjacent round storage feature. Although the excavated area is still limited, the continuity of architectural features, in terms of similarities in form, size, and spatial organization through different occupational horizons, is notable. This may represent a vernacular architectural tradition of the Neolithic inhabitants at Hacı Elamxanlı Tepe and deserves a comparative analysis with architecture documented at other settlements (see below).

Material Remains

Pottery

Pottery was noted right from the beginning of the occupation, during the 2012 season of excavations. However, the number of sherds (n = 18) was remarkably small in comparison with the great quantity of lithic artifacts from this site and the volume of pottery at the later Neolithic settlement of Göytepe (Nishiaki et al. 2013). The 2013 excavations yielded an even smaller number of Neolithic potsherds (three pieces) (**Fig. 12**). Based on the 2012 collection, the Neolithic sherds of Hacı Elamxanlı Tepe have been classified into four major wares: fine ware, mineral-tempered common ware, mineral-tempered coarse ware, and chaff-tempered coarse ware. As noted in **Table 1,** the 2013 collection represents the two mineral-tempered wares and the chaff-tempered ware, lacking fine ware (painted ware). All the Neolithic specimens are body sherds, measuring less than 6 cm in width. For this reason, it is practically impossible to reconstruct the original vessel shape.

Fig. 12. Neolithic pottery from Hacı Elamxanlı Tepe: (1) chaff-tempered coarse ware, (2) mineral-tempered coarse ware, and (3) mineral-tempered common ware. (Photo by K. Shimogama)

These specimens are significant additions to the small pottery assemblage from Hacı Elamxanlı Tepe. Combining samples from the two seasons, the pottery assemblage indicates the more common occurrences of mineral-tempered wares rather than chaff-tempered coarse ware. Sherds more or less comparable with the wares common at Hacı Elamxanlı Tepe have been found at Göytepe. However, the remarkable rarity of pottery at the former site and its association with a painted fine ware reminiscent of the northern Mesopotamian tradition (Nishiaki et al. in press) point to the unique traits of this assemblage. In addition, the prevalence of mineral-tempered pottery differs from the situation at the later settlement of Göytepe, where chaff-tempered pottery is dominant.

On a regional scale, the pottery assemblage most comparable with that of Hacı Elamxanlı Tepe is found at Horizon V, the lowest level of Aknashen, Armenia. The assemblage from the latter, containing two painted pots

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Table 1. The Neolithic Sherds from the 2013 Season at Hacı Elamxanlı Tepe

Contexts	*Level*	*Ware*	*Paste*	*Wall Thickness*	*Interior Surface*	*Exterior Surface*	*Core*	*Firing*	*Figure*	*Notes*
Black and compact sediments in an open area (M11-19)	1	Mineral-tempered common ware	Fine and compact; contains small brown minerals with a diameter of 0.1–0.5 mm	9 mm	Orange in color (7.5YR 7/6); wet-smoothed	Dull yellow-orange (10YR 7/3); covered with buff slip and treated by light burnishing	Grayish yellow (2.5Y 6/2)	Well fired	Fig. 12:3	
Inside the large room of the "snowman-shaped" house (L10-49)	3	Mineral-tempered coarse ware	Coarse; includes about 15% dark brown minerals and mica in a diameter of 0.5–2.0 mm	9 mm	Grayish yellow-brown (10YR 4/2); roughly smoothed	Dull yellow orange in color (10YR 6/4); roughly smoothed	Dull yellow (2.5Y 6/4	Well fired	Fig. 12:2	Traces of secondary firing are visible on both surfaces, especially on the interior surface
Inside the small room of the "snowman-shaped" house (L10-56)	3	Chaff-tempered coarse ware	2.0–5.0 mm organic inclusion, 5–10% brown and gray minerals, and sometimes mica	9–11 mm	Black; roughly smoothed	Black; light burnish	Yellowish gray (2.5Y 4/1)	Compact and well fired	Fig. 12:1	

probably imported from northern Mesopotamia, is also reported to be dominated by mineral-tempered pottery (Badalyan et al. 2010: 216). Its partial chronological overlap with Hacı Elamxanlı Tepe has also been demonstrated by radiocarbon dating (Nishiaki, Guliyev, and Kadowaki 2015). Considering their chronological positions as the oldest pottery-bearing assemblages in the region, questions related to the local or foreign origins of the first pottery and the socioeconomic role of ceramics in the local community should be investigated in the future.

Lithic Assemblages

The excavation of Squares L10, L11, and M11 in the 2013 season yielded more than 4,000 pieces of flaked stone artifacts from Neolithic contexts (i.e., Levels 1–4). Flaked stone artifacts were also recovered from the topsoil (n = 324) and post-Neolithic deposits (n = 250); their techno-typological features are similar to those of Neolithic artifacts, suggesting that they are derived from the underlying Neolithic deposits. Here we describe the assemblages from the Neolithic layers, focusing on Levels 1–3 and excluding finds from the upper disturbed deposits. As Level 4 was partially excavated in this season, only a small assemblage (ca. 250 pieces) was recovered; this will be reported when a greater sample size is obtained in future work.

The following section describes the flaked stone artifact assemblages from Levels 1–3 in Squares L10, L11, and M11 and compares them with those from the same levels in Square M10 that we excavated in the previous season. We did this because we did not sieve excavated sediments in the former squares (see above for the reason for this). In Square M10, we sieved at least 50% of the Neolithic deposits and increased the rate of sieving to 100% for contexts with high artifact density. We compared the assemblages collected without sieving (Squares L10, L11, and M11) with those collected through sieving (Square M10) and discuss below how differences in sampling methods influenced our account of lithic composition (raw materials, retouched tools, and debitage) and data on lithic dimensions.

Regarding lithic raw materials, the assemblages from the 2012 and 2013 seasons show a similar range of rock types, including obsidian, red-brown flint, green tuff, and red dacite/rhyolite, among others (Kadowaki, Gu-

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Table 2. Frequency of Obsidian and Other Lithic Raw Material, by Excavation Squares and Neolithic Levels at Hacı Elamxanlı Tepe

Square	*Raw Material*	*Level 1 (%)*		*Level 2 (%)*		*Level 3 (%)*	
M10 (2012)	Obsidian	469	(57.3)	1,037	(44.7)	416	(53.3)
	Others	349	(42.7)	1,285	(55.3)	364	(46.7)
	Total	818	(100.0)	2,322	(100.0)	780	(100.0)
M11 (2013)	Obsidian	72	(69.9)	236	(64.3)	187	(69.8)
	Others	31	(30.1)	131	(35.7)	81	(30.2)
	Total	103	(100.0)	367	(100.0)	268	(100.0)
L10 (2013)	Obsidian	124	(74.3)	112	(56.9)	743	(75.6)
	Others	43	(25.7)	85	(43.1)	266	(26.4)
	Total	167	(100.0)	197	(100.0)	1,009	(100.0)
L11 (2013)	Obsidian	142	(70.3)	179	(70.2)	1,000	(81.6)
	Others	60	(29.7)	76	(29.8)	240	(19.4)
	Total	202	(100.0)	255	(100.0)	1,240	(100.0)

Note the differences arising from the presence or absence of sieving between the 2012 and 2013 seasons, respectively.

liyev, and Nishiaki in press). Obsidian was most likely imported from sources in the southern Caucasus, and ongoing geochemical analyses should allow us to identify specific source locations. Potential sources of red-brown flint are outcrops located upstream along the Aghstafa River, ca. 40–60 km away from Hacı Elamxanlı Tepe. Various volcanic rocks and green tuff are locally available within a range of 10 km around the site. In all levels, obsidian occurs more frequently in the 2013 assemblages than in the previous season (**Table 2**). Obsidian in the 2012 assemblages (Square M10) accounts for 45–57% of the total raw material and increases to 57–82% in the 2013 season (Squares M11, L10, and L11). We may attribute this difference to spatial variations in the occurrence of raw material types through Levels 1–3; however, a more parsimonious explanation is the absence of sieving in the latter excavated areas leading to a biased collection. This is because obsidian artifacts have higher visibility in comparison with other rock types, owing to the luster of obsidian. By contrast, other lithic raw materials are mostly matte in texture; some, such as red dacite/rhyolite, are not easily recognizable as artifacts, owing to their physical properties. Thus, small flakes of raw materials other than obsidian are likely to be underrepresented in the 2013 assemblages, which were not sieved.

The range and frequency of retouched tool types are broadly similar between the 2012 and 2013 seasons (**Table 3**), both being characterized by high proportions of burins and retouched blades, with some distinct tools such as trapezes, sickle elements, and thick, round scrapers (**Fig. 13**). The two seasons, however, differ from each other in the proportions of certain types, particularly trapezes, which are fewer in the 2013 assemblage. Given that the mean size of trapezes, including unfinished/broken ones, is ca. 10 mm, they are likely to be underrepresented owing to the lack of sieving in the 2013 excavations. The underrepresentation of small objects in the 2013 collection is also indicated by the lower proportion of burin spalls. Although these are not technically retouched, they are included in the list of retouched tools to indicate their relative occurrence with respect to burins. The percentage of burin spalls is similar to that of burins in the 2012 season, while they are greatly underrepresented in the 2013 collection, which lacked sieving.

Table 4 compares relative frequencies of debitage types between the two seasons, including unretouched flakes/blades, chips (< 10 mm), cores, and core-trimming elements. Among these types, chips occur far less frequently in the 2013 assemblage, most likely due to the absence of sieving. Otherwise, the debitage of both seasons indicates a similar lithic technology characterized by the production of obsidian blades/bladelets from single platform cores. These blades/bladelets form the main blanks for various retouched tools. Other raw material types are represented mostly by irregular flakes, although some blades/bladelets of red-brown flint and green tuff are shaped into sickle elements.

In the 2012 season, obsidian blade production was indicated only by blade products and a few exhausted cores. However, the 2013 excavation yielded three large obsidian blade cores, indicating that blade production was practiced on-site (**Fig. 13:27–29**). The three blade cores were found in association with the "snowman-shaped" building that continued to be used in Levels 1–2. One of them (L11-47; **Fig. 13:29**) from Level 1 was recovered immediately outside the building (see **Fig. 4**), while

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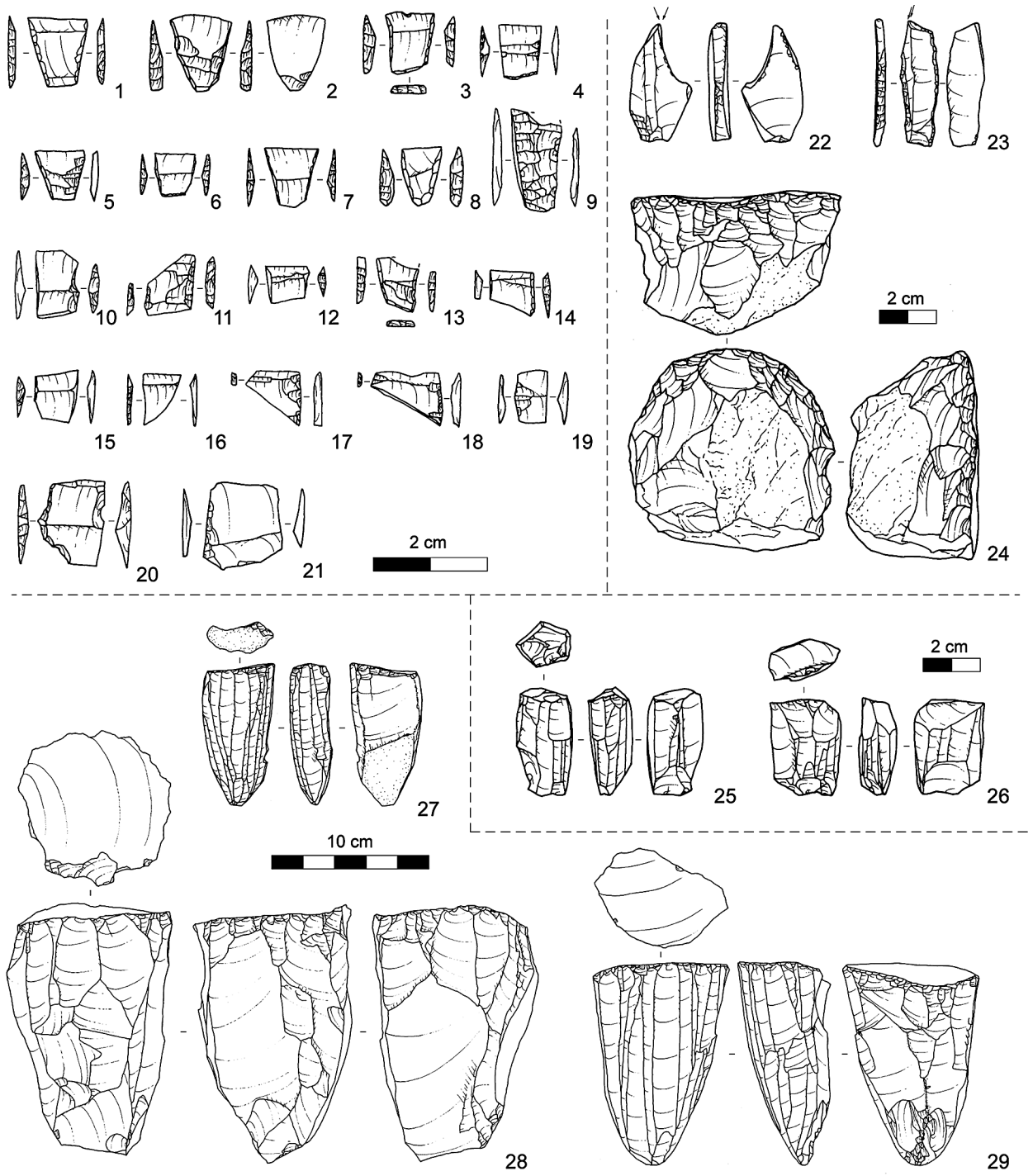

Fig. 13. Flaked stone artifacts from Hacı Elamxanlı Tepe. These comprise: (1–21) trapezes, including broken or unfinished pieces; (22–23) burins; (24) thick, round scraper; (25–26) bladelet cores; and (27–29) blade cores. All are made of obsidian except for some of red-brown flint (8) and red dacite/rhyolite (24). Note differences in scales. (Drawing by S. Kadowaki and H. Nakata)

the other two (L11-49; **Fig. 13:27–28**) from Level 2 were found together inside the same building near the wall (see **Fig. 6**). They were lying flat on their flaked surfaces. Although sediments around these cores were wet-sieved, we found no products or byproducts (including chips) resulting from their reduction. These recovery contexts suggest that the cores were cached in the domestic space for future reuse. Among single-platform cores, the largest one (**Fig. 13:28**) is circular in cross section, with evidence for the detachment of irregular blades or flakes

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Table 3. Frequency of Retouched Flaked Stone Tools from Hacı Elamxanlı Tepe (Levels 1–3)

	2012 Season (%)		*2013 Season (%)*	
Trapeze	17	(2.0)	3	(0.3)
Unfinished/broken trapeze	23	(2.8)	0	(0.0)
Sickle element	34	(4.1)	21	(2.0)
Borer	9	(1.1)	3	(0.3)
Scraper	25	(3.0)	19	(1.8)
Denticulated blade	21	(2.5)	37	(3.5)
Denticulated flake	9	(1.1)	3	(0.3)
Notched blade	8	(1.0)	11	(1.0)
Notched flake	3	(0.4)	8	(0.7)
Retouched blade	80	(9.6)	134	(12.5)
Retouched flake	54	(6.5)	46	(4.3)
Nibbled blade	34	(4.1)	121	(11.3)
Nibbled flake	5	(0.6)	2	(0.2)
Burin	225	(27.0)	402	(37.5)
Burin spall	243	(29.2)	203	(18.9)
Splintered piece	32	(3.8)	41	(3.8)
Truncation	10	(1.2)	18	(1.7)
Others	1	(0.1)	0	(0.0)
Total	833	(100.0)	1,072	(100.0)

Note the differences arising from the presence or absence of sieving between the 2012 and 2013 season, respectively.

Table 4. Frequency of Flaked Stone Debitage Types from Hacı Elamxanlı Tepe (Levels 1–3)

	2012 Season (%)		*2013 Season (%)*	
Cortical flake	33	(1.1)	28	(1.0)
Part-cortical flake	114	(3.7)	95	(3.3)
Flake	1,452	(47.1)	1,991	(68.9)
Part-cortical blade	7	(0.2)	4	(0.1)
Blade/bladelet	362	(11.7)	479	(16.6)
Chip	910	(29.5)	184	(6.4)
Debris	105	(3.4)	5	(0.2)
Crested piece	4	(0.1)	1	(0.0)
Platform tablet	26	(0.8)	30	(1.0)
Core edge flake	0	(0.0)	2	(0.1)
Core	72	(2.3)	72	(2.5)
Total	3,085	(100.0)	2,891	(100.0)

Note the differences arising from the presence or absence of sieving between the 2012 and 2013 seasons, respectively.

on all faces. On the other hand, the other two cores (**Fig. 13:27, 29**) are flattened in cross section and indicate detachment of regular, parallel blades struck from only half of the periphery of their striking platforms. The two cores also show abraded or slightly battered ridges at the periphery of their worked faces or at the unflaked surface on the back. These rounded ridges possibly resulted from the use of vices to stabilize cores during knapping. This technique indicates the use of pressure flaking, which has been suggested at some sites of the Shomutepe-Shulaveri culture (Badalyan et al. 2007; 2010). Along with these observations, their size variations also indicate that these three blade cores appear to represent different stages of core reduction. The core preparation stage is represented by the largest core (**Fig. 13:28**), followed by regular blade removals that progressively reduced the core size, as noted in the smaller two flat cores with blade scars (**Fig. 13:27, 29**).

As these blade cores (95–170 mm in length; n = 3) are distinctly larger than bladelet cores (38–39.5 mm in length; n = 2; **Fig. 13:25–26**), it is unclear whether the latter represent a distinct category or resulted from the progressive reduction of the former. The widths of blades/bladelets are distributed in a single mode (**Fig. 14**), indicating their continuous production. However, size was probably important for blank selection, as seen in the exclusive use of small blades and bladelets (ca. 11 mm in mean width) for the production of trapezes (**Fig. 13:1–21**). Additionally, the data on the dimensions of blades/bladelets is influenced by the presence or absence of sieving, as narrower pieces occur more frequently in the sieved 2012 assemblage.

To summarize, the flaked stone assemblages from the 2013 season display techno-typological features broadly similar to those from the 2012 season, despite variability in the relative frequencies of raw material types, compositions of retouched tools and debitage, and dimensions of blades/bladelets, arising from the absence of sieving. We aimed at clearly documenting the sampling methods used and the occurrences of small lithics (particularly microliths and bladelets), as an accurate assessment of their frequencies and techno-typological characteristics is necessary to understand the relationship between the Neolithic and Mesolithic lithic traditions. This relationship, in turn, has profound implications for the Neolithization of the southern Caucasus, particularly in regard to the degree to which indigenous Mesolithic foragers contributed to this process.

Ground-Stone Artifacts

The 2012 and 2013 seasons of excavations at Hacı Elamxanlı Tepe yielded 1,041 pieces of ground-stone artifacts. More than 80% of them were recovered from Neolithic Levels 1–4, while the rest were found in upper disturbed deposits, including topsoil. The finds from the latter contexts are likely to be intrusive materials from underlying Neolithic deposits, as they display similar techno-typological characteristics. Thus, this preliminary report describes all the ground-stone artifacts together as a single assemblage.

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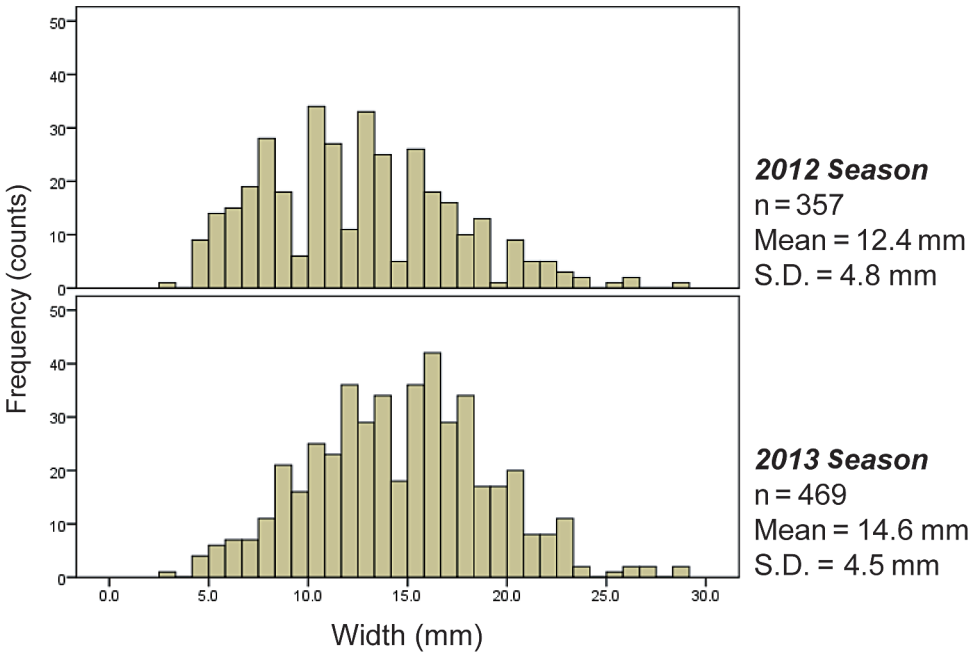

Fig. 14. Distribution of the width of unretouched blades/bladelets from Hacı Elamxanlı Tepe (Levels 1–3). Note differences arising from the presence or absence of sieving between the 2012 and 2013 seasons, respectively. (Graphs by S. Kadowaki)

Table 5. Frequency of General Categories of Ground-Stone Artifacts from Hacı Elamxanlı Tepe

	Number	*Percentage*
Grinding slab and quern	19	7.0
Mortar	2	0.7
Grinder and hand-stone	89	32.6
Pestle	3	1.1
Pounder	79	28.9
Cobble/pebble tool	59	21.6
Abrader and polisher	17	6.2
Ax and chisel	3	1.1
Shaft straightener	1	0.4
Unidentifiable fragment	1	0.4
Total	273	100.0/26.2
Pebble ("sling ball")	685	65.8
Debitage (flake and preform)	83	8.0
Grand Total	1,041	100.0

Table 5 lists frequencies of basic categories of ground-stone artifacts. Although their classification principally follows the ground-stone typology proposed by Wright (1992), they also incorporate some types reported from other Neolithic sites in the southern Caucasus (Badalyan et al. 2007; Hamon 2008). Thus, the typology reflects characteristics of the assemblage from Hacı Elamxanlı Tepe. For example, the most dominant category is pebbles constituting "sling balls." Although these are natural, unmodified pebbles (3–6 cm in length), their frequent occurrence, sometimes as caches in the settlement (Nishiaki et al. in press), indicates that they were gathered for some important purpose.

Excluding pebbles and debitage, we estimated the relative frequencies of other ground-stone artifacts (**Table 5**). Among this group, about 40% comprise tools that are mainly related to food-processing activities, predominantly grinders/hand-stones, followed by grinding slabs/querns, pestles, and mortars. We differentiated grinders (**Fig. 15:4**; 22–29 cm in length) from hand-stones (**Fig. 15:5–6**; 11–19 cm in length) on the basis of their dimensions, which resemble size distributions reported by Hamon (2008: 94). Hand-stones may have been used for tasks other than food processing (Hamon 2008: 108); however, along with grinders, they are characterized by ground surfaces often associated with transverse striations and pecked scars, which indicate their use and maintenance as tools moved in a linear back-and-forth direction on grinding slabs or querns. These grinding tools are also abundant at other Neolithic sites in the southern Caucasus (Hamon 2008)

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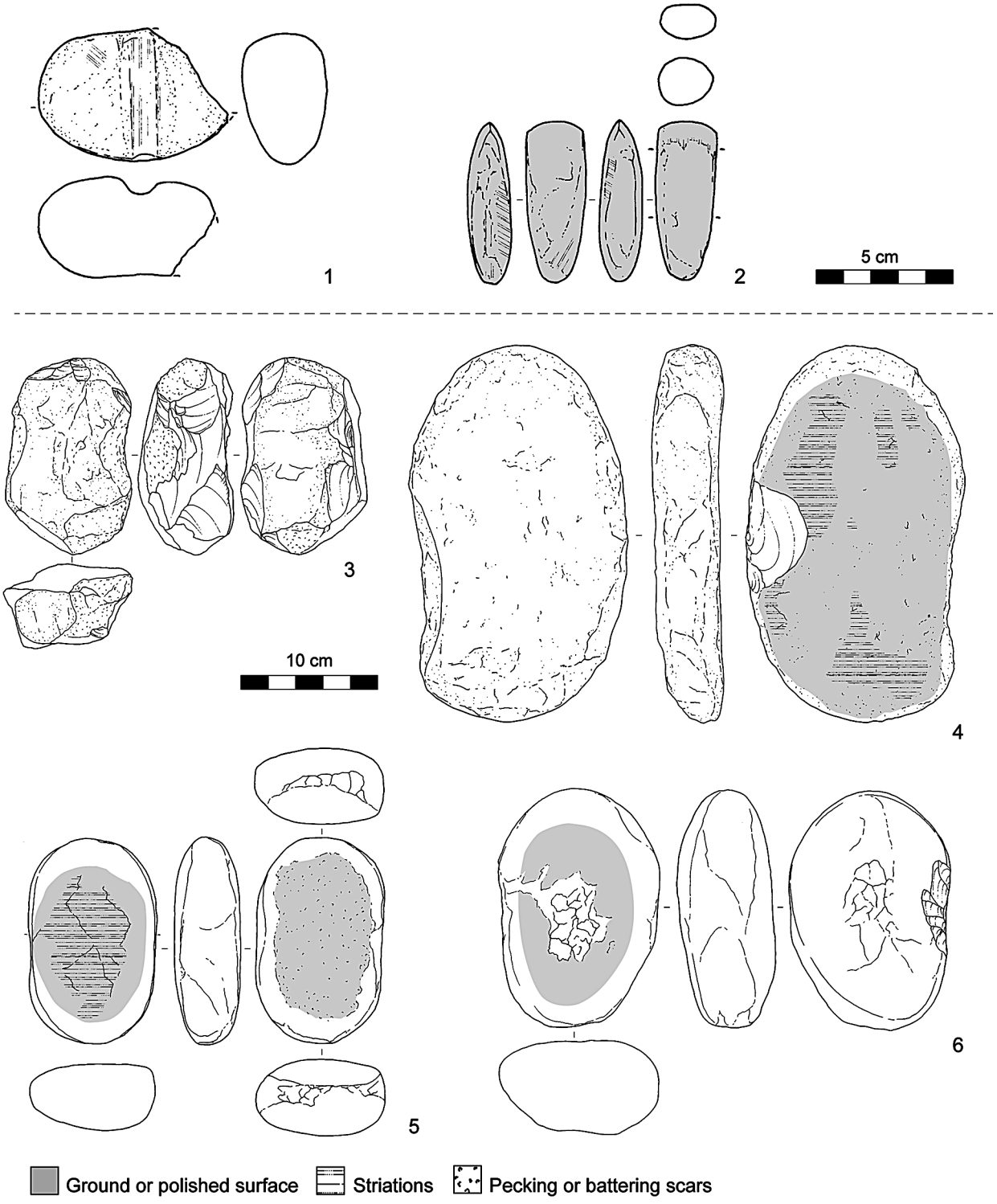

Fig. 15. Ground-stone artifacts from Hacı Elamxanlı Tepe, comprising: (1) shaft straightener, (2) chisels, (3) core pounders, (4) grinders, (5) hand-stone, and (6) hand-stone/crushing cobble. (Drawing by S. Kadowaki)

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and are reminiscent of the abundant grinding slabs and hand-stones at Pre-Pottery Neolithic B villages in the Levant (Wright 1993; Kadowaki 2014).

Other major tool categories are pounders and cobble/pebble tools (**Fig. 15:3**), which partly correspond to hammer stones in Hamon's typology (2008; 2012). They consist of various tool types defined by the kind and extent of modification traces, such as flaking, pecking, and grinding. Although the identification of their specific functions requires use-wear and residue analyses (Hamon 2008), their uses must have included pounding for the production and maintenance of the abundant grinding tools that often show pecked scars on their sides and working faces.

A single shaft straightener was recovered—a rare and notable tool with a U-shaped groove along its transverse axis (**Fig. 15:1**). The orientation of the groove is the same as that seen in shaft straighteners from other Neolithic sites in the southern Caucasus and the Zagros region, in contrast to those with a dominance of longitudinal grooves in the Levant and northern Mesopotamia (Badalyan et al. 2007; Arimura et al. 2010).

Another characteristic of the ground-stone artifacts from Hacı Elamxanlı Tepe is the scarcity of axes/chisels in comparison with sites related to the Shomutepe-Shulaveri culture (Hamon 2008). So far, this category is represented by a single piece of a small chisel (**Fig. 15:2**) and two tip fragments from ground edges.

Most tools described above are made of locally available volcanic rocks, such as andesite and basalt in boulders, cobbles, and pebbles. These occur in neighboring riverbeds, from which we suggest the raw material was procured and where the initial stages of tool production took place. On the other hand, the frequent occurrence of pounding tools along with debitage at the site indicate that the production and maintenance of tools were performed in the settlement, particularly at the household level, where food processing was practiced mainly with grinding tools. However, we currently know very little about the introduction and development of this technological system related to ground-stone artifacts in the southern Caucasus. Answering this question requires future investigation of chronologically earlier ground-stone assemblages and comparisons with neighboring regions that may have influenced the Neolithization process in the southern Caucasus.

Bone and Antler Artifacts

A total of 77 pieces of worked bone implements were recovered from the 2013 excavations at Hacı Elamxanlı Tepe. They were classified on the basis of their morphology (**Table 6**). As is the case at most Neolithic sites in the southern Caucasus (Badalyan et al. 2007; 2010; Hansen, Mirtskhulava, and Bastert-Lamprichs 2007; Lyonnet et al. 2012), awls or pointed tools are predominant in the assemblage (n = 47), followed by smaller numbers of other categories. In terms of manufacturing technology, these tools are made on blanks produced by the groove-and-splinter technique (**Fig. 16:1–2**). Although this practice is consistent throughout the occupation, some differences are observed between the lower (4–3) and upper (2–1) levels. Of great importance is the introduction of hammers in Level 2 (**Fig. 16:5**), fashioned out of the antler of red deer (*Cervus elaphus*). These differ from similar implements of the subsequent period, such as that seen at Göytepe, as they lack a perforation on the body. The frequent use of antler has been widely documented at settlements belonging to the late Shomutepe-Shulaveri culture like Göytepe (Narimanov 1987; Guliyev and Nishiaki 2012). Thus, this invention, as well as an apparent increase of hide-working tools (spatula and flesher) (**Fig. 16:3**), can be regarded as the first sign of remarkable developments in the bone artifact industry during the early stage of the Shomutepe-Shulaveri culture.

Table 6. List of Bone and Antler Tools from the 2013 Season at Hacı Elamxanlı Tepe

	Level 4	*Level 3*	*Level 2*	*Level 1*	*Total*
Awl	2	28	13	4	47
Spatula	0	0	3	0	3
Bipoint	0	2	1	0	3
Palette	1	3	0	1	5
Buttonette	0	1	0	0	1
Flesher	1	0	0	0	1
Hammer	0	0	3	1	4
Ornament	1	0	0	0	1
Indeterminate	1	7	1	3	12
Total	6	41	21	9	77

It is also important that "palettes" from Hacı Elamxanlı Tepe show close techno-morphological resemblances with those from Aratashen in the Ararat plain (Badalyan et al. 2007: fig. 6g) and Tilkitepe in the Lake Van region (Korfmann 1982: Abb. 17–5) (**Fig. 16:4**). Although the chronological position of Tilkitepe remains highly problematic, the virtually indistinguishable similarities in assemblages may point to some links between the southern Caucasus and Lake Van regions at the beginning of the sixth millennium B.C.

Small Finds

The category of small finds includes a variety of objects. The most common are burned tabular clay fragments of various shapes, which exceed potsherds in

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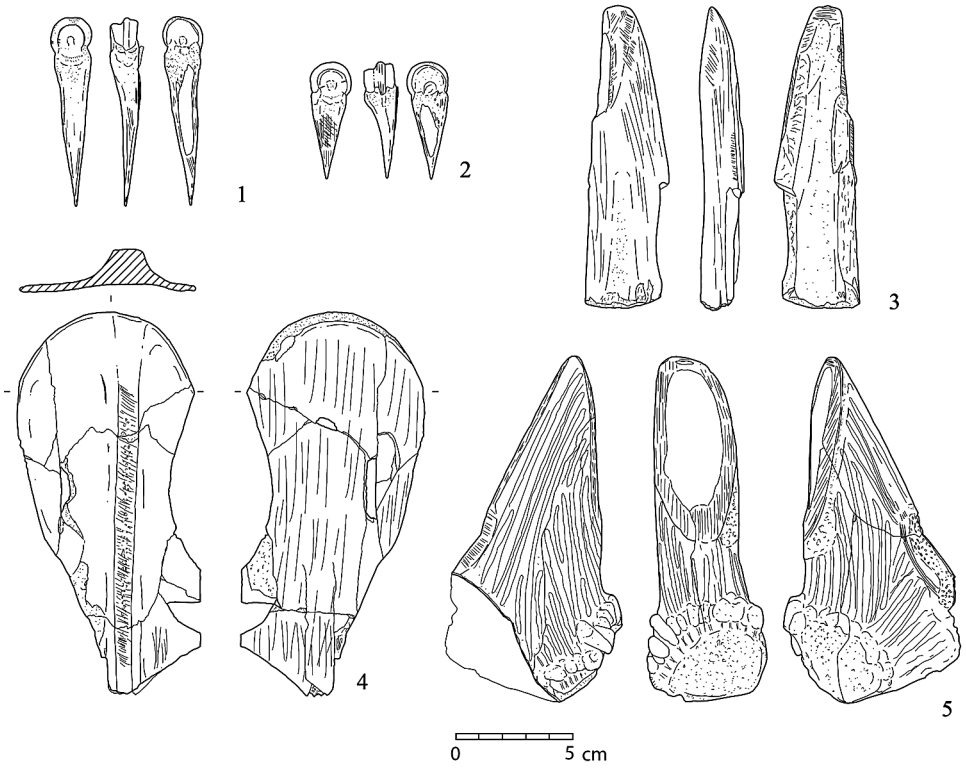

Fig. 16. Worked bone and antler implements from Hacı Elamxanlı Tepe from the 2013 season. (Drawing by S. Arai)

quantity. They were regularly found in all occupation levels at Hacı Elamxanlı Tepe. However, comparable specimens have been rarely encountered in the much larger excavations at Göytepe. This fact may point to the existence of a particular way of using clay among the oldest Pottery Neolithic communities. Considering their tabular shape and the occasional imprints of plants, they may represent fragments of containers, clay lining on some storage facilities or ovens, and even building material. Identification of their variations and uses deserves detailed investigation.

Another commonly found group of clay objects comprises sling balls. As referred to above, most sling-balls are made of stone, but some are also clay. The latter resemble stone sling balls in shape and size, measuring approximately 3–5 cm in length and about 3 cm in width. They have often been discovered in the form of a cache.

Clay objects also include one piece of a peanut-shaped object (**Fig. 17**), measuring 3.3 cm in height, 1.5 cm in thickness, and 2 cm in width. It is well fired and has a depression about 3 mm deep and 5 mm in diameter along the center of one side. It was discovered in the ash deposits of an open space in Level 3 (L10-74). Although the Shomutepe-Shulaveri cultural inventory includes a large diversity of clay objects and figurines (Kiguradze 1986: Abb. 82), no comparable object was noted here.

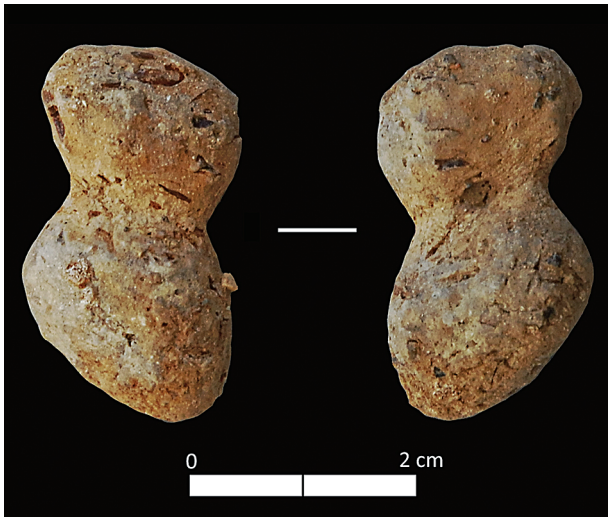

Fig. 17. The peanut-shaped clay material from Hacı Elamxanlı Tepe. (Photo by K. Shimogama)

In regard to ornamental objects, one disk-shaped bead made of a white stone is noteworthy. It is a tiny

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Table 7. Macrobotanical Remains from Hacı Elamxanlı Tepe

Macrobotanical Remains	*Number of Items*	*Frequency**
Food Plants		
Barley, grain	175	1.00
Hulled wheat, grain	37	1.00
Naked wheat, grain	3	0.33
Cereal, grain	375	1.00
Barley, rachis	121	0.67
Hulled wheat, spikelet base/glume	401	1.00
Naked wheat, spikelet base/glume	13	0.50
Chaff/rachis (barley or wheat)	423	1.00
Lens sp. (lentil/legume)	2	0.17
Amygdalus sp.	5	0.17
Crataegus sp.	1	0.17
Celtis sp.	2	0.17
Wild Taxa		
Artemisia-type	191	1.00
Asteraceae	1	0.17
Heliotropium sp.	34	0.17
Boraginaceae	1	0.17
Brassicaceae	61	0.50
Gypsophilla	11	0.17
Silene	3	0.33
Caryophillaceae	26	0.83
Chenopodium-type	300	0.83
Trifoliae	38	1.00
Erodium-type	3	0.17
Lamiaceae	3	0.33
Bromus sp.	18	0.33
Poa-type	19	0.67
Panicaceae	3	0.50
Poaceae	52	0.83
Adonis	3	0.33
Other wild taxa	27	0.83
Indeterminate	Uncounted	—
Total	2,352	

Note: Preliminary counts are based on six samples from Level 4.

* Frequency refers to the ratios of occurrences out of the six samples.

specimen, measuring 5 mm in diameter and 2 mm in thickness, and was discovered during the flotation of soil samples. Our records indicate that it was derived from a clay-lined pit oven in the "snowman-shaped" house in Level 2 (L11-22).

Plant Remains

More than 90 sediment samples were recovered for archaeobotanical analysis from both seasons of excavation. During the 2013 season, we collected approximately 60 sediment samples from various contexts and from all squares, including hearths, floors, ash pits, bins, and mortars. Minute concentrations of grains visible to the naked eye were also identified.

The samples were processed through flotation with a 0.3 m mesh sieve. Preliminary results of the analysis of six samples from Level 4 are presented to provide an overview of the plant assemblage of the oldest occupation level at this settlement. Five samples were collected from the floor of the round building in Square M10 (M10-96) and one from the large ash pit located at the northwest corner of the same square (M10-91). A total of 27 liters of soil was sampled (2.5–6 liters each; average of 4.5 liters), containing 170 ml of light fractions. **Table 7** lists the number of plant species and their frequency.

Almost all identified macrobotanical remains were charred, except for seeds of Boraginaceae and *Celtis* sp., which were mineralized. Barley is the most predominant cereal grain, and more than 100 rachis of barley were recovered. Hulled wheat exceeds barley in the number of glumes/chaff, although this is partly due to the fragmentary condition of hulled wheat glumes. Therefore, barley is considered to be the main cereal used at Hacı Elamxanlı Tepe, followed by hulled wheat. Many of the barley rachis have a clear trait indicating that they were of the domesticated variety; that is, each rachis retains the basal part of the upper rachis. Specimens that were not charred include two-rowed barley spikelets, which were retrieved inside a mud brick.

The important characteristic of this assemblage is the scarcity of free-threshing wheat. Only three wheat grains were of the round, plump form of the naked variety, and the number of grain/rachis of the free-threshing variety accounts for merely 3.6% of the hulled types. This ratio shows a striking difference from the neighboring, chronologically later site of Göytepe, in which free-threshing wheat along with barley are among the primary crop plants (Nishiaki et al. in press). The other possible food plants, which occur in small amounts, are lentils (*Lens* sp.), hackberries (*Celtis* sp.), almonds (*Amygdalus* sp.), and hawthorns (*Crataegus* sp.).

Among the wild/weedy species, *Chenopodium*-type, *Artemisia*-type, *Heliotropium* sp., *Bromus* sp., and several kinds of Brassicaceae seeds are common. Most of these wild taxa are also common at Göytepe (Kadowaki et al. 2015). In particular, the presence of the *Artemisia*-type is significant, as large amounts were discovered at Göytepe, often recovered in dense concentrations, suggesting intentional gathering. The occurrence of *Artemisia*-type at Hacı Elamxanlı Tepe might suggest intentional exploitation from the beginning of the Shomutepe-Shulaveri occupation in the region.

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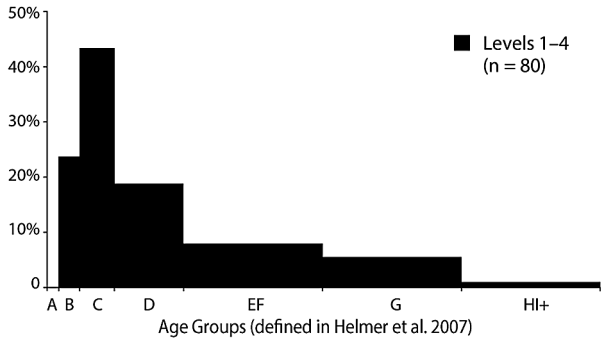

Fig. 18. Culling profile for caprines. (For age estimation method, see Helmer et al. 2007.) (Graph by S. Arai)

The preference for free-threshing wheat is considered to be one of the characteristics of the Neolithic Caucasus (Hovsepyan and Willcox 2008; Arimura et al. 2010: 82; Lyonnet et al. 2012: 161). As a matter of fact, free-threshing wheat was commonly exploited at Göytepe (Kadowaki et al. 2015). Given the older chronological position of Hacı Elamxanlı Tepe, which has rarely yielded free-threshing wheat, it is possible that the intensive cultivation of this type of wheat was a phenomenon of a rather late period of the Pottery Neolithic in the Middle Kura Valley. A detailed examination of the plant assemblage of Hacı Elamxanlı Tepe will shed light on the processes of establishing a food-producing economy characteristic of the southern Caucasus—that is, intensive exploitation of free-threshing cereals.

Faunal Remains

A faunal assemblage of 5,602 fragments (ca. 19 kg in weight) was recovered during the 2013 season of excavations at Hacı Elamxanlı Tepe. All specimens were recovered by hand during the excavation. As mentioned elsewhere (Nishiaki et al. in press), the animals exploited in this settlement were primarily domestic caprines (more than 80%) and, to a lesser extent, cattle, pig, and game species. The 2013 assemblage verified this pattern. As at other Neolithic sites in the region (Badalyan et al. 2007), the culling profile for caprines from Hacı Elamxanlı Tepe indicates that they were primarily raised for meat (**Fig. 18**).

The assemblage from the 2012 season shows that the frequency of cattle increases slightly in the upper levels (Nishiaki et al. in press). However, the frequency in the 2013 assemblage shows no comparable trend: cattle are quite rare throughout the four occupation levels (**Table 8**). While the precise reason for this inconsistency remains unclear, the age profile indicates that cattle were used for meat. Block vertebrae formation in a cattle bone from Level 3 indicates that they were also possibly used as draft animals (**Fig. 19**).

Discussion

The significance of Hacı Elamxanlı Tepe lies in its chronology. Eight radiocarbon dates have firmly placed the four occupation levels in a period ranging from ca. 5950 to 5800 cal B.C. (Nishiaki, Guliyev, and Kadowaki 2015). This date range is earlier than those from other Shomutepe-Shulaveri sites in the Middle Kura Valley, such as Aruchlo and Mentesh (Lyonnet et al. 2012), and from sites in the Araxes Valley, such as Aratashen (Badalyan et al. 2010). The occupation levels of Hacı Elamxanlı Tepe partially overlap with those of the lowest phase at the site of Aknashen (Badalyan et al. 2010), considered to represent the earliest stage of the Shomutepe-Shulaveri culture (Nishiaki, Guliyev, and Kadowaki 2015). As described above, the extension of the excavation area in the 2013 season provides a good basis to define the starting point of this culture and its subsequent development, through comparisons with evidence from later settlements. At the same time, those records help us to evaluate the origins of this culture. In fact, archaeological records from Hacı Elamxanlı Tepe include a range of elements that have not been identified at later settlements, including those related to architecture, pottery, lithic and bone industries, clay and ornamental objects, and plant and animal exploitation. The assemblages also exhibit links with both the local Mesolithic culture and the coeval Pottery Neolithic cultures situated to the south.

In terms of architecture, the discovery of a unique structure termed the "snowman-shaped" building is important. This house plan has never been encountered in the late Shomutepe-Shulaveri culture at Göytepe, where we excavated extensively (more than 1,000 m^2) within Neolithic settlements that are dated a few hundred years later than Hacı Elamxanlı Tepe. Although domestic buildings at Göytepe are circular (like those at Hacı Elamxanlı), they tend to be arranged around an open space and are connected with each other by appendicular walls to form a building compound with a courtyard (Guliyev and Nishiaki 2012; 2014). Such courtyard structures characterize Neolithic settlements, at least in the upper levels of Göytepe (Levels 1–5), although we do not have sufficient exposures of architectural arrangements in the lower levels (Levels 6–14). On the basis of these observations, we hypothesize that a change in architectural organization occurred between Level 1 at Hacı Elamxanlı Tepe and Level 5 at Göytepe (approximately between 5800 and 5500 cal B.C., according to Nishiaki, Guliyev, and Kadowaki 2015). This change in domestic buildings has implications for a concomitant shift in

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Table 8. Faunal Remains from the 2013 Season at Hacı Elamxanlı Tepe

	Level 4 (n = 84)		*Level 3 (n = 519)*		*Level 2 (n = 334)*		*Level 1 (n = 154)*		*Total*	
Taxa	NISP*	%	NISP	%	NISP	%	NISP	%	NISP	%
Ovis aries	5	6.0	51	9.8	50	15.0	26	16.9	132	12.1
Capra hircus	5	6.0	14	2.7	9	2.7	4	2.6	32	2.9
Ovis aries/Capra hircus	66	78.4	378	72.7	250	74.8	104	68.0	798	73.1
Bos taurus	1	1.2	20	3.9	6	1.8	3	1.9	30	2.7
Sus scrofa	3	3.6	24	4.6	6	1.8	7	4.5	40	3.7
Gazella subgutturosa	0	0.0	0	0.0	0	0.0	1	0.6	1	0.1
Canis familiaris	0	0.0	1	0.2	0	0.0	1	0.6	2	0.2
Cervus elaphus	0	0.0	1	0.2	3	0.9	3	1.9	7	0.6
Capreolus capreolus	0	0.0	1	0.2	0	0.0	0	0.0	1	0.1
Ovis/Capra/Gazella	0	0.0	3	0.6	0	0.0	0	0.0	3	0.3
Lepus sp.	0	0.0	0	0.0	1	0.3	1	0.6	2	0.2
Vulpes vulpes	0	0.0	1	0.2	0	0.0	1	0.6	2	0.2
Bird	2	2.4	1	0.2	1	0.3	1	0.6	5	0.5
Fish	0	0.0	1	0.2	0	0.0	0	0.0	1	0.1
Tortoise	0	0.0	18	3.5	2	0.6	1	0.6	21	1.9
Mollusk	1	1.2	0	0.0	0	0.0	0	0.0	1	0.1
Small rodent	1	1.2	3	0.6	5	1.5	1	0.6	10	0.9
Frog	0	0.0	2	0.4	1	0.3	0	0.0	3	0.3
Total	84	100.0	519	100.0	334	100.0	154	100.0	1,091	100.0

*NISP = Number of Identified Species

Fig. 19. Cattle vertebrae with pathological features. (Photo by K. Shimogama)

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social organization at the household level, such as size and composition, as indicated by several studies on this issue for Neolithic communities in the Levant (Garfinkel 2006; Banning 2011; Kadowaki 2012).

Building layouts similar to the "snowman-shaped" house at Hacı Elamxanlı Tepe have been known from the early excavations at Shulaveris Gora and Imiris Gora in eastern Georgia (Munchaev 1982: 139–40). They have been also recovered by recent excavations at Aruchlo, located nearby these sites (Hansen and Mirtskhulava 2012: 60–64), where Building Complexes I, II, and III are each composed of a circular structure adjoined by curvilinear walls that create another circular room. Radiocarbon dates from this site are distributed in a range between 5800 and 5300 cal B.C. (clustering at 5700 cal B.C.), which roughly corresponds to the time span that we suggest for the change in architectural organization between Hacı Elamxanlı and Göytepe. Another possible example of the "snowman-shaped" house has been reported from the lowest level of Aknashen (Horizon IV), in Armenia (Badalyan et al. 2010: 205). The architectural plan of Horizon IV (dated between ca. 5850 and 5500 cal B.C.) shows two circular structures (5 and 4.5 m in diameter, respectively) that are attached to each other, sharing part of a wall (Badalyan et al. 2010). In this case, however, the excavators suggest that the two circular structures represent different occupational phases (Badalyan et al. 2010: 188). This is not the case for the architecture from Hacı Elamxanlı Tepe, in which two circular structures were connected with a well-made passage, testifying to purposeful simultaneous construction. Given this observation, we suggest that the identification and interpretation of the "snowman-shaped" house must be based on the examination of the contemporaneity of constituent walls and the use of space in and around the structure in addition to a simple comparison of the building plan.

Differences from Göytepe are seen in the artifact assemblages as well—in the scarcity of pottery at Hacı Elamxanlı Tepe and differences in the lithic typo-technology. The Hacı Elamxanlı Tepe assemblages contain trapezes and bladelets to a greater extent than at Göytepe and other Shomutepe-Shulaveri sites. While the greater frequency of these small artifacts at Hacı Elamxanlı Tepe may be partly due to sieving, the disparity seems too large to be explained by this reason alone. Other important differences include the more common occurrences of flake scrapers at Hacı Elamxanlı Tepe. Scrapers of this type, made on rather thick cortical flint flakes (**Fig. 13:24**), have rarely been encountered in the Göytepe assemblages. In addition, Hacı Elamxanlı Tepe has a smaller quantity of obsidian artifacts (ca. 50–80%), which make up more than 80% of the lithic assemblages from Göytepe. As these samples were collected by hand from both sites, the disparity is significant.

The ground-stone assemblage from Hacı Elamxanlı Tepe includes almost all the basic tool categories of the Shomutepe-Shulaveri culture (Hamon 2008). The rarity of polished axes and chisels deserves attention, as they frequently occur in the later settlements of Göytepe and other sites (Narimanov 1987). The bone-tool assemblage of Hacı Elamxanlı Tepe also exhibits similarities with later assemblages, although it lacks some features, such as the presence of antler hammers. As mentioned above, a few of these occur only in the upper levels; their form is less elaborate and devoid of a central hole for hafting.

Differences in the faunal and floral remains are observed. Our preliminary study demonstrates the common exploitation of barley at Hacı Elamxanlı Tepe. The rare use of free-threshing wheat is in striking contrast to plant use at the later Shomutepe-Shulaveri sites, including Göytepe, where it constitutes one of the most dominant cereal types (Arimura et al. 2010: 84). If this is indeed confirmed in further studies, one may suggest a remarkable shift in the use of major cultigens during the early stage of the Shomutepe-Shulaveri culture.

The faunal assemblages from Hacı Elamxanlı Tepe also exhibit some dissimilarity with those of Göytepe. Rather unexpectedly, the faunal records indicate a heavier dependence on domesticated animals at the chronologically earlier site of Hacı Elamxanlı Tepe, as compared with that in the later periods at Göytepe. More specifically, the use of animals at Hacı Elamxanlı Tepe is more restricted, with limited exploitation of wild fauna. This finding seems in accord with the changes in tool types mentioned above: for example, fewer axes/adzes, which are generally regarded as wood-working tools, and antler hammers at Hacı Elamxanlı Tepe. The more intensive use of forest resources might have become common in the later phase of the Shomutepe-Shulaveri culture. This pattern may be correlated with an increase of humid climatic conditions as suggested in palynological records from the Lesser Caucasus (Joannin et al. 2013).

Thus, although the cultural assemblages from Hacı Elamxanlı Tepe share basic elements with the later assemblages of the Shomutepe-Shulaveri culture, they are dissimilar in important ways. This testifies to considerable local cultural developments in the first half of the sixth millennium B.C. In other words, classic elements of the Shomutepe-Shulaveri culture (Narimanov 1987) did not appear as a package in the southern Caucasus but were established gradually, involving significant diachronic changes in a variety of cultural and economic fields.

On the other hand, the relationship of the Hacı Elamxanlı Tepe assemblages with those of the local preceding cultures has not been fully defined. This unsatisfactory situation is primarily owing to the lack of reliable

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field data from chronologically older sites. One may suggest that the microlithic components at Hacı Elamxanlı Tepe are derived from local Mesolithic traditions. However, this conclusion needs to be considered with care. Microliths at Hacı Elamxanlı differ from those of the Mesolithic in the southern Caucasus in terms of their frequency and variety. The Mesolithic is characterized by a greater frequency and variety of microliths, including both non-geometric (e.g., backed or truncated bladelets) and geometric forms (e.g., scalene or isosceles triangles) (Meshveliani et al. 2007). In this respect, the microliths at Hacı Elamxanlı Tepe are distinct from those at Kmlo-2 in the Armenian highlands, where the production of more abundant and varied microliths might have lasted until the Neolithic and Chalcolithic periods (Arimura, Chataigner, and Gasparyan 2009; Arimura et al. 2010).

A few "aceramic Neolithic" lithic assemblages could bridge the technological gap between the Mesolithic and Hacı Elamxanlı Tepe assemblages. One such example is the assemblage from Layer A2 at Kotias Klde, western Georgia, which contains transverse arrowheads/trapezes, ventrally retouched denticulates, and flake scrapers (Meshveliani et al. 2007). Another possible example is the collection from Anaseuli I, also in western Georgia, which includes trapezes, abundant burins, and thick scrapers (Korobkova 1996; Meshveliani 2013). Although these sites are reported to be "Neolithic" or "aceramic Neolithic," their chronological or subsistence records are too sparse to determine whether they represent a transitional stage from the Mesolithic to the Neolithic.

Thus gaps in our understanding of the local cultural sequence require new data before we can conclude that the trapeze-dominant microlithic assemblage at Hacı Elamxanlı Tepe is indigenous with cultural-historical roots in more varied microlithic assemblages of the Mesolithic. This also applies to conclusions drawn from non-lithic cultural items.

We now turn to a broader geographic perspective. From an early stage of research, the food-producing economy in the southern Caucasus was assumed to have a foreign origin, with possible cultural links to northern Mesopotamia (Abibullayev 1959; Munchaev 1982; Narimanov 1987). The common construction of circular buildings in the southern Caucasus and in the Halaf culture, and the presence of a few imported north Mesopotamian ceramics recovered in the former region, were factors emphasized to argue for direct links between these two regions. In recent years, this issue has resurfaced with the discovery of Hassuna-Samarra ceramics from Aknashen upstream along the Araxes (Badalyan et al. 2010: 194) and, most recently, from Hacı Elamxanlı Tepe in the Middle Kura Valley (Nishiaki et al. in press).

Archaeological records from Hacı Elamxanlı Tepe can provide additional data to support those links. Despite limitations arising from morphological comparison, we note that a "snowman-shaped" plan also occurs in the late Pre-Halaf or Proto-Halaf contexts at Halula, northern Syria, toward the end of the seventh millennium cal B.C. (Akkermans and Schwartz 2003: 104). Although the Pre-Halaf and Proto-Halaf periods are primarily defined by ceramic assemblages, these phases are also characterized by the emergence of circular structures associated with multicellular rectangular buildings (Molist et al. 2013). These circular structures are considered early manifestations of the Halafian *tholoi*, which are often mentioned in relation to numerous circular structures at the Shomutepe-Shulaveri settlements in the southern Caucasus (Munchaev 1982; Chataigner 1995; Hansen, Mirtskhulava, and Bastert-Lamprichs 2007). One of the circular buildings in the late Pre-Halaf or Proto-Halaf context at Halula consists of two circular rooms connected to each other via a passageway (Akkermans and Schwartz 2003: 104–10). This is likely to represent a house compound instead of successive building constructions/occupations, resembling the "snowman-shaped" structure at Hacı Elamxanlı. Although circular buildings at Halula have distinct architectural elements, such as stone foundations and floor plastering (Molist et al. 2013), the occurrence of a similar plan, contemporary with that at Hacı Elamxanlı, may indicate a cultural link between the southern Caucasus and northern Mesopotamia. However, such an idea of a remote cultural link needs to be cautiously examined (Hansen, Mirtskhulava, and Bastert-Lamprichs 2007). This is a question worth examining carefully in combination with other lines of data, such as the occurrence of fine painted wares reminiscent of the Hassuna, Samarra, and Halaf types at several Neolithic sites in the southern Caucasus, including Hacı Elamxanlı Tepe (Chataigner 1995; Palumbi 2007; Badalyan et al. 2010; Nishiaki et al. in press).

With respect to the lithic industry, trapezes at Hacı Elamxanlı Tepe can be interpreted as part of a regional cultural phenomenon because they also occur at Pottery Neolithic sites in the south, as noted in our previous report (Nishiaki et al. in press). These Neolithic trapezes, among other geometrics in the Levant, Mesopotamia, and the Zagros region, are known to lack any continuous link with microliths of the Epipalaeolithic (Nishiaki 1993; Nishiaki, Azizi Kharanghi, and Abe 2013). This possible allochthonous cultural relationship is also suggested by the methods of retouching to fashion trapezes. Trapezes at Hacı Elamxanlı Tepe are made by segmenting bladelets. When the segmented ends are retouched, they form oblique truncations—that is, steep retouch toward the dorsal face—sometimes thinned by flat invasive retouch from the segmented ends. A single example shows such invasive retouch totally covering its dorsal

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surface (**Fig. 13:9**). These methods appear different from those at Kmlo-2, where bifacial retouch is observable on trapezes (Arimura, Chataigner, and Gasparyan 2009: 18). In contrast, retouching methods at Hacı Elamxanlı Tepe also characterize some of the trapezes at Pottery Neolithic sites in Upper Mesopotamia (Nishiaki 1993), including those contemporaneous with Hacı Elamxanlı, such as Levels 4–10 at Sabi Abiyad (Copeland 1996).

The shaft straightener in the ground-stone industry is another element indicating the existence of a widespread cultural horizon. The specimen from Hacı Elamxanlı Tepe retains a U-shaped groove along its transverse axis. This is similar to those characterizing Neolithic sites not only in the southern Caucasus but also in northern Mesopotamia and the Zagros—that is, in the eastern wing of the Fertile Crescent (Kozłowski and Aurenche 2005; Arimura et al. 2010). Likewise, the well-developed bone industry, comprising a large diversity of tool types such as awls, points, hammers, dibbles, arrowheads, and palettes, may be regarded as a unique feature of the Shomutepe-Shulaveri culture. However, similar assemblages existed at Tilkitepe, in the Lake Van region of southeast Anatolia, where one of the northernmost Halafian settlements has been identified (Korfmann 1982). In addition, although comparable specimens have not been excavated from Hacı Elamxanlı Tepe, we should mention the puzzling bone objects with a series of incised striations often recovered at Shomutepe-Shulaveri settlements including Göytepe (Guliyev and Nishiaki 2012: 76). Similar objects have been repeatedly recovered at early Pottery Neolithic sites in northern Mesopotamia (e.g., Sabi Abyad, Syria [Spoor and Collet 1996: 473] and Haji Firuz, Iran [Voigt 1983: 210–12]), where they have been described as "counters" or "grooved bones."

These similarities do not directly indicate that the Shomutepe-Shulaveri culture originated from the eastern wing of the Fertile Crescent. Future studies are necessary to determine to what extent and how local Mesolithic cultures and/or the foreign Pottery Neolithic entities of the Fertile Crescent contributed to the formation of the Hacı Elamxanlı Tepe assemblages. This interpretation has direct relevance to the Neolithization scenario in the southern Caucasus. The absence of any traces of local processes of domestication points to a foreign origin for at least part of the economy, although contributions from both local and foreign sources need to be considered when interpreting the formation of Shomutepe-Shulaveri culture. In this respect, it is interesting to recall that obsidian trace element analyses have suggested a way of relating the southern Caucasus with the eastern wing of the Fertile Crescent. Shomutepe-Shulaveri communities procured obsidian mainly from sources in the southern Caucasus. Contemporary communities of the Fertile Crescent obtained obsidian primarily from southeast Anatolia, from sources at Nemrut Dağ and Bingöl, which formed another separate trade and exchange zone for obsidian (Badalyan, Chataigner, and Kohl 2004; Arimura et al. 2010). This evidently exclusive distribution pattern has led some authors to suggest that the elaborated obsidian network in Mesopotamia did not play an important role in the Neolithization processes of the southern Caucasus (Arimura et al. 2010: 82). However, it is also important to recognize that sources southeast of Sevan Lake, Armenia, were continuously exploited by communities in the Lake Urmia region of northwest Iran, from the Pottery Neolithic period on (Chataigner et al. 2010: 386; Niknami, Amirkhiz, and Glascock 2010; Chataigner and Gratuze 2013: 17). Significantly, these communities procured obsidian from sources in the Lake Van region as well (Voigt 1983; Chataigner et al. 2010: 386–87), thus bridging the two separate obsidian distribution provinces. We do not claim that elements of the Shomutepe-Shulaveri culture were introduced by communities of the Lake Urmia region. It is likely that future research would reveal more possible links. With the present state of our knowledge, we suggest that Shomutepe-Shulaveri culture emerged in the context of cultural contacts with other regions, which, although sparse, cannot be ignored.

Conclusion

The extension of excavation areas in the 2013 season produced extensive data on one of the earliest food-producing economies in the southern Caucasus. Abundant artifactual remains helped to define the material culture with greater precision, attesting to a series of distinct cultural features differing from those of classic Shomutepe-Shulaveri culture. This discovery indicates that these changes occurred via indigenous evolution rather than (solely) through foreign import. The development in house plans is particularly important, as it suggests interesting socioeconomic changes in these societies. The repetitive occurrence of the "snowman-shaped," two-room buildings, which have a similar architectural form, size, and spatial organization, indicates the existence of a solid architectural tradition followed by the Neolithic inhabitants at Hacı Elamxanlı Tepe. This tradition differs from that at later settlements like Göytepe, where several round buildings connected with curvilinear wing walls formed circular dwelling compounds. These differences are further elucidated through extensive excavations and comparisons with the architecture of other early Neolithic settlements (e.g., Badalyan et al. 2010). These parameters may well serve as key features for identifying cultural changes that occurred during this very early stage of Neolithization in the region.

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The extended archaeological records from Hacı Elamxanlı Tepe enabled regional comparisons in various aspects. The architecture, the nature of flaked and ground-stone artifacts and bone tools, and the existence of imported ceramics also indicate links with foreign regions to the south, especially the eastern wing of the Fertile Crescent. The process of development of the Shomutepe-Shulaveri culture has not been investigated in detail, mainly owing to the lack of sufficient data on local preceding settlements. The evidence presented in this article suggests the importance of regional contacts at the dawn of the emergence of food-producing societies in the southern Caucasus.

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References

Abibullayev, A. O.
1959 *Археологические Раскопки в Кюльтепе*. Baku: National Academy of Science.

Akkermans, P. M. M. G., and Schwartz, G. M.
2003 *The Archaeology of Syria: From Complex Hunter-Gatherers to Early Urban Societies (c. 16,000–300 BC)*. Cambridge World Archaeology. Cambridge: Cambridge University Press.

Arimura, M.; Badalyan, R.; Gasparyan, B. S.; and Chataigner, C.
2010 Current Neolithic Research in Armenia. *Neo-Lithics* 1/10: 77–85.

Arimura, M.; Chataigner, C.; and Gasparyan, B.
2009 Kmlo 2: An Early Holocene Site in Armenia. *Neo-Lithics* 2/09: 17–19.

Badalyan, R. S.; Chataigner, C.; and Kohl, P.
2004 Trans-Caucasian Obsidian: The Exploitation of the Sources and Their Distribution. Pp. 437–65 in *A View from the Highlands: Archaeological Studies in Honour of Charles Burney*, ed. A. Sagona. Ancient Near Eastern Studies Supplement 12. Leuven: Peeters.

Badalyan, R. S.; Harutyunyan, A. A.; Chataigner, C.; Le Mort, F.; Chabot, J.; Brochier, J. E.; Balasescu, A.; Radu, V.; and Hovsepyan, R.
2010 The Settlement of Aknashen-Khatunarkh, a Neolithic Site in the Ararat Plain (Armenia): Excavation Results 2004–2009. *TÜBA-AR* 13: 185–218.

Badalyan, R. S.; Lombard P.; Avetisyan, P.; Chataigner, C.; Chabot, J.; Vila, E.; Hovsepyan, R.; Willcox, G.; and Pressin, H.
2007 New Data on the Late Prehistory of the Southern Caucasus: The Excavations at Aratashen (Armenia); Preliminary Report. Pp. 37–61 in *Les cultures du Caucase (VIe–IIIe millénaires avant notre ère): Leurs relations avec le Proche-Orient*, ed. B. Lyonnet. Paris: CNRS.

Banning, E. B.
2011 Houses, Households, and Changing Society in the Late Neolithic and Chalcolithic of the Southern Levant. *Paléorient* 36 (1): 49–87.

Chataigner, C.
1995 *La Transcaucasie au néolithique et au chalcolithique*. BAR International Series 624. Oxford: Tempus Reparatum.

Chataigner, C.; Avetisyan, P.; Palumbi, G.; and Uerpmann, H.-P.
2010 Godedzor, a Late Ubaid-Related Site in the Southern Caucasus. Pp. 381–98 in *Beyond the Ubaid—Transformation and Integration in the Late Prehistoric Societies of the Middle East*, ed. R. A. Carter and G. Philip. Chicago: Oriental Institute of the University of Chicago.

Chataigner, C.; Gasparyan, B.; Montoya, C.; Arimura, M.; Melikyan, V.; Liagre, J.; Petrosyan, A.; Ghukasyan, R.; Colonge, D.; Fourloubey, C.; Arakelyan, D.; Astruc, L.; Nahapetyan, S.; Hovsepyan, R.; Balasescu, A.; Tome, C.; and Radu, V.
2012 From the Late Upper Paleolithic to the Neolithic in Northwestern Armenia: Preliminary Results. Pp. 37–43 in *The Archaeology of Armenia in a Regional Context: Proceedings of the International Conference Dedicated to the 50th Anniversary of the Institute of Archaeology and Ethnography Held on September 15–17, 2009 in Yerevan*, ed. P. Avetisyan. Yerevan: National Academy of Sciences of Armenia; Gitutyun.

Chataigner, C., and Gratuze, B.
2013 New Data on the Exploitation of Obsidian in the Southern Caucasus (Armenia, Georgia) and Eastern Turkey, Part 2: Obsidian Procurement from the Upper Palaeolithic to the Late Bronze Age. *Archaeometry* 56: 48–69.

Copeland, L.
1996 The Flint and Obsidian Industries. Pp. 285–338 in *Tell Sabi Abyad, the Late Neolithic Settlement: Report on the Excavations of the University of Amsterdam (1988) and the National Museum of Antiquities Leiden (1991–1993) in Syria*, Vol. 2, ed. P. M. M. G. Akkermans. Uitgaven van het Nederlands Historisch-Archaeologisch Instituut te Istanbul 76. Istan-

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bul: Nederlands Historisch-Archaeologisch Institut te Istanbul.

Garfinkel, Y.
2006 The Social Organization at Neolithic Shaʿar Hagolan: The Nuclear Family, the Extended Family and the Community. Pp. 103–11 in *Domesticating Space: Construction, Community, and Cosmology in the Late Prehistoric Near East*, ed. E. B. Banning and M. Chazan. Studies in Early Near Eastern Production, Subsistence, and Environment 12. Berlin: Ex oriente.

Guliyev, F., and Nishiaki, Y.
2012 Excavations at the Neolithic Settlement of Göytepe, the Middle Kura Valley, Azerbaijan, 2008–2009. Pp. 71–84 in *Proceedings of the 7th International Congress on the Archaeology of the Ancient Near East, 12 April–16 April 2010, the British Museum and UCL, London*, Vol. 3: *Fieldwork & Recent Research—Posters*, ed. R. Matthews and J. Curtis. Wiesbaden: Harrassowitz.
2014 Excavations at the Neolithic Settlement of Göytepe, the Middle Kura Valley, Azerbaijan, 2010–2011. Pp. 3–16 in *Proceedings of the 8th International Congress on the Archaeology of the Ancient Near East, 30 April–4 May 2012, University of Warsaw,* Vol. 2: *Fieldwork and Progress Reports—Posters*, ed. P. Bieliński, M. Gawlikowski, R. Koliński, D. Ławecka, A. Sołtysiak, and Z. Wygnańska. Wiesbaden: Harrassowitz.

Hamon, C.
2008 From Neolithic to Chalcolithic in the Southern Caucasus: Economy and Macrolithic Implements from Shulaveri-Shomu Sites of Kwemo-Kartli (Georgia). *Paléorient* 34 (2): 85–135.
2012 Macrolithic Tools from Neolithic and Chalcolithic Sites in the Southern Caucasus: Mentesh Tepe and the Mil Plain Sites. *Archäologische Mitteilungen aus Iran und Turan* 44: 163–69.

Hansen, S., and Mirtskhulava, G.
2012 The Neolithic Settlement of Aruchlo: Report on the Excavations in 2009–2011. *Archäologische Mitteilungen aus Iran und Turan* 44: 58–86.

Hansen, S.; Mirtskhulava, G.; and Bastert-Lamprichs, K.
2007 Aruchlo: A Neolithic Settlement Mound in the Caucasus. *Neo-Lithics* 1/07: 13–19.

Helmer, D.; Gourichon, L.; and Vila, E.
2007 The Development of the Exploitation of Products from *Capra* and *Ovis* (Meat, Milk and Fleece) from the PPNB to the Early Bronze in the Northern Near East (8700 to 2000 BC cal). *Anthropozoologica* 42 (2): 41–69.

Helwing, B., and Aliyev, T.
2012 Fieldwork in the Mil Plain: The 2010–2011 Expedition. *Archäologische Mitteilungen aus Iran und Turan* 44: 4–16.

Hovsepyan, R., and Willcox, G.
2008 The Earliest Finds of Cultivated Plants in Armenia: Evidence from Charred Remains and Crop Processing Residues in Pisé from the Neolithic Settlements of Aratashen and Aknashen. *Vegetation History and Archaeobotany* 17 (1S): S63–S67.

Joannin, S.; Ali, A. A.; Ollivier, V.; Roiron, P.; Peyron, O.; Chevaux, S.; Nahapetyan, S.; Tozalakyan, P.; Karakhanyan, A.; and Chataigner, C.
2013 Vegetation, Fire and Climate History of the Lesser Caucasus: A New Holocene Record from Zarishat Fen (Armenia). *Journal of Quaternary Science* 29: 70–82.

Kadowaki, S.
2012 A Household Perspective towards the Pre-Pottery Neolithic to Late Neolithic Cultural Transformation in the Southern Levant. *Orient* 47: 3–28.
2014 Groundstones and Grinding Technology. Pp. 259–85 in *The Sands of Time: The Desert Neolithic Settlement at Ayn Abū Nukhayla*, ed. D. O. Henry and J. E. Beaver. Bibliotheca neolithica Asiae meridionalis et occidentalis. Berlin: Ex oriente.

Kadowaki, S.; Guliyev, F.; and Nishiaki, Y.
In press Chipped Stone Technology of the Earliest Agricultural Village in the Southern Caucasus: Hacı Elamxanlı Tepe (the Beginning of the 6th Millennium BC). *Proceedings of the 9th International Congress of the Archaeology of the Ancient Near East*, Vol. 2: *Fieldwork and Recent Research*. Wiesbaden: Harrassowitz.

Kadowaki, S.; Maher, L.; Portillo, M.; Albert, R. M.; Akashi, C.; Guliyev, F.; and Nishiaki, Y.
2015 Geoarchaeological and Palaeobotanical Evidence for Prehistoric Cereal Storage in the Southern Caucasus: The Neolithic Settlement of Göytepe (Mid 8th Millennium BP). *Journal of Archaeological Science* 53: 408–25.

Kiguradze, T.
1986 *Neolithische Siedlungen von Kvemo-Kartli, Georgien*. Materialien zur allgemeinen und vergleichenden Archäologie 29. Munich: Beck.

Korfmann, M.
1982 *Tilkitepe: Die ersten Ansätze prähistorischer Forschung in der östlichen Türkei*. Istanbular Mitteilungen 26. Tübingen: Wasmuth.

Korobkova, G. F.
1996 The Neolithic Chipped Stone Industries of the Southern Caucasus. Pp. 57–90 *in Neolithic Chipped Stone Industries of the Fertile Crescent, and Their Contemporaries in Adjacent Regions: Proceedings of the Second Workshop on PPN Chipped Lithic Industries, Institute of Archaeology, Warsaw University, 3rd–7th April 1995*, ed. S. K. Kozłowski and H. G. K. Gebel. Studies in Early Near Eastern Production, Subsistence, and Environment 3. Berlin: Ex oriente.

Kozłowski, S. K., and Aurenche, O.
2005 *Territories, Boundaries and Cultures in the Neolithic Near East*. BAR International Series 1362. Oxford: Archaeopress.

Lyonnet, B., and Guliyev, F.
2012 Part III: Mentesh Tepe. *Archäologische Mitteilungen aus Iran und Turan* 44: 86–121.

Lyonnet, B.; Guliyev, F.; Helwing, B.; Aliyev, T.; Hansen, S.; and Mirtskhulava, G.
2012 Ancient Kura 2010–2011: The First Two Seasons of Joint Field Work in the Southern Caucasus. *Archäologische Mitteilungen aus Iran und Turan* 44.

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Meshveliani, T.
2013 On Neolithic Origins in Western Georgia. *Archaeology, Ethnology and Anthropology of Eurasia* 41 (2): 61–72.

Meshveliani, T.; Bar-Oz, G.; Bar-Yosef, O.; Belfer-Cohen, A.; Boaretto, E.; Jakeli, N.; Koridze, I.; and Matskevich, Z.
2007 Mesolithic Hunters at Kotias Klde, Western Georgia: Preliminary Results. *Paléorient* 33 (2): 47–58.

Molist, M.; Anfruns, J.; Bofill, M.; Borrell, F.; Clop, X.; Cruells, W.; Faura, J. M.; Ferrer, A.: Gómez, A.; Guerrero, E.; Saña, M.; Tornero, C.; Vicente, O.; and Buxó, R.
2013 Tell Halula (Euphrates Valley, Syria): New Data from the Late Neolithic Settlement. Pp. 443–453 in *Interpreting the Late Neolithic of Upper Mesopotamia*, ed. O. P. Nieuwenhuyse, R. Bernbeck, P. M. M. G. Akkermans, and J. Rogasch. Papers on Archaeology of the Leiden Museum of Antiquities, Egyptology 9. Turnhout: Brepols.

Munchaev, R. M.
1982 *Энеолит Кавказа*. Pp. 100–164 in *Энеолит СССР, Археология СССР*, ed. V. M. Masson and N. A. Merpert. Moscow: Nauk.

Narimanov, I.
1987 *Культура древнейшево земледельческо-скотоводческого населения Азербайджана (эпоха энеолита VI–IV тыс. до н.э.)*. Baku: Elm.

Niknami, K. A.; Amirkhiz, A. C.; and Glascock, M. D.
2010 Provenance Studies of Chalcolithic Obsidian Artefacts from near Lake Urmia, Northwestern Iran Using WDXRF Analysis. *Archaeometry* 52: 19–30.

Nishiaki, Y.
1993 Anatolian Obsidian and the Neolithic Obsidian Industries of North Syria: A Preliminary Review. Pp. 120–40 in *Essays on Anatolian Archaeology*, ed. T. Mikasa. Bulletin of the Middle Eastern Culture Center in Japan 7. Wiesbaden: Harrassowitz.

Nishiaki, Y.; Azizi Kharanaghi, M. H.; and Abe, M.
2013 The Late Aceramic Neolithic Flaked Stone Assemblage from Tepe Rahmatabad, Fars, South-West Iran. *Iran* 51: 1–15.

Nishiaki, Y.; Guliyev, F.; and Kadowaki, S.
2015 Chronological Contexts of the Earliest Neolithic in the Southern Caucasus: Radiocarbon Dates for Göytepe and Hacı Elamxanlı Tepe, West Azerbaijan. *American Journal of Archaeology* 119 (3): 279–94.

Nishiaki, Y.; Guliyev, F; Kadowaki, S.; Arimatsu, Y.; Hayakawa, Y.; Shimogama, K.; Miki, T.; Akashi, C.; Arai, S.; and Salimbeyov, S.
In press Hacı Elamxanlı Tepe: Excavations of the Earliest Pottery Neolithic Occupations on the Middle Kura, Azerbaijan, 2012. *Archäologische Mitteilungen aus Iran und Turan* 45.

Palumbi, G.
2007 A Preliminary Analysis on the Prehistoric Pottery from Aratashen (Armenia). Pp. 63–76 in *Les cultures du Caucase (VIe–IIIe millénaires avant notre ère): Leurs relations avec le Proche-Orient*, ed. B. Lyonnet. Paris: CNRS.

Spoor, R. H., and Collet, P.
1996 The Other Small Finds. Pp. 439–75 in *Tell Sabi Abyad, The Late Neolithic Settlement; Report on the Excavations of the University of Amsterdam (1988) and the National Museum of Antiquities Leiden (1991–1993) in Syria*, Vol. 2, ed. P. M. M. G. Akkermans. Uitgaven van het Nederlands Historisch-Archaeologisch Instituut te Istanbul 76. Istanbul: Nederlands Historisch-Archaeologisch Instituut te Istanbul.

Voigt, M. M.
1983 *Hajji Firuz Tepe, Iran: The Neolithic Settlement*. Hasanlu Excavation Reports 1; University Museum Monograph 50. Philadelphia: University Museum, University of Pennsylvania.

Wright, K. I.
1992 A Classification System for Ground Stone Tools from the Prehistoric Levant. *Paléorient* 18 (2): 53–81.
1993 Early Holocene Ground Stone Assemblages in the Levant. *Levant* 25: 93–111.

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