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Stone Age of Armenia

Kanazawa University

2014

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Kanazawa University

Institute of Archaeology and Ethnography of
the National Academy of Sciences of
the Republic of Armenia

Gfoeller Fund of America Corporation, Armenian Branch

Center for Cultural Resource Studies, Kanazawa University

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A Guide-book to the Stone Age Archaeology in the Republic of Armenia

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Boris GASPARYAN

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Scientific advisory board:

Pavel AVETISYAN, Sumio FUJII

Monograph of the JSPS-Bilateral Joint Research Project

Center for Cultural Resource Studies,
Kanazawa University

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And finally, but most importantly, we extend our profond thanks to all the colleagues spending their energies, times and efforts to make this publication a reality.

CONTENTS

CHALCOLITHIC

Introduction

Our initial reason for producing this volume was to publish the proceedings of the workshop titled "Stone Age in Armenia". This workshop was organized by staff at the Institute of Archaeology and Ethnography of the National Academy of Sciences of the Republic of Armenia, and Kanazawa University, Japan, with the support of the Armenian Branch of the Gfoeller fund of America Corporation. The main aim of the workshop was to share and exchange a growing body of knowledge emerging from archaeological investigations by researchers in Armenia. Additionally, organizers – who included the authors of this paper – invited young researchers and graduate students to make presentations at the workshop, since it was thought their involvement would be indispensable to the future development of the field of archaeology. The workshop was held in the library at the Institute of Archaeology and Ethnography, Republic of Armenia, on 5 March 2013 (Figure 1). Fifteen talks were given, introducing the latest results from field studies and scientific analyses dating from the Paleolithic, Neolithic, and Chalcolithic periods. Although the workshop was quite long and tiring, participants filled the room with a palpable sense of excitement (Figures 2-8).


Սեմինար

Քարի դարը Հայաստանում

Քարեդարյան հնագիտության վերջին նվաճումները Հայաստանի Հանրապետությունում: Անցած ուղին և հետանկարները

Վերջին շրջանում Հայաստանի քարի դարի հուշարձանների հետազոտման տեսական, ժամանակագրական և հնամիջավայրային ուսումնասիրությունների ասպարեզում որակական նոր տեղաշարժ է նկատվում: Չնայած դեռես առկա բազմաթիվ «բացերին», վերջին տարիների ընթացքում մեր գիտելիքներն այս ուղղությամբ էապես ավելացել են: Սեմինարում կներկայացվեն հայ մասնագետների 15 զեկուցումներ՝ նվիրված քարի դարի նորագույն հետազոտություններին Հայաստանում: Մեր հիմնական նպատակն է տեղեկություններ շրջանառել և փոխանակել նոր հնագիտական պեղումների և հետազոտությունների արդյունքների վերաբերյալ: Սեմինարի ընթացքում հուսով ենք խնամատարել արդի գիտական նվաճումների նշանակությունը և արժևորել քարեդարյան հնագիտության զարգացման հետանկարները Հայաստանում:

- Տեղը՝ Հնագիտության և ազգագրության ինստիտուտի գրադարան (Չարենցի փողոց)
- Օրը և ժամը՝ Մարտի 5, 11:00
- Կազմակերպիչներ՝ Բորիս Գասպարյան (borisg@virtualarmenia.am, Հեռ. 055 411 459)
  Մակոտո Արիմուրա (arimura.mako@gmail.com, Հեռ. 098 726 462)

Workshop for

Stone Age in Armenia

What' s done and what must be done. Recent Achievements of Stone Age Archaeology in the Republic of Armenia

A new wave of research is now beginning to lay a robust theoretical, chronological, and paleoenvironmental foundation for the county' s Stone Age sites. Although there are still many "missing links" periods in our knowledge, it is true that our knowledge in this direction has dramatically increased since last decade.

The workshop will give some 15 presentations by Armenian specialists studying Stone Age of Armenia to present their recent activities. The main purpose is to share and exchange information from recent archaeological excavations and studies. Through the workshop, we hope that we will understand our achievements at the present and take future perspective for Stone Age Archaeology in Armenia.

- Place: Library in the Institute of Archaeology and Ethnography (Charents street)
- Day and time: 5 March, 11:00 AM
- Contact persons: Boris Gasparyan (borisg@virtualarmenia.am, tel: 055 411 459)
  Makoto Arimura (arimura.mako@gmail.com, tel: 098 726 462)

Institute of Archaeology and Ethnography, National Academy of Sciences of RA

"Gfoeller" Fund of America Corporation Armenian Branch

Kanazawa University

Figure 1
Announcement posters for the workshop in Armenian and English.

Since some authors prepared their papers after the workshop's conclusion, and others not in attendance expressed interest in contributing to the series of papers, we decided to prepare a monograph presenting recent findings of archaeological research conducted on the Stone Age sites in the Republic of Armenia.

By means of this publication, we hope that readers will become aware of our achievements to date, and come to understand the future prospects for Stone Age archaeology in Armenia. In addition, this workshop marks the beginning of cooperative efforts between Armenian and Japanese archaeologists - after all, both countries have unique and long-standing historical-cultural traditions in this field.

Pavel Avetisyan

Director of the Institute of Archaeology and Ethnography, the National Academy of Sciences of the Republic of Armenia

Sumio Fujii

Director of the Center for Cultural Resource Studies, Kanazawa University, Japan

Figure 2
Participants and audince in the workshop.

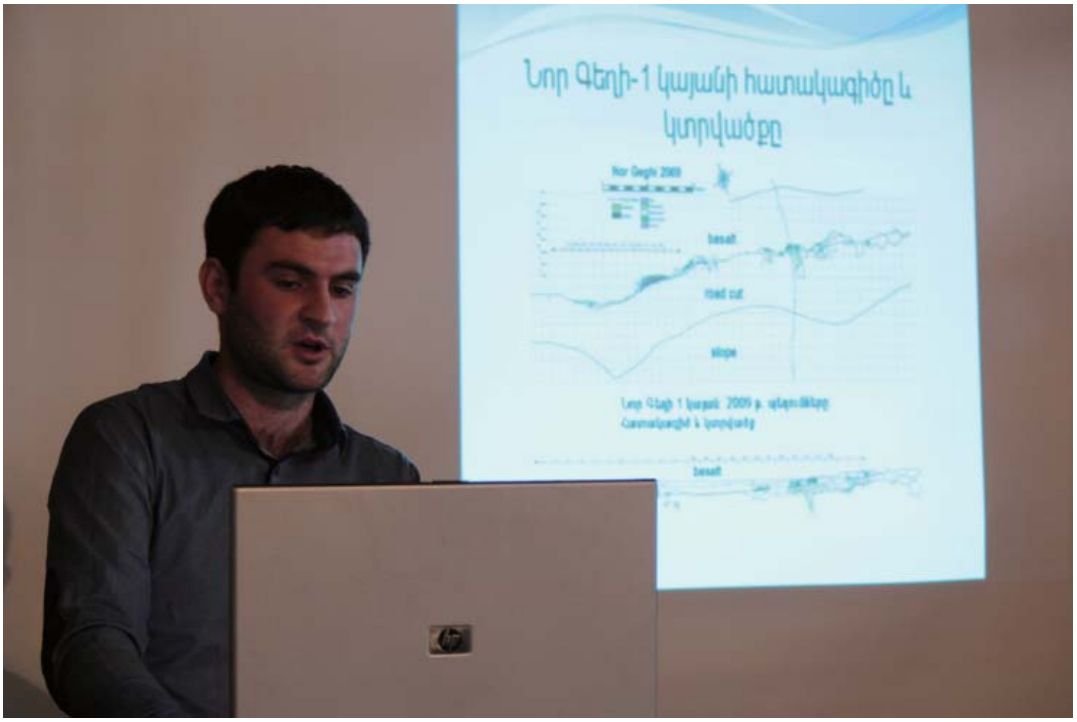

Figure 3
Presentation by Karen Azatyan.

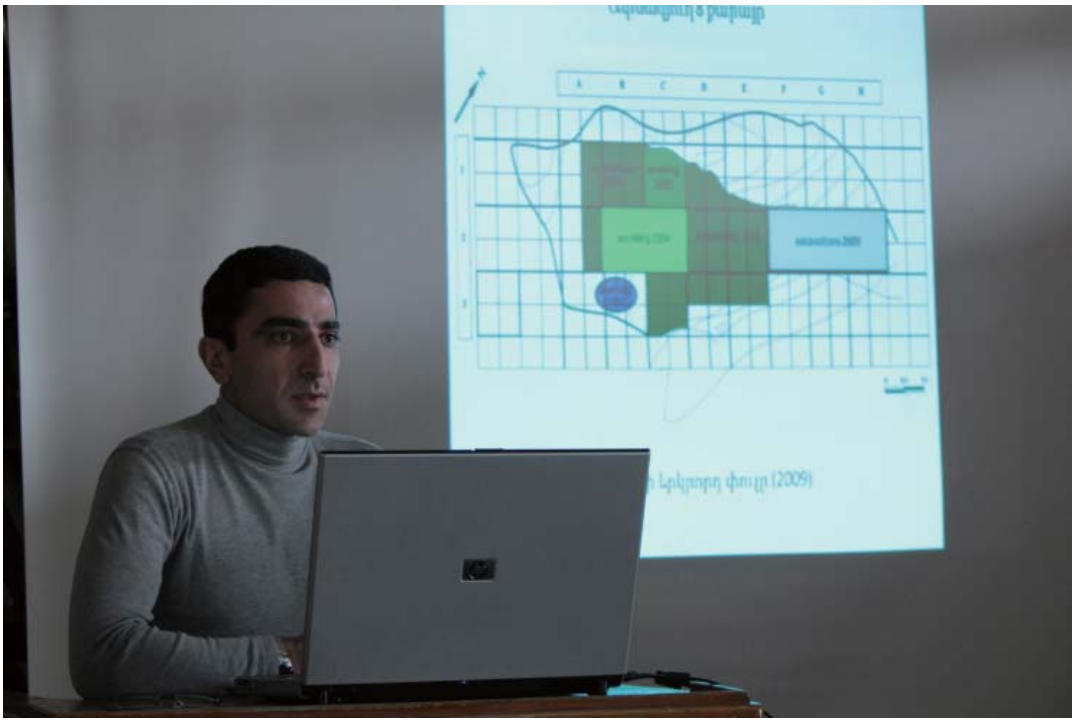

Figure 4
Presentation by Arthur Petrosyan.

Figure 5
Presentation by Diana Zardaryan.

Figure 6
Participants and audience in the workshop.

Figure 7
Young participants.

Figure 8
Participants and audience in the workshop.

Weaving the Ancient Past: Chalcolithic Basket and Textile Technology at the Areni-1 Cave, Armenia

Lyssa Stapleton, Lusine Margaryan, Gregory E. Areshian, Ron Pinhasi and Boris Gasparyan

1. Introduction

Before our ancestors began to fire pottery or smelt metals, they made hats, garments, containers, bags, floor coverings and clothing by twisting and weaving plant and animal fiber. Due to the poor preservation of organic material in most archaeological sites, archaeologists rarely have the opportunity to study both the tools used for weaving and the woven material itself. Areni-1 cave in the Arpa River Valley (southern Armenia) has a unique microclimate which facilitated the desiccation of organic remains including fragments of baskets and textiles.

Six trenches are currently being excavated at Areni-1. Trenches 1, 2 and 3 have produced woven material dating to the Late Chalcolithic sequence. Trench 1 is located in the main or first gallery inside the cave and contains artifacts and features that are clearly related to funerary ritual including human remains and wine making paraphernalia dating to 4,000–3,800 Cal BC (Barnard *et al.* 2011; Areshian *et al.* 2012; Wilkinson *et al*. 2012). Trench 2 is adjacent to Trench 1 and has produced pots containing cremations, as well as isolated human remains recovered from loci between the pots. Trench 3 is located outside the cave and the main entrance to the first gallery, under the overhang of the cave. This trench has Medieval dwellings cutting into at least three Late Chalcolithic occupational phases designated as Chalcolithic Horizons I – III (4,300–3,400 Cal BC). Of the three horizons, the first tends to be most truncated; it is present only within the limits of Trench 3 and was damaged by an Early Medieval (7th–9th centuries) house or hut and by High Medieval (11th–13th centuries) storage pits and ovens. Horizon I is represented by strengthened and repeatedly rebuilt dirt floors with household pits and jar burials under them and dates to the

final phase of the Late Chalcolithic (3,700–3,400 Cal BC). Chalcolithic Horizon II occupies a more extensive area. It begins in Trench 3, outside the entrance to the first gallery. Horizon II underlies Horizon I but is separated from it by a layer of zoogenic humus (dung). It extends into the cave, to the rear part of the first gallery and across to the limits of Trenches 1 and 2. In Trench 3 Horizon II is also characterized by strengthened and repeatedly finished floors and includes wooden constructs or buildings and large, unfired bins. A set of radiocarbon dates from Horizon II provides an absolute time range between 4,000–3,800 Cal BC, which places it in the middle phase of the Late Chalcolithic. The third Chalcolithic Horizon encompasses a rather small area and appears in multiple locales underlying Horizon II in Trench 3 and also inside the first gallery, within the limits of Trenches 1 and 2. Traces of plastered floors and partially destroyed stone constructs (damaged by intrusive bins dug during the time of occupation of Horizon II) are recorded in Trench 3. Radiocarbon dates for this Horizon range between 4,300–4,000 Cal BC placing them in the early phase of the Late Chalcolithic.

2. The anatomy of a woven artifact

Baskets and textiles are both the result of the intentional weaving of fibers. The terms “basket” and “textile” are often definitionally separated, perhaps somewhat arbitrarily, by both end-use and construction technique. Baskets generally serve as vessels or other containers or as mats for sitting and sleeping, floor coverings, in the construction of mud-brick architecture, and as burial shrouds and grave liners. Textiles, which are made from softer and more pliable fibers, are used for clothing, bed linens, and to create soft bags or other containers that need to have more flexibility than a basket. A large variety of fibers are used in weaving textiles and baskets including bast fibers from plants and trees as well as hair and wool. Textile fibers generally receive more pre-treatment than the fibers used in basket making. These pre-treatments can include splitting, peeling, retting, combing, and spinning and weaving on a loom or other device (see Adovasio 1977, p. 1; Barber 1992, p. 5; Seiler-Baldinger 1994, pp. 5-47). Looms are necessary for the creation of most textiles simply because spun fibers are so pliable, the loom gives them the tension required for weaving. However, there are textiles that are not loom woven, these techniques include interlacing to create a mesh by looping with fingers or needles (crochet, lace-making, knotting, knitting and macramé) (Emery 2009, pp. 59-69; Seiler-Baldinger 1994, pp. 5-25) or construction with the aid of other tools such as the kumihimo and weaving with tablets or cards (Barber 1991, p. 118; Knudsen 2012, p. 254). Looms, like the textiles created on them, rarely survive in the archaeological record.

Archaeologists are therefore often forced to use related rather than direct evidence to discuss ancient textile technology. Common artifacts related to the process of textile construction are spindle whorls, loom weights, and needles. Even without the actual textiles, these objects inform archaeologists about ancient weaving technology: spindle whorls allow researchers to calculate the weight and tension of spun fibers; a smaller whorl will spin faster and create a tighter thread (Barber 1991, p. 53; Grömer 2012, p. 41). The shape of a whorl can indicate whether it was placed at the top or bottom of the spindle (high whorl or low whorl) and this, in turn, may indicate the type of fiber being spun: high whorl spindles are better for producing an "S" twist and are therefore more suitable for linen. The size and weight of a spindle whorl affects the thickness and tension of the spun thread just as the weight of a loom weight affects the tension of the warp fibers of the textile. Loom weights help us to understand the size and construction of looms (Barber 1991, pp. 93-113). It should be noted that weights are not in all cases evidence for loom weaving: they can be used as fishnet weights, to hold down roof thatching, to tie bags, or as weights for devices like the kumihimo (Barber 1991, p. 97; Gleba and Mannering 2012, p. 15; Knudsen 2012, p. 254). Artifacts like needles and awls can also be an indicator that weaving activities were taking place.

When woven artifacts or evidence for them (i.e. impressions in clay or pseudomorphs in corroded metal) are discovered in an archaeological context, fiber identification can be aided by determining the direction of spin: linen has a preferential spin in an "S" (or \) direction and Elizabeth Wayland Barber contends that cotton and hemp tend spin in the opposite, "Z" (or /) direction (1991, p. 66). If these fibers are spun in opposition to their natural inclination, the resulting thread is likely to unravel. Using fibers spun in opposite directions for the warp and weft will create a tightly woven textile due to the opposing tension on the two axes.

3. Identifying textile technology at Areni-1

The Chalcolithic textile (001.2010.013) (Figure 1) found at Areni-1 cave was certainly loom woven, probably on a warp-weighted loom (Figure 2) though a horizontal ground loom or even a waist or band loom could also have been used. The existence of a starter or header row (Figures 1 and 3), however, makes the use of a warp-weighted loom most likely (Burnham 1965, p. 173; Barber 1991, p. 99; Grömer 2012, p. 41).

This textile fragment (Figure 1) is woven of spun linen (*Linum usitatissimum*), was excavated in Trench 1 and belongs to Horizon II and dates to 3,950–3,790 Cal BC (2 sigma range)[1].

1. UCIAMS-96016, 5065±15 BP.

Linen is the most common fiber used to make textiles until the development of wool bearing sheep around the third millennium BC (Good 1998, p. 40; Shishlina *et al*. 2003). Both the warp and weft fibers of 001.2010.013 are spun in an "S" direction. They are tightly spun to a 45–55° angle of twist for the warp and 45–47° for the weft. The textile is woven in a plain (or tabby) weave: a simple "one over, one under" technique. The notation for this weave is 1/1, indicating how many warp threads the weft passes over to create the pattern. The process of passing the weft thread around the outermost warps on each pass secures the edges of a loom woven textile; this edge is called the selvage. Neither selvage edge is intact on 001.20120.013 but a basket weave header, consisting of one warp thread crossed by two weft threads, is intact as is the fringe created by knots that tied off the warps when the textile was removed from the loom (Figure 1).

No looms or fragments of looms have been found at Areni-1. This is not entirely surprising considering the ritual nature of most of the Chalcolithic remains; weaving is an activity that typically takes place in a domestic setting. Weights however, have been found in abundance. The majority of these were excavated in Trench 3. Twelve of the forty-four cylindrical clay weights as well as two of three very large clay weights are all from the same excavation unit and date to Chalcolithic Horizon I. Meanwhile, the entire single textile fragment as well as the basketry fragments belong to Horizons II and III.

The quality of a loom woven textile is dependent of the skill of the person who spun the thread, the skill of the weaver, and the proportions and construction of the loom. Loom weights can be made from any convenient material that can be perforated or incised so that it can be suspended from the warp thread: fired clay, stone, or even wood (Figures 2 and 4). Only six of the fifty weights from Areni-1 are immediately recognizable as loom weights. These include three small stone weights (Figure 5: 1-3) and three very large and heavy clay weights (Figure 5: 4-6). The other forty-four are made of fired clay and are long and cylindrical in shape (Figure 6). These weights are unusually small and light for a warp-weighted loom, but are similar to cylindrical clay weights found at the Bronze Age Greek site of Sitagroi (Elster 2003, p. 241) and at Neolithic sites in Poland (Barber 1991, pp. 99-100). There is, in fact, a direct relationship between the diameter of the warp thread and the weight of the loom weight. Together, they decide the tension of the woven textile and thread: a larger diameter thread requires a heavier loom weight. According to Anderson Strand and Nosch (forthcoming), a thread of ≤0.3 mm requires c. 10 g in warp tension, a 0.3–0.4 mm thread requires c. 15–20 g of tension, a 0.4-0.6 mm thread requires c. 25–30 g of tension and 0.8–1.0 mm thread requires c. 40 g of warp tension (also see Mårtensson *et al*. 2009, p. 378; Baxter *et al*. 2010).

The cylindrical clay weights from Areni-1 weigh between 6 and 10 grams[2] and measure between 4.5 and 6 cm long and are 1 to 1.5 cm in diameter. The three ovoid stone weights (Figure 5: 1-3) with an incised depression for attaching the warp weigh between 26 and 32 grams and the three large clay weights (Figure 5: 4-6) weigh between 1 and 1.5 kg. The threads used in the single Chalcolithic textile (001.2010.013, Figures 1 and 3) recovered from Areni-1 are approximately 5 mm. The small, cylindrical clay weights (Figure 6), therefore, could have been used to weave this light-weight, almost gauzy fabric on a warp-weighted loom. The stone and unfired clay weights, however, would have been far too heavy.

4. Basket weaving technology at Areni-1

Baskets are created from plant fibers that are generally thicker and more resilient than textile fibers. While splitting, heating, dying, bending, and bundling are often used to treat these fibers; baskets are never woven on a loom and generally have a different end-use than textiles (Adovasio 1977, p. 1; Crowfoot 1954, p. 414; Wendrich 1999, pp. 31-35). Tools such as awls (Figure 7) and needles are often used in the construction of a basket and thread or cordage may be used to create a more secure weave or to fasten the end of the weaving bundle or the baskets edge. The techniques of basket making are generally classified into three weave types: twining, coiling, and plaiting. Within each of these three classes are a large number of sub-classes; all are mutually exclusive based on technique or "features of manufacture" (Adovasio 1977, p. 1; Wendrich 1999, pp. 41-42).

To date, 19 basketry artifacts have been recovered from Areni-1 cave, the majority of them from burial contexts of Chalcolithic Horizon II. The only *in situ*, non-burial context that basketry has been found in is in Trench 3 where there were stacked fragments of mats fixed to a floor in the Horizon III layer. Context gives us two usages for basketry at Areni-1, as burial goods and for floor coverings.

At least two of the basketry fragments have been directly dated – from Locus 40 a matting fragment date to 4,040–3,800 Cal BC (2 sigma range)[3]. The floor mat from Trench 3 dates to 3,980–3,790 Cal BC (2 sigma range)[4].

The basketry artifacts are of two construction types: twill plaited mats and one small, coiled basket. All of the basketry artifacts excavated thus far are woven from the same reed, a species of *Calamagrostis* that still grows locally. Awls are often used to create twined and coiled

2. Eight of the forty-four cylindrical clay weights are complete or close enough to complete to estimate the original weight.

3. OxA-23913, 5144±30 BP.

4. OxA-28783, 5110±32 BP.

baskets but in general, the construction of baskets leaves behind few tools to indicate how they were manufactured.

The single coiled basket (001.2010.020) (Figure 8) from Areni-1 comes from Locus 63 in Trench 1, a context that has a firm relative date in the Chalcolithic. This Locus comprises an infant burial inside a plaster vessel. The infant was placed on top of the small, coiled basket and was also accompanied by numerous other fragments of twill plaited basketry mat, a container made of horn, and other items.

Coiled baskets are constructed with two elements that can best be described as a passive bundle with an active wrapping (Wendrich 1999, p. 86; Seiler-Baldinger 1994, p. 33). The passive bundle is the foundation of the basket, controlling its size and shape while the active wrapping secures and covers the bundles (Figure 8) and can be used to create a surface design. The wrapping elements are inserted into the small space between bundles; each stitch is inserted through the previous coil of bundle. This may require an awl to either create a hole for insertion or to force the elements through.

All 19 of the basketry mat fragments from Areni-1 are woven in a twill plait with strips of reed. Many of the weave patterns are two-toned, an effect created by alternating the outer, glossier surface of the reed with the inner, darker surface (Figures 9 and 10). Twill weaving, also called plaiting, is a technique involving single elements or sets of element that cross over two or more element sets (Adovasio 1977, p. 99). Twill plaiting is used to manufacture flat objects; it is difficult to make a curved wall using this technique. A twill weave is described according to the patterned created by passing one set of elements over another. A simple twill weave noted as "1/1 with single elements sets", means that a single element crosses over and under only one element or element set on the opposing axis. A twill weave described as 1/3 with a single element set would indicate that one element crossed over one element or element set, then three. A 2/2 twill with a two elements set describes a weave where a set of two elements crosses over then under two elements or element sets. The principle interval for the twill plaited mats from Areni-1 is 3/3 with single element sets like those found in fragment 001.2010.003 from Locus 40 (Figure 9)[5]. A "principal interval" is the most frequent pattern of element crossing (Adovasio 1977, p. 107). Changes to the principal interval to create a different pattern are called shifts. Several of the mat fragments from Areni-1 are woven with complex patterns created with multiple shifts in both axes. A basketry mat fragment (001.2010.001) from Locus 63 is shown in Figure 10. This pattern is noted as follows: The principal

5. Locus 40 is a painted pottery vessel excavated from Trench 1 and containing the partial remains of an adult woman accompanied by several fragments of basketry mat.

interval is 3/3 with single elements sets. A pattern shift to 3/1/3, 3/3/3, 3/5/3 on one axis creates a step pattern that eventually forms a box (Figure 10).

Six of the mat pieces have fragmentary but intact edges giving us an understanding of how the mats were finished and weave elements secured. The element sets used to weave the Areni-1 baskets are both folded over at the edge and then rewoven into the body of the mat, creating a self edge (Figures 9 and 10). This method of finishing is called a "self" edge because it utilizes elements from the body of the basket rather than introducing a new weaving element.

The excavation of Areni-1 is only partially complete and members of the Areni expedition are cataloging and analyzing hundreds of new finds every season. These woven artifacts and the tools used to make them will help researchers gain a better understanding of technologies used during the Chalcolithic period in the Arpa River Valley and in the greater region of the southern Caucusus.

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Figure 1
Linen textile fragment from Areni-1 (001.2010.013).

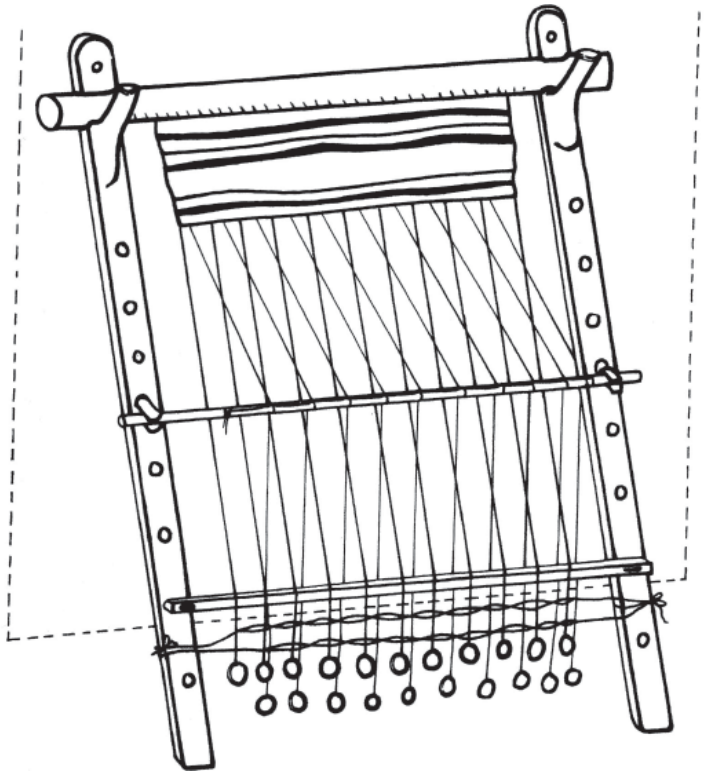

Figure 2
Warp weighted loom with loom weights. From Gleba and Manning 2012, p. 15. Drawing courtesy Eva Andersson.

Figure 3
Detail of header row on 001.2010.013.

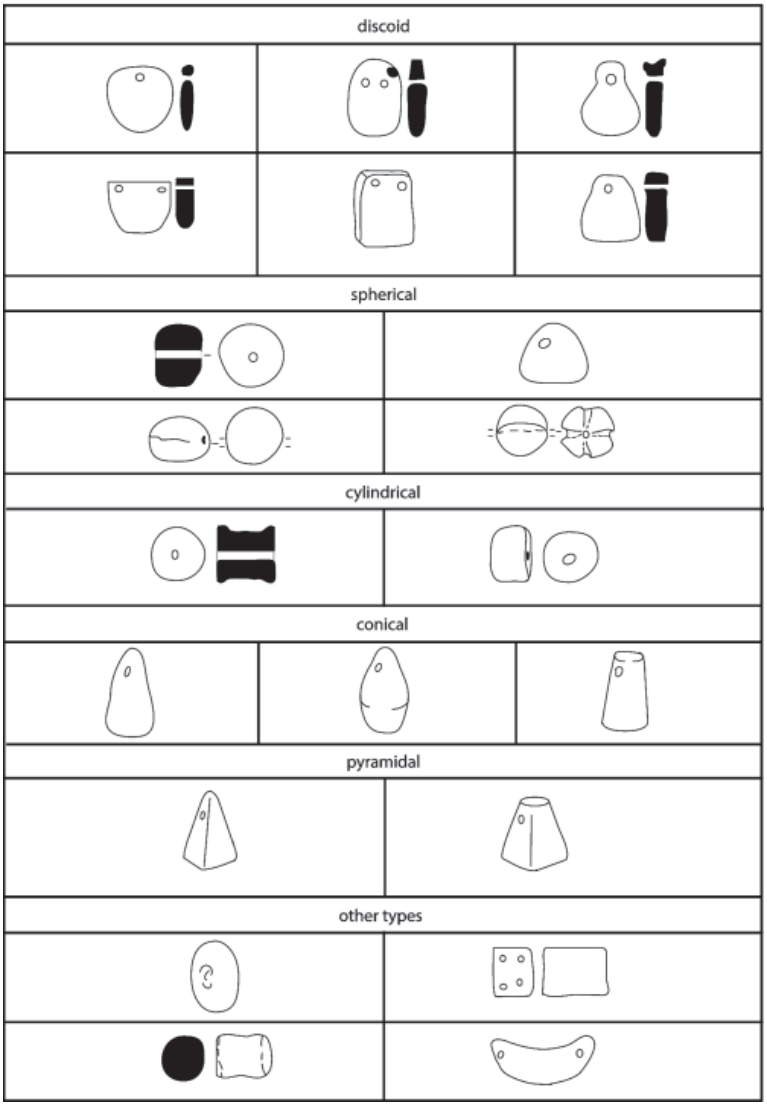

Figure 4
Examples of loom weight types from the Aegean Bronze Age. From Mårtensson *et al*. 2009, p. 375. Drawings after Evely 1993-2000; Dabney 1996; Stærmose Nielsen 1999.

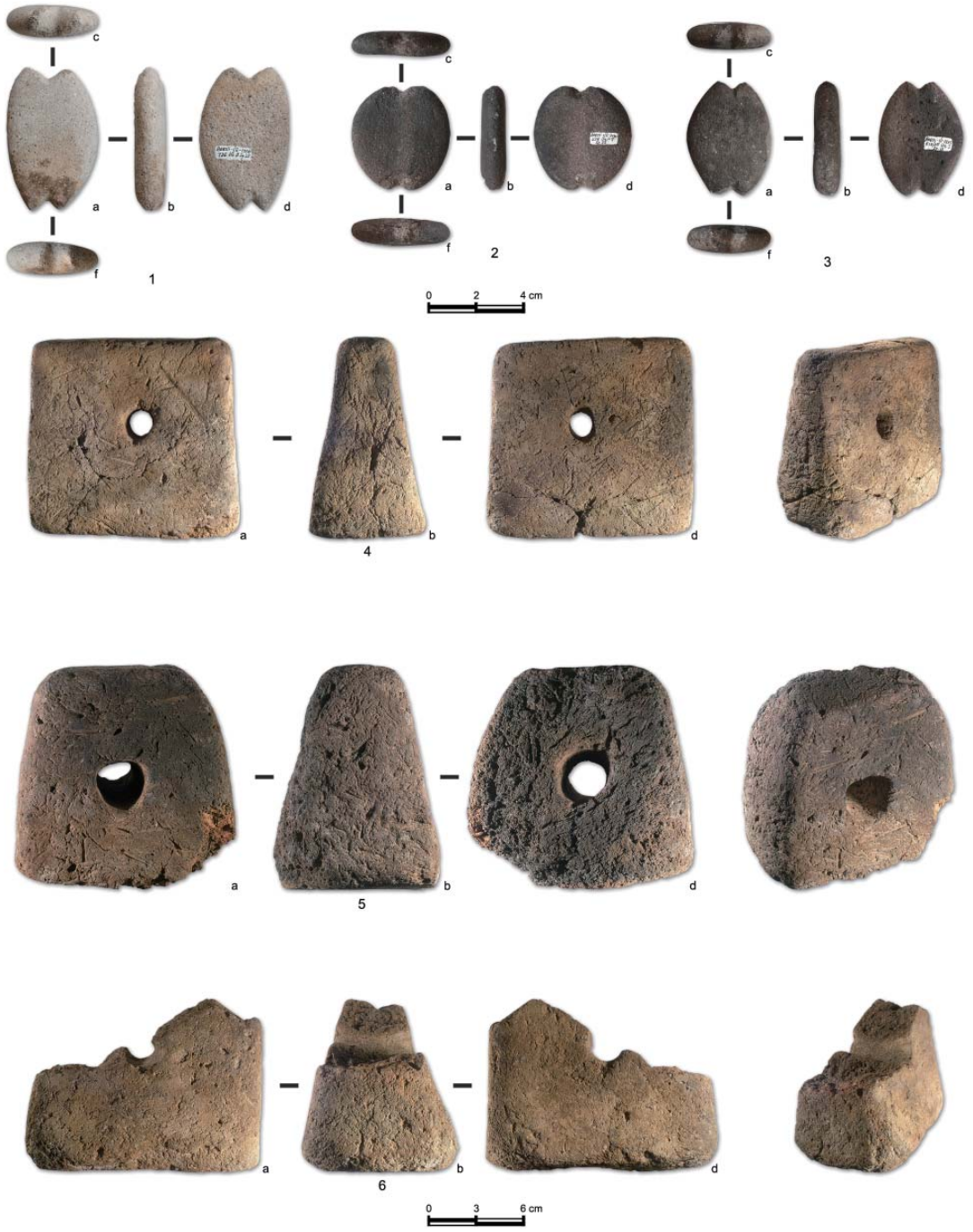

Figure 5
Areni-1 cave. 1-3. Small ovoid stone weights from Trench 2 (Horizon II: 4,000–3,800 Cal BC); 4-6. Large clay weights from Trench 3 (Horizon I: 3,700–3,400 Cal BC).

Figure 6
Areni-1 cave. Group of cylindrical clay weights from Trench 3 (Horizon I: 3,700–3,400 Cal BC).

Figure 7
Areni-1 cave. Bone awls from different Chalcolithic Horizons.
1, 3. Horizon III (4,300–4,000 Cal BC); 2. Horizon I (3,700–3,400 Cal BC); 4. Horizon II (4,000–3,800 Cal BC).

Figure 8
Areni-1 cave. 001.2010.020, small coiled basket from Locus 63 of Trench 1.

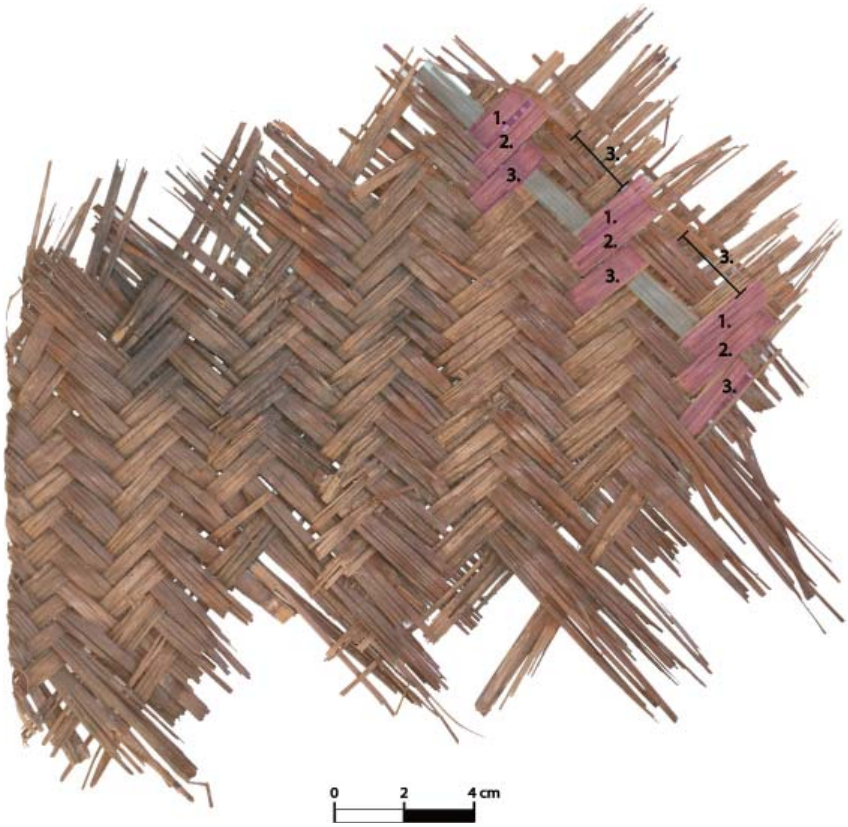

Figure 9
Areni-1 cave.
001.2010.003, twill woven mat fragment from Locus 63 of Trench 1.

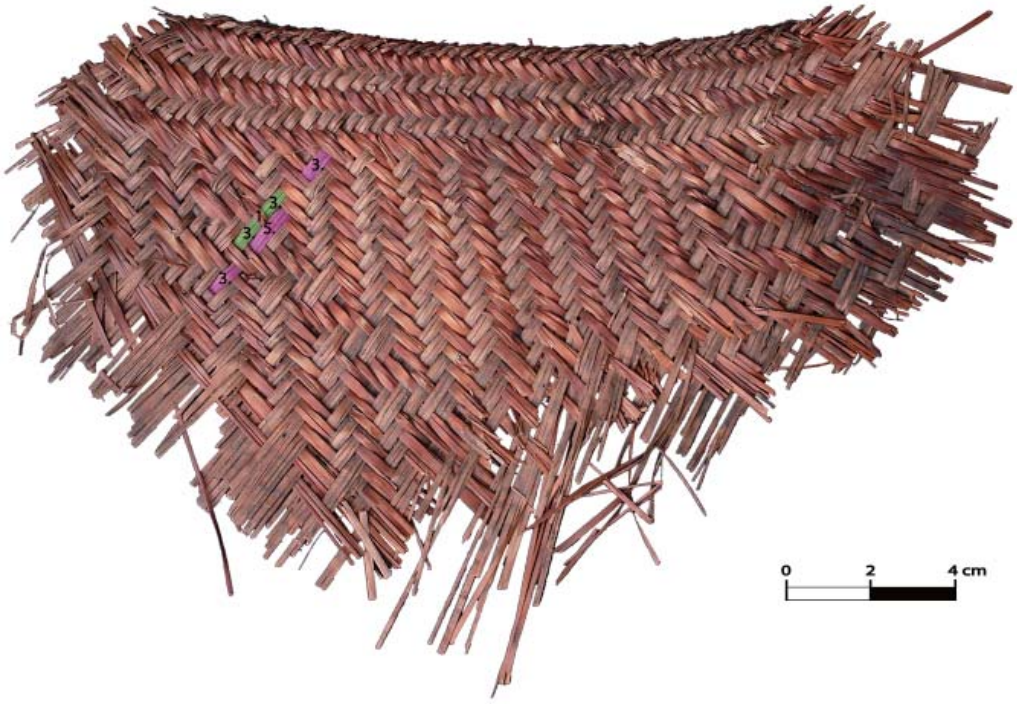

Figure 10
Areni-1 cave. 001.2010.001, twill woven mat fragment from Locus 40 of Trench 1.

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