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Araştırma/Research

Archaeological Evidence for Late Neolithic/Early Chalcolithic Marble Vessel Making at Ada Höyük

[ADA HÖYÜK GEÇ NEOLİTİK/ERKEN KALKOLİTİK MERMER KAP YAPIMINA İLİŞKİN ARKEOLOJİK KANITLAR]

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Keywords

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Anahtar Kelimeler

Batı Anadolu, Mermer Kaplar, Neolitik, Kalkolitik, Üretim teknolojisi.

ABSTRACT

Stone vessels generally appear in chronological order dating back to the Epipaleolithic period. Although several chronological and typological evaluations of vessels made of different types of stones have been made so far, there is little information about their production techniques.

The focus of this study is the production of marble vessels as well as on some other finds of Ada Höyük, a settlement, which was investigated as part of the Uşak Protohistoric Period Survey Project (UPDAP). They are generally defined as grave goods or daily use objects according to their context. This article aims to date marble vessels from Ada Höyük through typological analogies and to assess their chaîne opératoire and production technology.

ÖZET

Taş kaplara Epipaleolitik döneme kadar geriye giden bir kronolojik dizin içinde rastlanmaktadır. Farklı cinslerde taşlardan yapılan kaplara dair kronolojik ve tipolojik değerlendirmeler yapılmış olsa da özellikle erken dönem üretim teknikleri ile ilgili bilgiler azdır.

Bu çalışmada Uşak Protohistorik Dönem Yüzey Araştırmaları Projesi (UPDAP) ile tespit edilmiş Ada Höyük ve mermer kap üretimine dair bulgular değerlendirilmiştir. Mermer kaplar, Yakındoğu'da birçok yerleşim ve kontekste ele geçmiştir. Genellikle buluntu kontekstlerine göre mezar hediyesi veya günlük kullanım objesi olarak tanımlanmışlardır. Bu makale, Ada Höyük'te bulunan mermer kapları tipolojik benzerlerinden hareketle göreli olarak tarihlendirmekte, ayrıca bu objelerin üretim teknolojisine ve zincirine ilişkin değerlendirmelerde bulunmayı hedeflemektedir.

Introduction

Although as a critical passage between inner and coastal western Anatolia, the modern province of Uşak entails archaeological significance, it is still far from being adequately investigated in terms of prehistoric and protohistoric periods. This is largely due to the lack of systematic excavations in the province. However, surveys and rescue excavations carried out since the past decade continue to increase our knowledge of this area substantially.[1] The Uşak Protohistoric Period Survey Project (UPDAP), which started in 2017, define the settlement organization, human movements, interregional relations and material culture within the

1 Chronologically, the most significant prehistoric discovery of the region is the Paleolithic findspot at Banaz/Sürmecik. The campsite of Sürmecik, which seems to had been used for a long time during the Middle Paleolithic period, provided an appropriate ecological niche for Neanderthal groups (Söyler *et al* 2018: 387; Taşkıran *et al* 2021). The data pertaining to the Neolithic and subsequent prehistoric periods are sparse. Harun Oy, whose surveys focused on the Early Bronze Age, recorded regionally characteristic Neolithic and Early Chalcolithic pottery from Altıntaş Höyük, Ada Höyük and Mercimeklik Tepe (Oy 2017; Oy 2019a.).

borders of Banaz and Merkez districts. In this area 46 mounds were examined by extensive survey methods. The data obtained from the mounds show the settlement sequences extending from the Neolithic to the Late Antiquity.[2]

Ada Höyük was examined during an extensive survey in 2018. Tools and marble vessel fragments were collected from the surface which were subsequently macroscopically documented. This initial study confirmed that the abrasions on the ground stone tools and the marble vessels were very similar to each other. In 2019, Ada Höyük was re-examined to understand the distribution and density of ground stone tools, marble vessels and rought-outs. Additionally, related settlements and possible sources of raw materials in the vicinity were also investigated to assess whether the production of marble vessels took place locally at the workshops near the sources.

Marble or stone vessels generally appear in chronological order dating back to the Pre-Pottery Neolithic period. Although chronological and typological assessments of stone vessels are a hallmark of archaeological regions and culture history, information about their production techniques is still limited. Stone vessels, which are considered components of a 'cultural package,' are oftentimes classified ambiguously. Beside the Kulaksızlar marble workshop site, research about on stone vessel production are based on unfinished vessels or their rough-outs. Currently, the most important iconography illustrating the production tools comes from examples in Egypt. In this article, Egyptian iconography provides a proxy for understanding and explaining how manufacturing tools were used in Ada Höyük. Despite chronological and regional differences between Egypt and Anatolia, traditional methods as in pottery production have been used for ages. In this context, the earliest mentions of the production of stone vessels are known from the Egyptian hieroglyphic inscriptions dating back to the IIIrd Dynasty,[3] while the oldest iconographic expression can be detected in the tomb reliefs of the Vth Dynasty (25-24th centuries BC) at Saqqara.[4] Especially based on these depictions the use of the drill can be studied in detail. Information about how pre-urban communities in Anatolia produced stone vessels is entirely based on data from the marble workshop at Kulaksızlar.[5] The dating of the Kulaksızlar marble workshop, identified by surveys in the 1990s, was further clarified by the rescue excavations carried out in 2018 and 2019. Radiocarbon dates and comparative studies show that Kulaksızlar was occupied for a short period of time between 4500 and 4250 BC.[6]

The finds of Ada Höyük, which were examined within the scope of the Uşak Protohistoric Period Survey Project (UPDAP) are significant in this case. This article will focus on the tools and techniques used in the early phases of the production of marble vessels compared with similar finds in the region.

Location and Geography of Site

Discovered during the UPDAP Survey in 2018, the site of Ada Höyük[7] is located in the southernmost part of the Banaz district.[8] It is a hilltop settlement, 2.8 km southeast of Ayvacık village and 2.8 km north of Kavacık village in an area called 'Alıçlı Mevkii'. Its eastern side abuts the creek Alıçlı, its western side – the creek Kızılpınar. The area between the valleys formed by these two creeks is commonly known as the 'Ada Mevkii' (Fig. 1). 'Banaz/Alıçlı Höyük' was presented as the find spot of two figurines discussed by Önder Bilgi,[9] although there is no registered mound known as 'Alıçlı Höyük' in Banaz or within Uşak. Consequently, it has been suggested that the 'Alıçlı Höyük' mentioned by Bilgi must be Ada Höyük, located in Alıçlı Mevkii. The settlement is considered a small settlement in the region as it covers less than one hectare.

Banaz belongs to the area described as the threshold of Inner Western Anatolia, where

2 Yılmaz 2019a; Yılmaz *et al.* 2019; Erdem 2019; Yılmaz 2020.

3 Ilan 2016: 270.

4 Arnold and Pischikova 1999: Fig. 73.

5 Takaoğlu 2005: 28–35; Takaoğlu 2021.

6 Takaoğlu 2021: 46.

7 UTM Coordinates of Ada Höyük: 35 S 0748731 E/4279415 N, Altitude: 1184 m.

8 Yılmaz *et al.* 2019: 437.

9 Bilgi 1980: 3.

the regions of Central Anatolia and the Aegean meet, with mountainous edges (1250–1350 m) and plains in the centre (850–900 m) (Fig. 2). The lands between are rugged but habitable.[10] The wide valley between Kireç Tepe and Sümbül Tepe, where Ada Höyük is located, has been inhabited since the Neolithic period.

Seasonal streams flow from the aforementioned hills into the valley, and local natural resources were suitable for long-term residential areas. Banaz, dominated by brown forest soils, is one of the richest plant diversity regions in Western Anatolia, as well as the highest forested zone in Uşak province. Red pine, larch, acorn oak and juniper are the most common tree species. In the southern part, where Ada Höyük is located, with increasing altitude oak forests appear. Oak-juniper forests are present at higher altitudes.[11]

Raw materials associated with marble vessels were found in the vicinity of Ada Höyük. Paleozoic and Upper Paleozoic marbles are dominate in this area, while Jurassic-Cretaceous marbles prevail south of the village of Yazıtepe.[12] Currently, there are marble quarries 3.5 km south of Ada Höyük (Fig. 3). Known as the Kavacık quarries, these were among the most frequently used, high-quality marble quarries in Antiquity. This milky white, fine-grained resembles fine marble called 'Afyon sugar'.[13] Additionally, the production equipment that was supposedly used in the production of marble vessels were made from outcrops in the immediate vicinity. Production equipment was made from intermediate and mafic igneous rocks, in particular of mafic (basaltic) rocks, common at Karanlıcak Tepe, east of Sivaslı and 12 km south of Ada Höyük.[14]

The Finds

Ada Höyük is significant in terms of finds, despite its small size than the settlements in the region. The finds point to a sequence of settlements from the Late Neolithic to the Early Bronze Age. The diversity of finds is important both in terms of the settlement's complexity and its interaction with the surrounding settlements.

Almost all finds were collected during illegal digging activities on the mound and eastern slope of the mound. Pottery from the site contain Late Neolithic and Early Chalcolithic ware groups such as red slip ware, brown ware, grayish brown ware, brown slip ware and cream slip ware. The morphological features of the pottery display similarities to pottery from Düzkışla Höyük, a site previously investigated and dated to the Late Neolithic-Early Chalcolithic period. [15] Bowls with everted rims varying between 14 and 21 cm in diameter, bowls with an 'S' profile, hole mouth jars and jars with cylindrical neck are common (Fig. 6/1-12). The decorations consist of geometric motifs made with reddish brown paint on a cream slip and black paint on brown wares (Fig. 6/16-22). Additionally, vertical tubular lugs, characteristic of local Neolithic pottery, are also observed (Fig. 6/13-15).

Other sherds helped construct the settlement sequence at Ada Höyük. Among the sherds recovered from the mound, handmade pottery of Early Bronze Age character and leg fragments belonging to tripods were found.[16] The head of a disc-faced terracotta figurine, similar to those of the Early Bronze Age, was also recovered.[17] The headdress in the form of *polos* and the interpretation of the eyebrows, eyes, mouth and ears are very characteristic of this period.

Apart from pottery, fragments of marble vessels and manufacturing tools were identified. Thirty-five drill bits, two drill weights, four vessel drafts and thirty-five marble vessel fragments collected during the surveys were examined (see Fig. 4-5). Weights, vessel rought-outs and vessel fragments were made of marble. No completely finished vessel is observed in the assemblage. Different stone types were used in the made of drill bits.

10 Kara 2010: 16.

11 Kara 2010: 76–77.

12 Kara 2010: 7, 16, Şekil 1.2; Atasoy 2017: 25–26, Harita 9.

13 Asgari 1981: 43–44.

14 Atasoy 2017: 23.

15 Yılmaz 2020: 8–16, Resim 2–6.

16 Yılmaz *et al.* 2019: 437; For parallels see Lloyd and Mellaart 1962: 118, Fig. P. 14/24; Sperling 1976: 317, Fig 8/107; Koçak and Bilgin 2005: 102, Fig 12/3.

17 Gündoğan-Aydıngün 2003: 166, Levha 52/f.

Production Tools

Production of stone vessels is common during the Epipaleolithic and Pre-Pottery Neolithic period in the Near East. Archaeological finds show that objects made from different stones reflect the technology and style preference of the period. Ada Höyük finds display a production chain (or *chaîne opératoire*) similar to Kulaksızlar and Kanlıtaş. The first stage of this chain is the supply of raw materials. Then, a draft is created from the raw material according to the size of the vessel to be produced. In the following stage, the draft is emptied with the help of a drill. In the last stage, the final shape of the vessel is given and its surface is smoothed/polished. Since most of the surface finds were collected from the illegal digging pits and accumulation in the stream bed, they do not give much information about the organization of the work area.

It is recognized that stone vessels were pre-designed before production and special technologies were developed for efficient production. In this context, one of the most significant factors of stonework is the solidity and strength of the stone. For instance, while solid stones such as obsidian and flint can only be shaped by chipping, stones like quartz and marble can be shaped with a drill made of similar hardness and with the help of abrasives. Some fine-grained volcanic rocks, therefore, can be shaped into an object after being roughly shaped by chipping and then giving their final shape with the abrasives (Fine basalt, quartzite and high silicate limestone)[18] In addition to the main drill body, which was probably wooden, several other components were required: drill bits and drill weights. Abrasive marks on the interior of the pieces of marble vessels discussed in this article indicate that they were produced in the aforementioned manner. Identical marks are also visible on the drill bits.

The drill bits

The most comprehensive research thus far into drill bits was conducted by D. A Stocks in his experimental work on Egyptian stonework. According to Stocks, three different typed of drill bits were used in the manufacture of stone vessels: the crescent-shaped drill bit, the conical or round-bottom drill bit, and the figure-of-eight drill bit. While the crescent-shaped drill bit is usually made of flint, other types of stone have also been used. Stocks argues that the conical type is usually used to dig a deep hollow, while others are used to extend it.[19] Additionally, a flower-shaped drill bit has been described in the city of Heit el-Ghurab in recent research.[20]

During our surveys, we noticed that some stones were carved and shaped in the same technique. Marble vessel fragments and vessel rough-outs suggested that they were related to the production process. The regular scrape marks, especially at the endpoints, stimulated our interpretations. Based on these marks, it was hypothesized that some of the drill bits were used as drillers (Fig. 7/1, 3-4, 6, 12-13) and others as wideners (Fig. 7/2, 5, 7-11, 14-17; Fig. 8). The marks at the ends, which were defined as marks of a driller, appear rounded and nested, suggesting a fixed and fast-rotating mechanism on the marble to be processed. The bits, defined as wideners, are the most common type. An abrasion which is related to the working principle, on the widener drill bits draws attention. Presumably, these bits were attached to a *twist-and-reverse-twist drill*.[21]

The types of stones and morphological characteristics of the drill and the widener drill bits contribute to our further understanding of these tools and their production. A stone with a higher *Mohs* hardness should have been used to erode the marble in the making of the drill bits. Drill or drill bits were required to have a hardness of at least *Mohs* 7.[22] It was found that trachyandesite was the most preferred among Ada Höyük drill bits. These stones, which belong to the rocks of magmatic origin, are widely distributed in the provinces of Afyon, Ankara, Denizli, Balıkesir and Uşak.[23] Other types include basalt, quartzite and quartz-schist (Fig. 9). The Rock Strength Coefficient (RSC),[24] Mohs hardness[25] and abrasion index

18 Squiteri and Eitam 2016: 5; Hodges 1964: 98–99.

19 Stocks 2003: 139–145.

20 Ayad 2014: 36, Figure 2-4, image 2–8.

21 Stocks 2003: 148.

22 Ilan 2016: 270.

23 Tuncay *et al.* 2016: 75.

24 Yaralı *et al.* 2008: Çizelge 1.

25 Görcelioğlu 1976: 155, Tablo III.

of marble is lower than that of trachyandesite, basalt, quartz and quartz-schist (Fig. 10).

In the evaluation of the drill bits, morphological characteristics and rock features were considered. The drill bits were generally round in cross-section and had diameters between 5 and 9 cm. The drill bit was suitable for the size of the vessel to be produced and the punching mechanism used was reasonably preferred. Widener drill bits had triangular or trapezoidal forms of an oval cross-section. Tip widths varied between 6.3 and 11 cm. An example, albeit a single one, is reminiscent of figure-of-eight drill bits (Fig. 7/18). However, only one side of this drill bit showed signs of use. Therefore, it may have gained its current form after secondary use. There was also a round cavity on both faces.

Drill weights

Recent studies in Near Eastern archaeology have led to the identification of various types of drills as well as their apparatuses, particularly in Egypt.[26] Drill bit weights are another component of the drill apparatus identified in iconography and archaeological contexts. Drill weights are difficult to define when they do not appear with other elements.[27] Consequently, archaeologists have relied on wall reliefs in Egypt to identify them.[28] Weights on the drills appear in hieroglyphs as single, double and dome-shaped. Although weights varied in shape, they were used to speed up the engraving process by pressing and adding dynamic impact on the rotation process.[29]

At Ada Höyük two objects have been defined as weights (Fig. 11/1-2). Both weights are made of marble. One of them is complete and has a hole with a 2.3 cm diameter (Fig. 11/1). The polish caused by friction surrounds the hole on the weight, which is almond-shaped and undamaged. The thread hole is drilled near the centre of the upper section. The second weight was found broken (Fig. 11/2). While there is ongoing debate concerning the position of the weights on the drill[30], we think that it was attached to a crank drill mechanism. The drills and weight positions were were based on drill and weight positions from reliefs in Egypt, but may vary due to the type and production stage of the marble object produced.

Marble Vessel Rough-outs

The vessel rough-outs provide significant information about the production stages at Ada Höyük. Three vessel rough-outs with a diameter of 10-18 cm are completely rough, and one of them has three legs, which were not finished (Fig. 11/3-6). While the base of other vessel rough-outs were carved spherically, the upper parts were left flat. The marble taken from the quarry is prepared for the next stage by 'pecking', presumably with the help of an igneous rock.[31] Apart from the four vessel rough-outs, a group of semi-finished marble vessels can also be distinguished in this group. The incompleteness of these specimens is evident from their shallowness. The unevenness in the interior of the vessels rough-outs also indicate that they were unfinished (Fig. 12/9, 14). Similar examples of vessel rough-outs are known from Karayakuplu Höyük.[32]

Marble Vessels

Fragments of marble vessels from Ada Höyük are mostly made of white marble, while some specimens are made of grainy marble (Fig. 12/4, 15). Fragments of marble vessels and semi-finished specimens were grouped into several types, depending on their profile characteristics. Open profiles are common in these groups. Spherical bowls are divided into 'S' profiles (Fig. 12/3, 7-8; Fig. 13/2-5) and vertical rims (Fig. 12/4-7; Fig. 13/7). Two vessels with predominantly spherical bodies are carinated. Samples with 'S' profile were divided into groups with rounded rims (Fig. 12/8; Fig. 13/5) and outwardly cut rims (Fig. 12/7; Fig. 13/2-4). Marble vessels with vertical rimsare sub-divided into flat-topped (Fig. 12/4, 8, 10-12) and cross-cut rims (Fig. 12/1). According to their bases, they are further subdivided into vessels with round bases and vessels with tripods. In

26 Ilan 2016: 261.

27 Ilan 2016: 269.

28 Arnold and Pischikova 1999: Fig. 73.

29 Hartenberg and Schmidt 1969: 157.

30 Hartenberg and Schmidt 1969: 159.

31 Squitieri and Eitam 2016: 555.

32 Oy 2019b: 12.

particular, some vessels with tripods are very shallow (Fig. 13/2-4). The same situation is observed for vessels with a spherical body (Fig. 12/9-10, 12, 14). This indicates an unfinished production, or suggests that it may have been shaped intentionally. With the exception of a few thin-walled specimens, the rough work on the outer surface of most vessel fragments suggests an unfinished production. Some examples show drill marks on their inside (Fig. 12/4, 6, 16; Fig. 13/9), but none is polished.

The diameters of the marble vessels with tripods vary between 11 and 18 cm. While some of them have shallow interior volumes, some samples whose exact dimensions are not known have thinner walls and deep interior volumes. One example has four opposite knobs (Fig. 13/6-7), which may have been made for decorative purpose. However, when considered in terms of functionality, it is speculated that these knobs were made to prevent slipping of the leather or the rope surrounding the weaving to close the mouth of the vessel. In one of the marble vessels, there is both a knob and a hole which was pierced secondarily (Fig. 13/7). Inside this hole a gloss caused by use can be seen. Additionally, these vessels were possibly used as mortars due to their thick bases and traces of use. They include fragments of round-bottomed marble vessels with the same profile features as marble vessels with a tripod (Fig. 12/9, 14).

Production Technology

As mentioned before Ada Höyük finds enable us to follow the production process of a marble vessel from its beginning to the end (Fig. 13/1). Marble for the vessels was probably obtained from the Kavacık marble quarries, 3.5 km south of Ada Höyük. Raw material blocks cut from the surface marble formations were shaped by pecking until they reached the size of the vessel desirable to be produced with the help of harder stones. Tripod vessels were also roughly shaped, as observed from the incomplete vessels.

The drill bits, the traces on drill bits, a reflection of similar traces on marble vessels and drill weights suggest that crank drills were used for the production of marble vessels. Crank drills described in detail by D. A. Stocks and D. Ilan consist of a wooden shaft and a fork in the bit section to which the drill bit is attached. The forked part at the drill bits and the shaft are defined as two separate parts.[33] The reason is that the forked section at the end is changed for the production of vessels of different depths. From the descriptions in Egypt, it is known that in addition to the drills designed as two pieces, crank drills made of one piece of wood were also used.[34] On the upper part of the shaft, there was a diagonal turning lever. The weights were also attached between the shaft and the twisting part.[35] There is a debate regarding the position of weights in the iconography. For both balance and comfort, it is recommended that the weights were in the middle of the shaft, not above.[36] There were not only drilled bits and weights to carve the inside of the vessel. At some point, the first cavity was made with a hammer or with drill bits to empty the prepared vessel rough-outs. In the next stage, the cavity was expanded with widener drill bits. However, abrasives achived the biggest progress in the engraving process. Fine basalt, quartzite and high silicate limestone dust were commonly used as abrasives.

The mechanism used in the production of the Ada Höyük marble vessels has also been reconstructed from the drills indicated on the Egyptian reliefs. Although itmay be difficult to extrapolate the wooden component of the drill, examples from iconography provide a promising and logical comparison, especially if one considers how bow or pump drills have been used unchanged throughout the ages. There are similarities and inconsistencies between the unearthed production tools and iconography. Based on the marks on the drill bits, the drill used at Ada Höyük is posited to work according to the *twist-and-reverse-twist* principle defined by Stocks (Fig. 14/b-c).[37] As the depths and dimensions of Ada Höyük marble vessels do not vary significantly, it is assumed that a twist-rod drill with a one-piece shaft was used (Fig. 14/c). Two different hypotheses for how the drill bits were attached to the shaft based

33 Stocks 2003: 152; Ilan 2016: 267.

34 Hartenberg and Schmidt 1969: 156, Fig. 2 (a).

35 Stocks 2003: 144-154.

36 Hartenberg and Schmidt 1969: 159.

37 Stocks 2003: 148.

on the profile characteristics remain 1) a drill bit attached to a fork was used in Ada Höyük, as in the Egyptian samples (Fig. 14/a), as some trapezoidal drill bits and a figure-of-eight drill bit can be confirmed; and 2) the drill bit (Fig. 14/b-c) was inserted by splitting the end of the shaft made of a thicker wood, presumably, the pointed sections of the trapezoidal drill bits inserted into the wood and tied tightly with a string.

The round-section drill bits, defined as drillers, can also be identified from the abrasion marks on which they are attached to the drill operating on a vertical axis. Moreover, the widener drill bits operated at an angle varying from at least 60-80 degrees. First, the right hand held the handle and the left hand held the weights, and, when using the system of twist and reverse twist, part of the vessel abraded. After a while, the left hand would hold the handle and the right hand would use pressure on the weights and the other part of the vessel would corrode. Thus, both the single-arm does not become tired and the abrasion method is accelerated. The abrasion marks and the ridge formed after abrasion in most of the widener drill bits are characteristic of this working principle.

A Short Note for Craft Specialization

While craft specialization remains among archaeologists a frequently discussed topic for early periods, it note that specialization is a relative rather than an absolute phenomenon. In discussions on specialization, more emphasis is placed on quantity rather than quality.[38] Data from settlement contexts or surveys provide direct or indirect information about specialization according to certain criteria.[39] The determined criteria help define the presence and degree of specialization.

Two well-defined examples of specialization in the production of marble objects are Kulaksızlar and Kanlıtaş. Takaoğlu, draws attention to four characteristics of specialization in pre-urban communities: Segregation of production (1), the number of finished objects must exceed the needs of the producers (2), finished products must be standard (3), and finished artifacts must show skill and labor in the production (4).[40] The marble objects in Kulaksızlar meet these criteria.

In Kanlıtaş, an early specialization characterized by Rosen[41], '…incipient and sporadic specialization, not yet institutionalized nor widespread' is discussed. Despite a survey context, it appears to meet many criteria for specialization.[42] Repeated production, finding more successful objects than wasters, and elements of production chain are indicators of craft specialization.

Considering the defined parameters, more than one criteria meet craft specialization in Ada Höyük. The definition of production stages and technology are among these criteria. Repeated standardized forms can be argued as another important criterion. The proximity to the raw material source provides an advantage in specialization as in Kulaksızlar. While analogical studies show the widespread use of marble vessels, they do not supply much information about the production centers (origin) and distribution. The available data suggests an incipient specialization, not yet institutionalized nor widespread as in case of Kanlıtaş.[43] Surveys conducted in the immediate vicinity of Ada Höyük indicates that it is not the only production center of marble vessel in the region[44]. The marble vessels produced are not ornamental, ritual or prestige items like those vessels in Kulaksızlar and Kanlıtaş. It is difficult to comment on the demand and economic inputs of marble vessels from different contexts in various settlements.[45]

Discussion

To contextualize our survey finds, the production centers and findspots with marble vessels in the vicinity were examined. The marble workshop at Kulaksızlar is obviously the first findspot that come to mind when comparing the Ada Höyük assemblage with other Inner

38 For the definition of craft specialization Costin 1991:3; Takaoğlu 2005: 5-8; Baysal *et al.* 2015: 251-254.

39 Costin 1991:2.

40 Takaoğlu 2005: 45.

41 Rosen 1989: 111.

42 Baysal *et al.* 2015: 252.

43 Baysal *et al.* 2015: 252.

44 Oy 2019b; Yılmaz 2020.

45 Kerner 2010: 182.

West Anatolian sites. Identification of marble figurines and idol sketches, incomplete marble vessels, improper manufacturing and production wastes, as well as the manufacturing tools found here, led to the definition of the site as 'workshop'.[46] According to the pottery and C^{14} dating, it is dated to the third quarter of the 5th millennium BC (ca. 4500-4250).[47] Furthermore, marble objects found in Manisa/Dağdere are quite similar to the objects at Kulaksızlar.[48] Apart from these settlements, which are adjacent to each other, it was suggested that marble vessels from Gülpınar in the Troas[49] and Yeşiltepe/Eskişehir[50] are similar to the products of Kulaksızlar and that these products can be observed in a wide geographical region. The only common point between Kulaksızlar and Ada Höyük is that they are both described as 'workshops'. Thus, neither the morphological features of the marble objects, nor other find categories provide any relationship.

Some findspots and finds identified in the research carried out in Uşak recently years provide important contextual and historical information for the finds of Ada Höyük. First, Karayakuplu Höyük in the district of Karahallı, discovered during the survey conducted by H. Oy, was identified as a workshop due to the presence of marble vessel fragments and rough-outs.[51] However, marble objects, which resemble Kulaksızlar assemblage that can be dated between the Middle Chalcolithic and the Early Bronze Age, were not identified. In fact, the presence of Early Chalcolithic pottery from Karayakuplu Höyük suggests that the marble vessels belong to an earlier date .[52] The finds of Karayakuplu Höyük were therefore incorrectly associated with the Kulaksızlar workshop only due to geographical proximity.[53]

Düzkışla Höyük, which was discovered in the district of Banaz during the UPDAP survey, helps to date Ada Höyük finds. The marble finds of Düzkışla Höyük related to the production of marble vessels include a bowl rim fragment, a body fragment, a miniature bowl or mug (?), a mortar or vessel rough-out, an animal-headed vessel fragment and two drill bits.[54] Surface finds collected from Düzkışla like pottery, figurines, grounding stones and sling stones indicate a settlement, which was possibly inhabited between 6300/6200-5800/5700 BC.[55]

Marble vessels draw attention to settlements in Western Anatolia and the Lake District. The earliest marble vessels in the Lake District originate from the so-called 'Aceramic' levels.[56] While marble vessels were common in the Hacılar VI, they decreased in Hacılar I.[57] Along with Hacılar, other early Neolithic marble items were found at the EN I/9 and EN II/2 levels at Bademağacı.[58] Although there was little interest in marble vessels, which are represented by a total of four pieces in Bademağacı, the marble vessels found in Höyücek, approximately 25 km to the north, are quite remarkable.[59] There are similarities between marble vessels from the Temples Phase at Höyücek (6280-6080 BC) and the later Hacılar VI marble vessels. In the Lake District, marble pieces belonging to three different vessels, were found in the Neolithic and Early Chalcolithic layers of Kuruçay.[60] The marble vessels are parallel to the pottery typology in this area. In particular, footed marble vessels found in Hacılar and Höyücek are comparable to the marble vessels from Ada Höyük. The vessels with tripods and 'S' profiles that dominate most vessel roughouts at Ada Höyük were recorded both in Hacılar[61] and Höyücek[62].

Yeşilova Höyük is the only settlement in

46 Takaoğlu 2002: 71-72.

47 Takaoğlu 2005: 21; Takaoğlu 2021: 46.

48 Takaoğlu 2017: 3.

49 Takaoğlu 2006: 309.

50 Takaoğlu and Bamyacı 2018: 497-498.

51 Oy 2019b: 2.

52 Oy 2019b: Fig. 29.

53 Oy 2019b: 22.

54 Yılmaz 2020: 19-20, see for drill bit (Resim 7: 11-12); see for pieces of marble vessels (Resim 7: 19-24).

55 Yılmaz 2020: 22.

56 Mellaart 1970: 3-7; Mellaart 1970: 6, pl. V/a; Duru 2007: 331.

57 Mellaart 19970: 149.

58 Yurtsever-Beyazıt 2019: 84-85.

59 Duru and Umurtak 2005: Levha /Plate 150-153.

60 Umurtak 1994:69, Lev.222/6-8; 231/4.

61 Mellaart 1970: Fig. 159/3,7, Fig. 162/1, Fig. 163/2, 12-17.

62 Duru and Umurtak 2005: Levha /Plate 153/1.

Western Anatolia where a marble vessel contemporary of the Lake District can be found. The marble vessels concentrated in levels III8-6 belonging to the Neolithic I period include bowls with simple rims and other types of bowls.[63] The similarity of the Yeşilova finds is discussed among the marble vessels of Ada Höyük (Fig. 12/3.5,7,8). Additionally, a marble vessel found in a tomb at Barcın Höyük in Northwest Anatolia is the only example of this region.[64]

The settlements in Western Anatolia, where marble vessels were recovered, show similar pottery assemblages to Ada Höyük: Hacılar IX-VI, few monochrome[65] and painted[66] in the Lake District, Early Building Phase, and the Temples Phase in Höyücek[67], EN II in Bademağacı[68], Level 12-7 in Kuruçay (especially tubular lugs)[69], Ekşi Höyük in the Upper Meander Basin[70] and Yeşilova 3-5 (Neolithic III)[71] on the coastal Aegean.

The pottery from Ada Höyük date from the Late Neolithic to the Early Chalcolithic. Unfortunately survey finds impede an absolute dating of the rest of the archaeological finds. However, based on the pottery found at the site and all the comparisons we bring to the discussion, we suggest that the marble objects and all the related materials can also be dated to the Late Neolithic-Early Chalcolithic period (ca. 6300/6200-5800/5700 BC).

Conclusion

The emphasis of this study was on the production of marble vessel and on some other finds of Ada Höyük, a settlement, investigated as part of the Uşak Protohistoric Period Survey Project (UPDAP). Marble vessels, analyzed over a wide time range, were found in many settlements and contexts throughout the Mediterranean and Near East. Although limited in number, the marble vessel production in Western Anatolia date back to the Neolithic period. Marble vessels are commonly considered funerary implements or objects of everyday use. In this article, production technology, *chaîne opératoire* and craft specialization were examined through survey finds from Ada Höyük. We also discussed the site chronology with the help of material analogies.

Based on the presented drill bit evidence, drill use associated with stonework at Ada Höyük works on the principle of *twist-and-reverse-twist*. Since the depths and dimensions of the marble vessels do not differ from each other, it can be suggested that they have a one-piece shaft. Considering all the finds, there is a clear *chaîne opératoire* in place at Ada Höyük that can be observed from the raw material source to the finished object. While future excavations will help better understand the workshop process or loci of manufacture, the available data show that early craft specialization was practiced at Ada Höyük as in Kulaksızlar and Kanlıtaş.

Although knowledge of the potential dating and the production of the marble vessels was gained, information about the scale of production and the distribution of the vessels from Ada Höyük is still lacking. At present, preliminary findings show that the technology for the production of marble vessels at Ada Höyük and in the immediate vicinity qualify the site as a local workshop.

63 Derin *et al.* 2009: 18, Fig. 22/33-36; Derin 2012: 381, Fig.11.

64 Özbal *et al.* 2017: 20-21, Resim 10.

65 Mellaart 1970: 243/10.

66 Mellaart 1970: 272-349.

67 Duru and Umurtak 2005: Levha 33-34, 35/6-9, 38; Levha 54/1-5.

68 Umurtak 2019: Levha/Plate 85.

69 Duru, 1994: s. 33 Levha 59/11, Levha 164/3, Levha 197/6.

70 Dedeoğlu *et al.* 2017: Çizim 2; Dedeoğlu *et al.* 2018: s. 564, Figür 6.

71 Derin *et al.* 2009: Fig. 9-11.

Bibliography

Arnold and Pischikova 1999: D. Arnold - E. Pischikova, "Stone vessels: luxury items with manifold implications" In: *Egyptian Art in the Age of the Pyramids, The Metropolitan Museum of Art* O'NeilL, J.P., Fuerstein, C., Childs Allison, E., Donovan, M. & Howard, K. (Eds.), New York, 121-131.

Asgari 1981: N, Asgari, "Uşak Selçikler ve Çevresinden Roma Çağı Lahitleri ve Mermer Ocakları" *Türk Arkeoloji Dergisi* XXV-2, 11-47.

Atasoy 2017: A. Atasoy, *Uşak Atlası*. Kayseri.

Ayad 2014: E. A. M. Ayad, *Drilling Tools and Stone Vessels of Heit el-Ghurab*, Yayınlanmamış Yüksek Lisans Tezi, The American University of Cairo, School of Humanities and Social Science.

Baysal et al. 2015: E. Baysal, A. Baysal, A. U. Türkcan and A. Nazaroff, "Early Specialized Production? A Chalcolithic Stone Bracelet Workshop at Kanlıtaş, Turkey" *Oxford Journal of Archaeology* 34(3), 235-257.

Bilgi 1980: Ö. Bilgi, "Yeni Bulunmuş Eserlerin Işığı Altında Anadolu'da Bronz Çağı Öncesi İnsan Figürleri Hakkında Yeni Gözlemler" *Belleten* XLIV, 173, 1-24.

Costin 1991: C. Lynne Costin, "Craft Specialization: Issues in Defining, Documenting, and Explaining the Organization of Production" *Archaeological Method and Theory*, 3, 1-56.

Dedeoğlu et al. 2017: F. Dedeoğlu, H.H. Baysal, A. Ozan, E. Konakçı and B. Temür, "Ekşi Höyük 2015 Yılı Kazı Çalışmaları". *KST* 38.2, 389-402.

Derin 2012: Z. Derin, "Yeşilova Höyük" *Anadolu'da Uygarlığın Doğuşu ve Avrupa'ya Yayılımı, Türkiye'de Neolitik Dönem, yeni kazılar, yeni bulgular*, M. Özdoğan-N. Başgelen (Eds.) İstanbul: Arkeoloji ve Sanat Yayınları, 377-384.

Derin et al. 2009: Z. Derin, F. Ay, and T. Caymaz, "İzmir'in Prehistorik Yerleşimi-Yeşilova Höyüğü 2005-2006 yılı Çalışmaları" *ADerg* XIII (2009/1), 7-58.

Duru 2007: R. Duru, "Göller Bölgesi Neolitiği. Hacılar-Kuruçay Höyüğü-Höyücek-Bademağacı Höyüğü" in *Anadolu'da Uygarlığın Doğuşu ve Avrupa'ya Yayılımı, Türkiye'de Neolitik Dönem, yeni kazılar, yeni bulgular*, M. Özdoğan-N. Başgelen (Eds.) İstanbul: Arkeoloji ve Sanat Yayınları, 331-360.

Duru and Umurtak 2005: R. Duru, G. Umurtak, *Höyücek. 1989-1192 Yılları Arasında Yapılan Kazıların Sonuçları*. Ankara: Türk Tarih Kurumu.

Erdem 2019: İ. B. Erdem, "Uşak Protohistorik Dönem Yüzey Araştırmaları Projesi 2017-2018: Yontmataş Buluntu Topluluğu", *AST* 35: 73-94.

Görcelioğlu 1976: E. Görcelioğlu, "Yapı Malzemesi Olarak Kullanılan Başlıca Doğal Taş Çeşitlerinin Bazı Teknik Özellikleri", *İstanbul Üniversitesi Orman Fakültesi Dergisi* 26(1): 148-166.

Gündoğan-Aydingün 2003: Ş. Gündoğan-Aydıngün, *Eski Tunç Çağında Anadolu Pişmiş Toprak Figürin ve İdolleri*, Yayınlanmamış Doktora Tezi, Hacettepe Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Hartenberg and Schmidt 1969: R.S. Hartenberg, J. Jr. Schmidt, "The Egyptian Drill and the Origin of the Crank" T*echnology and Culture* 10(2): 155-165.

Hodges 1964: H. Hodges, *Artifacts. An Introduction to Early Materials and Technology*. London: John Baker.

Ilan 2016: D. Ilan, "The ground stone components of drills in the ancient Near East: Sockets, flywheels, cobble weights, and drill bits" *Journal of Lithic Studies* 3(3): 261-277.

Kara 2010: H. Kara, *Banaz İlçesinin Coğrafyası*, Konya.

Kerner 2010: S. Kerner, "Craft Specialisation and its Relation with Social Organisation in the Late 6th to Early 4th Millennium BCE of the Southern Levant" *Paléorient*, 36(1), 179-198.

Koçak and Bilgin 2005: Ö. Koçak- M. Bilgin, "Taşlı Höyük: An Important Early Bronze Age Settlement and Necropolis in Bolvadin-Dişli Village" *Anatolia Antiqua* XIII: 85-109.

Lloyd and Mellaart 1962: S. Lloyd, J. Mellaart, *Beycesultan, Vol. I. The Chalcolithic and Early Bronze Age Levels*, London.

Mellaart 1970: J. Mellaart, *Excavations at Hacılar*, Edinburgh: Edinburgh University Press.

Oy 2017: H. Oy, "Uşak İli'nde Bulunan Neolitik ve Kalkolitik Bir Yerleşim: Altıntaş Höyük" *Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 28, 337-358.

Oy 2019a: H. Oy, "Banaz'da İki Son Neolitik/İlk Kalkolitik Çağ Yerleşimi: Ada Höyük ve Mercimeklik" *SDÜ Fen-Edebiyat Fakültesi Sosyal Bilimler Dergisi*, 47, 16-41.

Oy 2019b: H. Oy, "İçbatı Anadolu'da Prehistorik Döneme ait Bir Mermer Atölyesi: Karayakuplu Höyük", *OLBA* XXVII: 1-40.

Özbal 2017: R. Özbal, F. Gerritsen, M. Erdalkıran ve H. Özbal, "2015 Yılı Barcın Höyük Kazıları" *KST* 38/3, 17-32.

Rosen 1989: S. A. Rosen, "The origins of craft specialization: lithic perspectives" in *People and Culture in Change*, I. Herschkovitz (ed.) Oxford, BAR International Series 508, 107-114.

Söyler et al. 2018: Ş. Söyler, H. Taşkıran, R.M. Czichon, K. Özçelik, S. Polat, M. Ali Yılmaz, E. Erbil, M. Türker and D. Dağcı "Uşak Banaz Sürmecik Paleolitik Kazısı-2016", *KST* 39.2. 281-391.

Sperling 1976: J.W. Sperling, "Kum Tepe in the Troad: Trial Excavations 1934". Hesperia 45/4: 305-364.

Stocks 2003: D. Stocks, *Experiments in Egyptian Archaeology: Stoneworking technology in Ancient Egypt*. Routledge: London.

Squiteri and Eitam 2016: A. Squiteri, D. Eitam, "An experimental approach to ground stone tool manufacture", *Journal of Lithic Studies* 3(3): 553-564.

Takaoğlu 2002: T. Takaoğlu, "Chalcolithic Marble Working at Kulaksızlar in Western Anatolia" *TÜBA-AR* V: 71-93.

Takaoğlu 2005: T. Takaoğlu, *A Chalcolithic Marble Workshop at Kulaksızlar in Western Anatolia. An Analysis of Production and Craft Specialization. BAR International Series 1358*. Oxford, England: Archaeopress.

Takaoğlu 2006: T. Takaoğlu, "The Late Neolithic in the Eastern Aegean: Excavations at Gülpinar in the Troad" *Hesperia* 75(3): 289-315.

Takaoğlu 2017: T. Takaoğlu, "Middle Chalcolithic Finds From Dağdere in the Akhisar Region" *Anadolu/Anatolia* 43: 1-13.

Takaoğlu 2021: T. Takaoğlu, "Kulaksızlar Revisited: Excavating the Contexts of A Chalcolithic Marble Workshop" in *the Archaeology of Anatolia, Volume IV. Recent Discoveries (2018-2020)*. S. R. Steadman and G. McMahon (Eds.), Newcastle upon Tyne: Cambridge Scholars Publishing. 45-55.

Takaoğlu and Bamyacı 2018: T. Takaoğlu, O. Bamyacı, "On marble, conical ryhta: New evidence from Yeşiltepe in the West Anatolian hinterland" in *Communities in Transition, The Circum-Aegean area during the 5th and 4th millennia BC*. S. Dietz, F. Mavridi, Z. Tankosic (Eds.), Oxford&Philadelphia: Oxbow Books. 491-498.

Taşkıran et al. 2021: H. Taşkıran, Y. Aydın, K. Özçelik and E. Erbil, "A new discovery of Neanderthal settlements in Turkey: Surmecik open-air campsite in Western Anatolia" *L'anthropologie* 125: 1-13.

Tuncay et al. 2016: E. Başpınar Tuncay, D. Dedeoğlu and F. Yağmurlu, "Altıntaş Köyü (Uşak) Kuzeyindeki Andezitik Kayaçların Kaplama ve Döşeme Taşı Olarak Kullanılabilirliğinin Araştırılması" *Mehmet Akif Ersoy Üniversitesi Fen Bilimleri Enstitüsü Dergisi* 7(1), 75-83.

Umurtak 1994: G. Umurtak, "Taş Eserler" in *Kuruçay I. 1978-1988 Kazılarının Sonuçları Neolitik ve Erken Kalkolitik Çağ Yerleşmeleri*. R. Duru (Ed.) Ankara: Türk Tarih Kurumu, 69-71.

Umurtak 2019: G. Umurtak, "Çömlekçilik" in *Bademağacı Höyüğü Kazıları. Neolitik ve Erken Kalkolitik Çağ Yerleşmeleri I/Excavations at Bademağacı Höyük. The Neolithic and Early Chalcolithic Settlements*. Duru, R. and Umurtak, G. (Eds.), İstanbul: Ege Yayınları, 32-73.

Yaralı et al. 2008: O. Yaralı, A. Kandemir and A. Eren, "Bazı Magmatik Kayaçların Kayaç Dayanım Katsayısı ve Schmidt Sertliği Arasındaki İlişkiler" *Madencilik* 47(2): 25-36.

Yılmaz 2019: M. Ali Yılmaz, "Uşak Protohistorik Dönem Yüzey Araştırmaları Projesi (UPDAP) 2017 Yılı Sonuçları (İlk Sezon)", *AST* 36.2, 425-452.

Yılmaz 2020: M. Ali Yılmaz, "İç Batı Anadolu Neolitik-Kalkolitiğine Dair Yeni Bulgular: Düzkışla Höyük, Uşak" *Anadolu Araştırmaları* 23: 1-40.

Yılmaz et al. 2019: M. Ali Yılmaz, R. M. Czichon, M. Deniz, H. Dülger, S. Akın, A. Nacar, A. Söyler, H. Çelik and F. Yiğit "Uşak Protohistorik Dönem Yüzey Araştırması (UPDAP) 2018 Yılı Sonuçları", *AST* 37.2, 435-468.

Yurtsever-Beyazıt 2019: A. Yurtsever Beyazıt, "Taş Buluntular" in *Bademağacı Höyüğü Kazıları. Neolitik ve Erken Kalkolitik Çağ Yerleşmeleri I/ Excavations at Bademağacı Höyük. The Neolithic and Early Chalcolithic Settlements*. Duru, R. ve Umurtak, G. (Eds.), İstanbul: Ege Yayınları, 83-85.

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Fig. 1. Findspots of UPDAP and the cited in the article

Fig. 2. Ada Höyük seen from the East (UPDAP archive)

Fig.3. Marble quarry at Kavacık (UPDAP archive)

Find Number	Type	Material	Height (cm)	Width (cm)	Thickness (cm)	Weight (g)
BNZ.ADAHYK.116	Drill bit	Trachyandesite	10	5.9	5	245
BNZ.ADAHYK.161	Drill bit	Basalt	11.4	6.1	4.3	367
BNZ.ADAHYK.134	Drill bit	Trachyandesite	11.5	6.6	5.5	497
BNZ.ADAHYK.119	Drill bit	Trachyandesite	12.9	6	5.3	573
BNZ.ADAHYK.139	Drill bit	Trachyandesite	9.9	5.1	3.9	204
BNZ.ADAHYK.128	Drill bit	Trachyandesite	14.4	7.1	5.4	635
BNZ.ADAHYK.167	Drill bit	Basalt	7.6	6.2	4.2	216
BNZ.ADAHYK.165	Drill bit	Basalt	7.7	5.6	4.6	195
BNZ.ADAHYK.143	Drill bit	Quartzite	11	8.4	6.1	817
BNZ.ADAHYK.142	Drill bit	Trachyandesite	10.4	8.6	6.5	703
BNZ.ADAHYK.122	Drill bit	Basalt	11	8	5.3	451
BNZ.ADAHYK.141	Drill bit	Trachyandesite	11.7	7.8	6.8	675
BNZ.ADAHYK.154	Drill bit	Trachyandesite	12	9.3	7.4	869
BNZ.ADAHYK.120	Drill bit	Quartz-schist	15.2	9	5.9	659
BNZ.ADAHYK.163	Drill bit	Basalt	11.3	7.7	5.6	507
BNZ.ADAHYK.135	Drill bit	Trachyandesite	12.3	7.8	6.1	731
BNZ.ADAHYK.144	Drill bit	Basalt	11.8	8.1	6.2	592
BNZ.ADAHYK.156	Drill bit	Basalt	12.2	9.2	5.6	892
BNZ.ADAHYK.164	Drill bit	Basalt	7.9	6.3	4.5	183
BNZ.ADAHYK.129	Drill bit	Trachyandesite	9.6	6.8	5.1	381
BNZ.ADAHYK.126	Drill bit	Quartzite	9.8	7.8	5.5	512
BNZ.ADAHYK.127	Drill bit	Basalt	10.4	7.2	5.2	450
BNZ.ADAHYK.138	Drill bit	Trachyandesite	10	7.2	5	391
BNZ.ADAHYK.117	Drill bit	Trachyandesite	10.9	10	6.6	718
BNZ.ADAHYK.123	Drill bit	Trachyandesite	11.3	10.5	5.9	662
BNZ.ADAHYK.136	Drill bit	Trachyandesite	11.6	8.4	6	561
BNZ.ADAHYK.146	Drill bit	Quartzite	15.4	11	6.4	1336
BNZ.ADAHYK.147	Drill bit	Trachyandesite	9.9	7.4	5.5	385
BNZ.ADAHYK.137	Drill bit	Trachyandesite	11.6	8.7	7.2	712
BNZ.ADAHYK.173	Drill bit	Quartzite	11.2	10.9	5.8	693
BNZ.ADAHYK.148	Drill bit	Basalt	12	8.8	5	586
BNZ.ADAHYK.130	Drill bit	Trachyte	13.1	8.6	6.6	708
BNZ.ADAHYK.132	Drill bit	Quartzite	11.2	9.4	6.4	747
BNZ.ADAHYK.131	Drill bit	Trachyandesite	12.4	9.9	6.6	832
BNZ.ADAHYK.121	Drill bit	Quartz-schist	12.6	10.7	6	1112

Find Number	Type	Material	Height (cm)	Width (cm)	Hole (cm)	Weight (g)
BNZ.ADAHYK.107	Drill weights	Marble	17.6	27.1	2.3	5700
BNZ.ADAHYK.166	Drill weights	Marble	21	13.5	-	4200

Fig.4. Table of drilling equipment

Find Number	Type	Material	Lenght (cm)	Width (cm)	Weight (g)
BNZ.ADAHYK.110	Vessel rough-out	Marble	17.6	27.1	1735
BNZ.ADAHYK.112	Vessel rough-out	Marble	6.5	10.7	1076
BNZ.ADAHYK.101	Vessel rough-out	Marble	9	18	1430
BNZ.ADAHYK.101	Vessel rough-out	Marble	9.1	11.4	1872

Find Number	Type	Material	Diameter (cm)	Lenght (cm)	Width (cm)	Weight (g)
BNZ.ADAHYK.077	Vessel	White marble	9	2.4	-	17
BNZ.ADAHYK.076	Vessel	White marble	10	3.2	-	26
BNZ.ADAHYK.079	Vessel	White marble	19	5.8	-	51
BNZ.ADAHYK.078	Vessel	Grainy marble	18	3.5	-	53
BNZ.ADAHYK.155	Vessel	White marble	21	6.8	-	187
BNZ.ADAHYK.106	Vessel	White marble	23	6.6	-	105
BNZ.ADAHYK.089	Vessel	White marble	14	6.2	-	187
BNZ.ADAHYK.097	Vessel	White marble	16	7.9	-	422
BNZ.ADAHYK.159	Vessel	White marble	19	8.1	-	1090
BNZ.ADAHYK.075	Vessel	White marble	14	2	-	80
BNZ.ADAHYK.170	Vessel	White marble	18	5.9	-	407
BNZ.ADAHYK.080	Vessel	White marble	20	2.7	-	121
BNZ.ADAHYK.087	Vessel	White marble	?	4.8	-	192
BNZ.ADAHYK.150	Vessel	White marble	13	7.5	-	742
BNZ.ADAHYK.162	Vessel	Grainy marble	-	5	17.6	54.6
BNZ.ADAHYK.095	Vessel	White marble	-	6	19	131
BNZ.ADAHYK.083	Vessel	White marble	-	5.2	10	64
BNZ.ADAHYK.153	Vessel	White marble	-	7.1	13	263
BNZ.ADAHYK.081	Vessel	White marble	-	12.8	37	1631
BNZ.ADAHYK.098	Vessel	White marble	-	9.3	20	436
BNZ.ADAHYK.094	Vessel	White marble	-	3.9	7.5	210
BNZ.ADAHYK.088	Vessel	White marble	-	7.3	15	1912
BNZ.ADAHYK.086	Vessel	White marble	11	6.2	-	211
BNZ.ADAHYK.100	Vessel	White marble	14	9.4	-	2038
BNZ.ADAHYK.082	Vessel	White marble	13	9.1	-	987
BNZ.ADAHYK.093	Vessel	White marble	14	7.5	-	342
BNZ.ADAHYK.084	Vessel	White marble	-	12.1	17.1	904
BNZ.ADAHYK.158	Vessel	White marble	16	7.5	-	2038
BNZ.ADAHYK.149	Vessel	White marble	13	4.2	-	165
BNZ.ADAHYK.099	Vessel	White marble	-	5.4	13	253
BNZ.ADAHYK.091	Vessel	White marble	-	6	18	462

Fig. 5. Table of marble vessel components

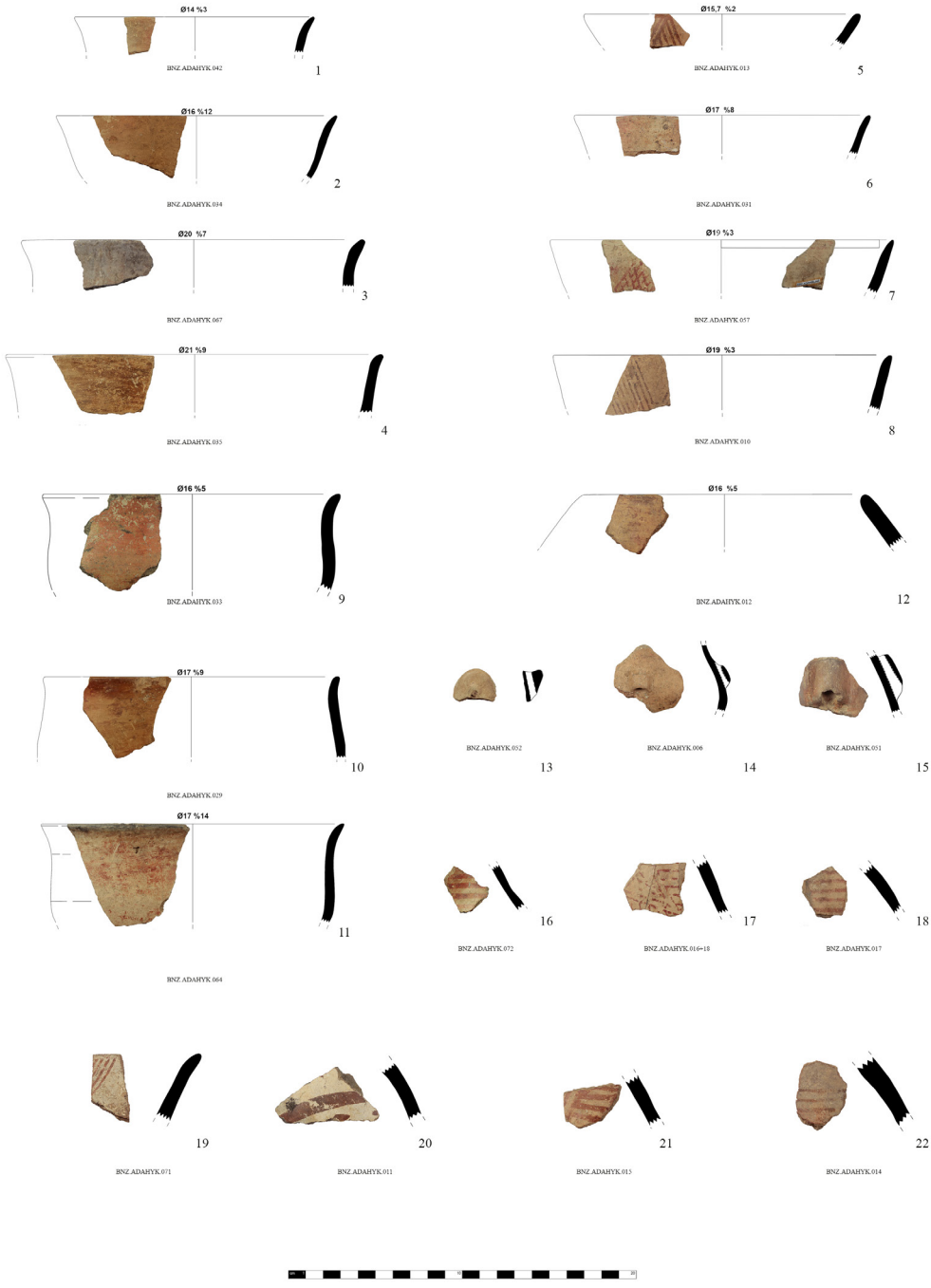

Fig. 6. Late Neolithic-Early Chalcolithic pottery from Ada Höyük

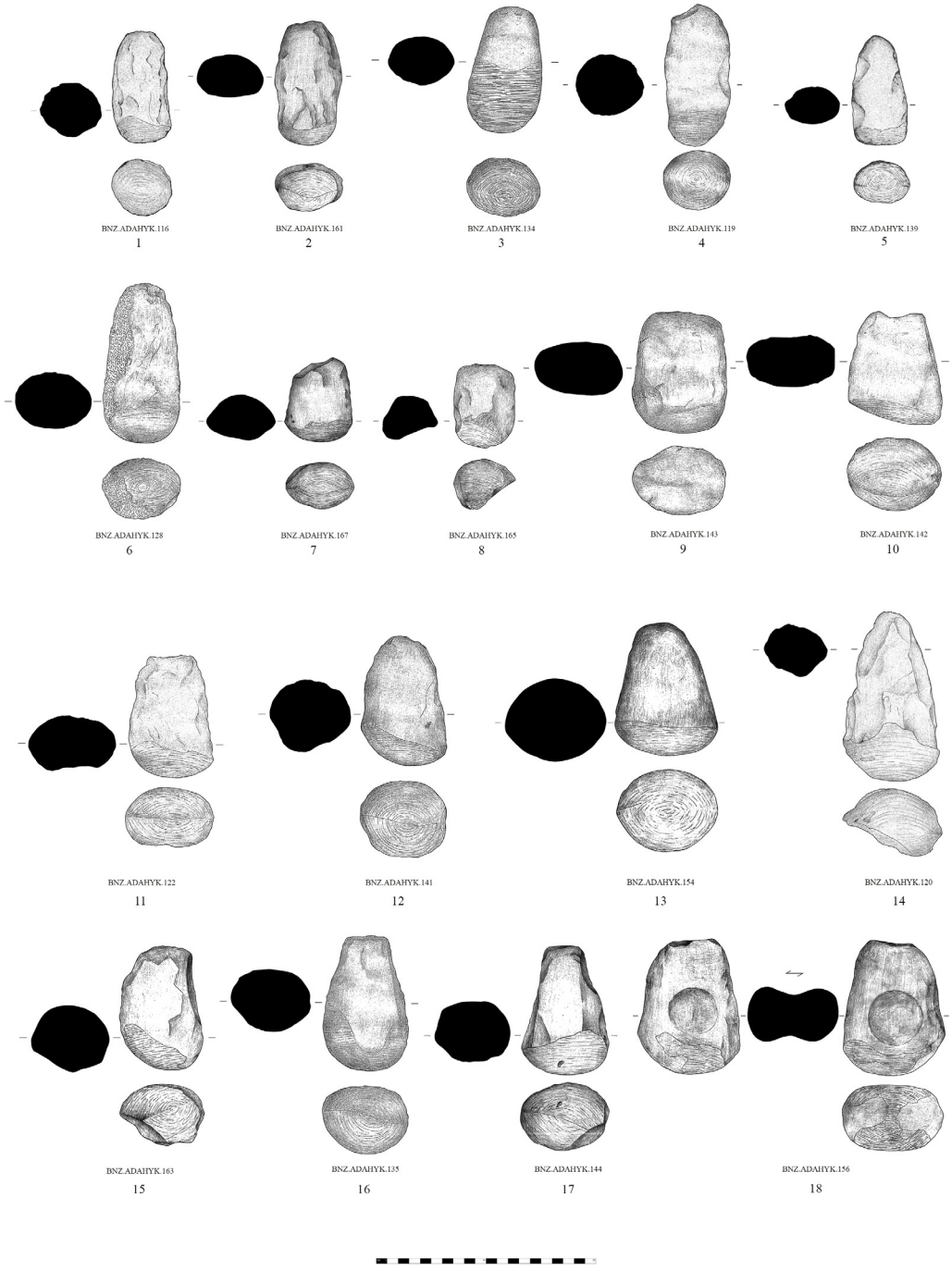

Fig. 7. Drill bits (Drillers: 1, 3-4, 6, 12-13; Wideners: 2, 5, 7-11, 14-17)

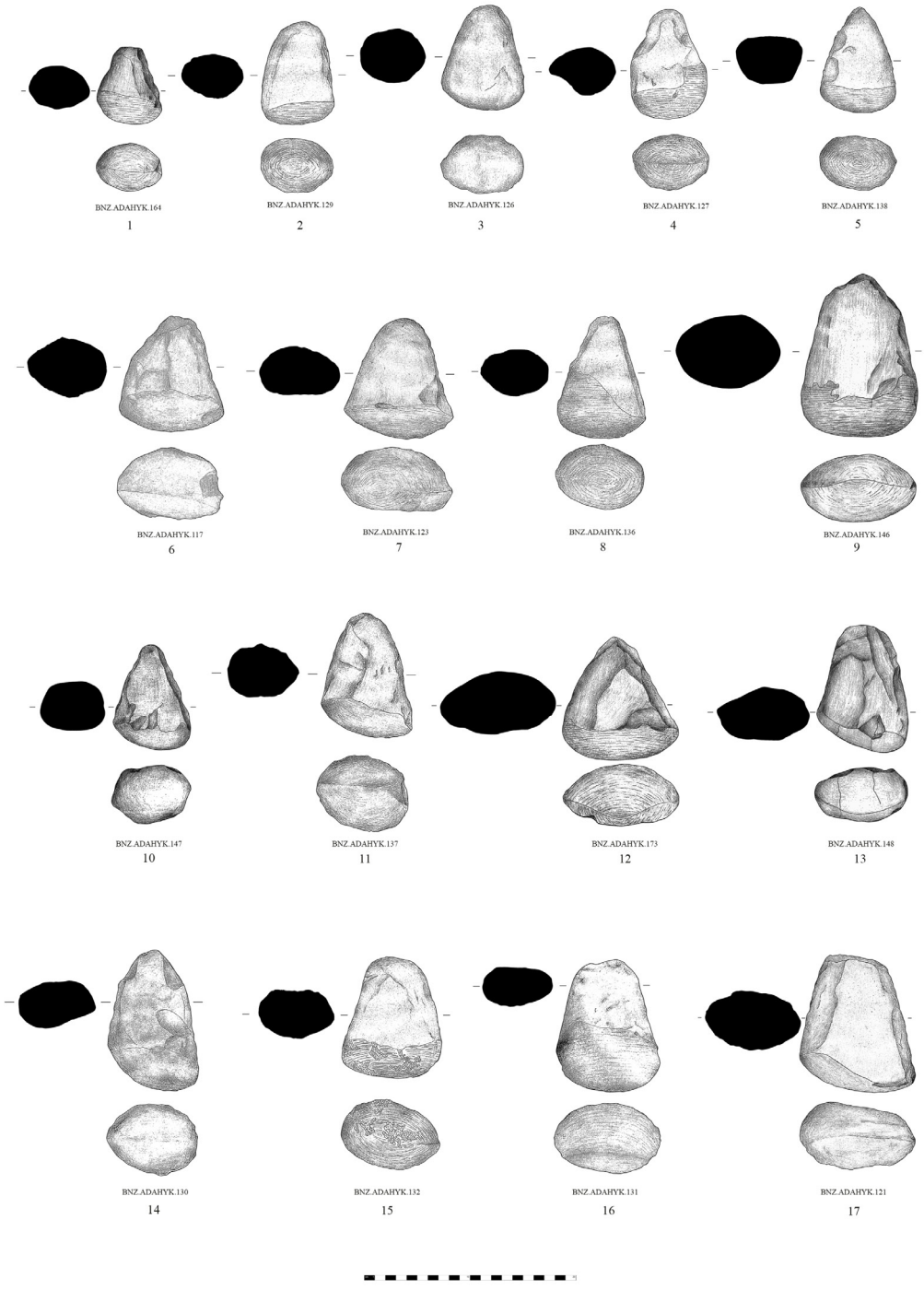

Fig. 8. Widener drill bits

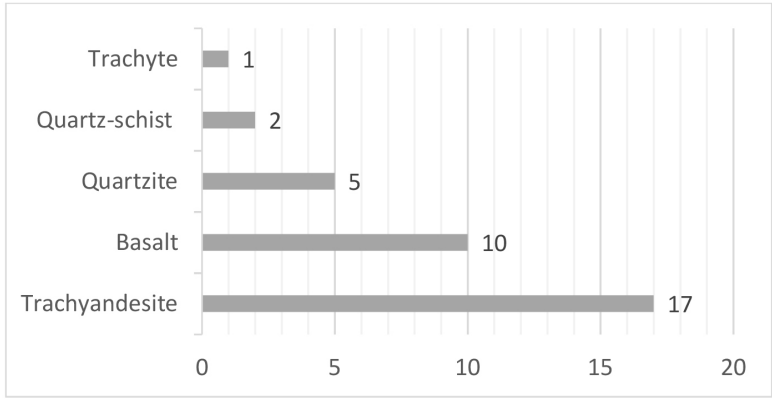

Fig. 9. The proportion of different raw materials for drill bits

Stone Type	RSC	Mohs Scale	Abrasion index
Marble	0.68	3	0.001-0.03
Trachyandesite	2.28	6	0.5
Basalt	2.11	5-6.5	0.1-0.3
Quartz	1.01	7	0.65-0.9

Fig. 10. The table presents the rock strength coefficient, Mohs hardness scale and abrasion index values of the types of stones used at Ada Höyük (Yaralı et al 2008: 27, 32).

Fig. 11. The weights (1-2) and vessel rough-outs (3-6)

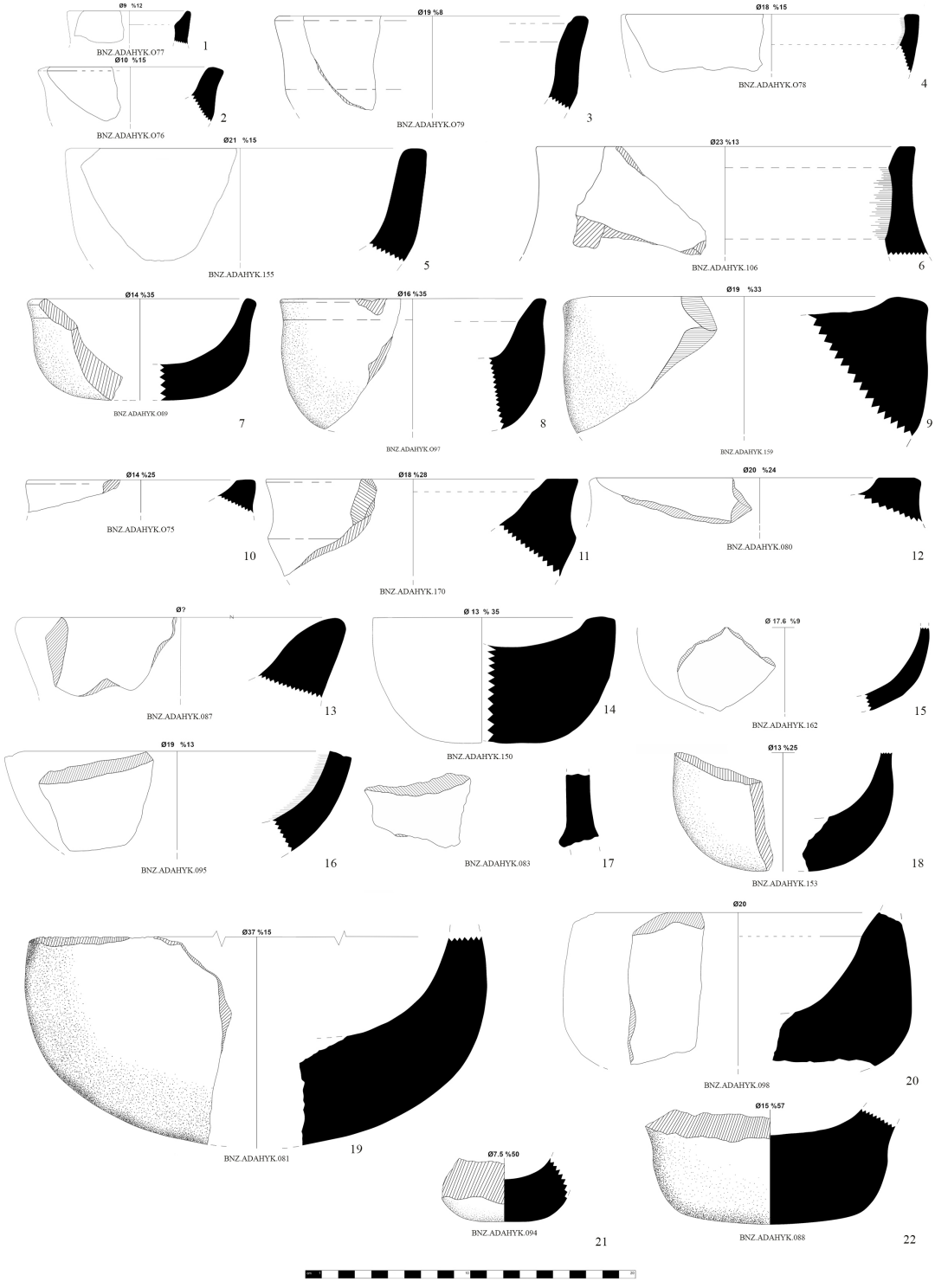

Fig. 12. Fragments of marble vessels and their profiles

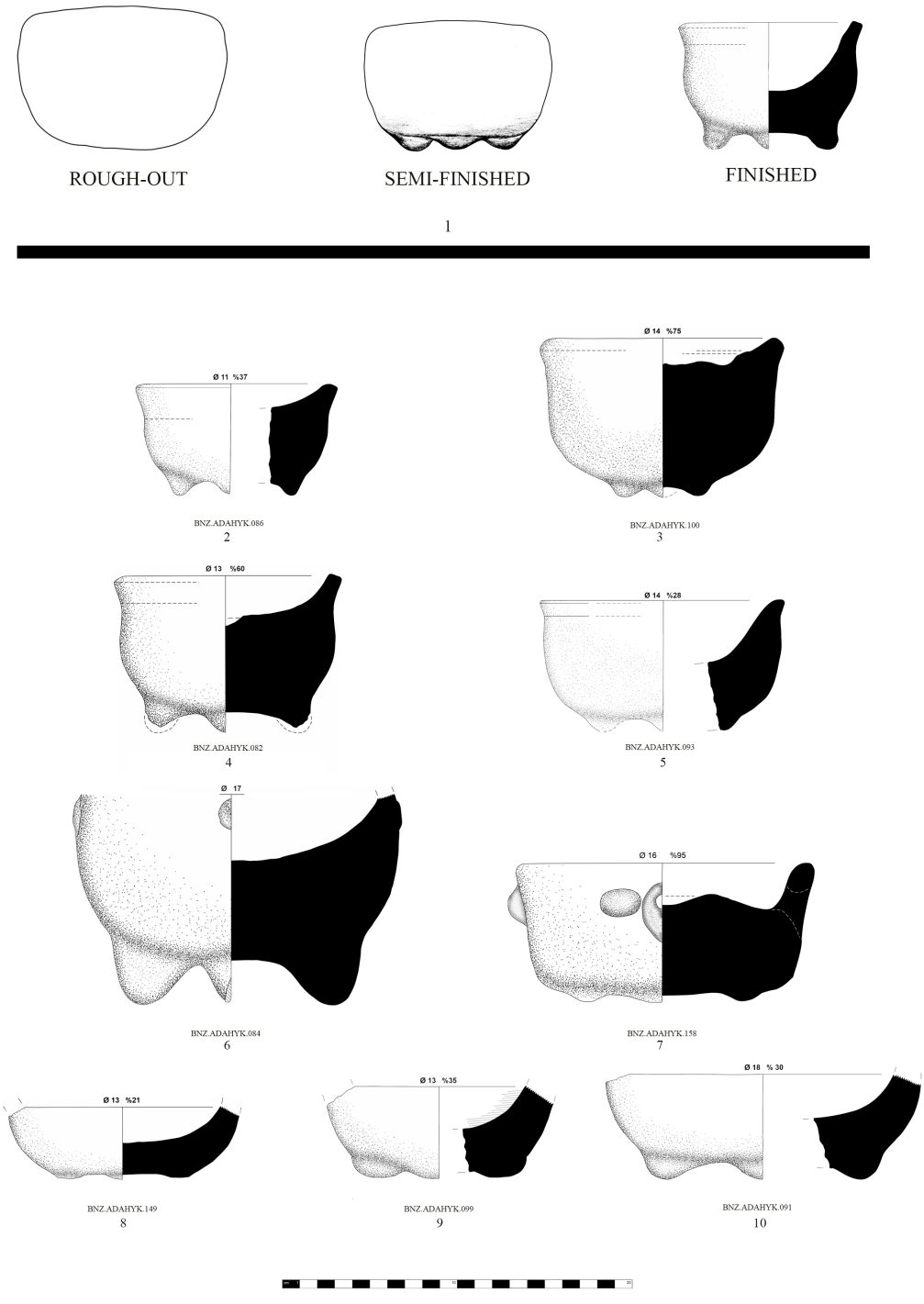

Fig. 13. Production stage (1) and footed vessels (2-10)

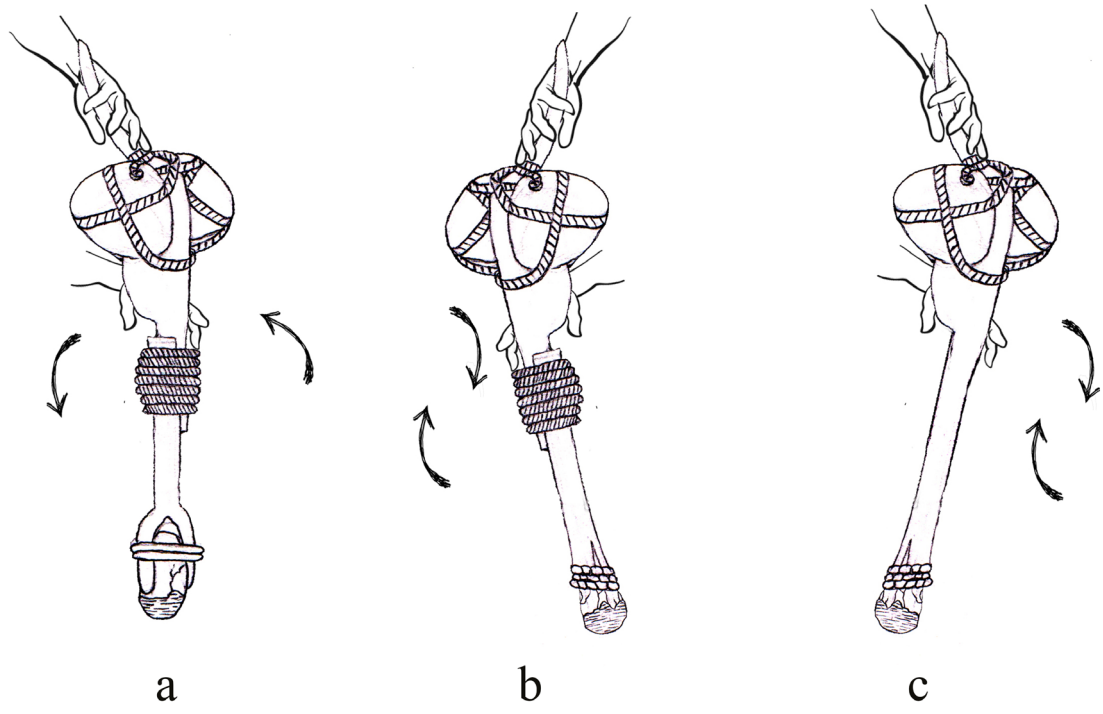

Fig. 14. The Ada Höyük finds and illustration of twist-rod drill (Drawing: Mete Ulusoy)