Manufacturing technology of stone miniature columns from the Bronze Age site Gonur Depe (southern Turkmenistan)

Natalia N. Skakun, Vera V. Terekhina

Institute for the History of Material Culture, RAS. 191186 Palace emb., 18, St. Petersburg, Russia.
Email: Skakun: skakunnatalia@yandex.ru; Terekhina: terehinavera@mail.ru

Abstract:

Archaeological cultures of the Bronze Age, despite the widespread use of metal, also used stone raw materials for the manufacture of tools, household, and sacred items. A lot of stone products had a complicated shape and meticulous finishing, but the technology of their manufacture is still not always clear. This fully applies to the materials of the Bronze Age of southern Turkmenistan where long-term settlements of the proto-urban type are being studied. These include Gonur Depe (2500-1500 BCE) - the administrative and religious centre of ancient Margiana (Sarianidi 2005). Among its materials are stone miniature columns of "unknown" purpose in the shape of a chess rook, which are usually found in sacral complexes. This paper deals with the technology of producing these objects (half of the collection of intact items was investigated) and is part of a collective work on a comprehensive study of large stone cult objects from Gonur Depe. The raw materials for studied miniature columns were gypsum, limestone, marbled limestone, marbled onyx, onyx, talcochlorite, and polymictic breccia. For the first time the authors made an attempt to consider the issues of miniature columns manufacturing technology. Thanks to the use-wear study of their surfaces, it became possible to reveal numerous technological traces invisible to the naked eye. The data obtained made it possible to characterize all stages of the miniature columns manufacturing technology, which indicates a high level of development of the stone-processing industry in the settlements of the Bronze Age of Turkmenistan.

Keywords: Turkmenistan; Bronze Age; stone processing production; stone miniature columns; technical, morphological and use-wear analysis

1. Introduction

During the Bronze Age, in many cultures of Eurasia, stone continues to be widely used for making various household and sacral items. However, the technology of their manufacture remains insufficiently studied. This fully applies to the materials of the Bronze Age of southern Turkmenistan, where long-term tell settlements of the proto-urban type have been excavated. Among such sites is Gonur Depe (2500-1500 BCE) - a unique settlement with numerous adobe residential buildings, a palace complex, complex defensive structures, and various funerary implements (Sarianidi 2005; 2008; Zaitseva *et al*. 2008). Gonur's materials

Journal of Lithic Studies (2021) vol. 8, nr. 2, 26 p. DOI: https://doi.org/10.2218/jls.4490

Published by the School of History, Classics and Archaeology, University of Edinburgh
ISSN: 2055-0472. URL: http://journals.ed.ac.uk/lithicstudies/

are represented by a rich ceramic complex, various finds made of bronze, gold, silver, as well as variety of stone products. Some stone artifacts became the subjects of special papers (Skakun 1972; 1977; 2003; Boroffka & Sava 1998: 29-39, fig. 11-21; Korobkova 2004), others are only mentioned in generalizing publications (Schmidt 1937: 157, 172-175, 185, 200, 216-218; 218-223, 311, fig. 96-99, Pl. XLI, XLIII, XLIV; Masson 1981: 54, 64, 65, 69, fig. 22: 1; Pottier 1984: 16-48, 91, 98, 99, 141: fig. 7, 175: fig. 41, 187: Pl. V, 216: Pl. XXXIV, 217: XXXV; Amiet 1986: 193-204, 285: fig.101, 102; 307: fig. 148.5, 311: fig. 157, 158; Jarrige 1988: 114-116, 126-127; Sarianidi 1990: 143-144; 2005: 271-275, fig. 123, 124; Frankfor 1997: 63; Antonova 2001; Vinogradova 2004: fig. 10: 36; Abdullaev 2009: 81-97).

2. Materials and methods

The materials of Gonur Depe represent various categories of finds made of stone: grinding stones, pestles, mortars, amulets, vessels, seals, jewellery, caskets, long rods - “staffs”, discs, and miniature columns. Our research was devoted to the study of the technology of making miniature columns, most of which were found in cult complexes (mostly “in graves as well on the floor of temple premises” (Sarianidi 2005: 277)). From the collection of intact miniature columns (75 items, one miniature column comes from lifting material), we studied 33 objects, as well as 1 fragment out of 43 fragments available in the museum collections. As analogies, materials from other sites of the Bronze Age of Turkmenistan were investigated (Adjikui Depe (2 items), Altyn Depe (5 items) and Ulug Depe (2 items)) (Figures 1 and 2).

Figure 1. Stone miniature columns from Gonur Depe, Adjikui Depe, and Ulug Depe, “staff”, disc, and metal censer in the form of a miniature column from Gonur Depe (from the depositories of the National Museum of Turkmenistan, Ashgabat).

Raw materials used were soft rocks: gypsum, limestone, marbled limestone, marbled onyx, onyx, talcochlorite, and polymictic breccia (Figure 3).

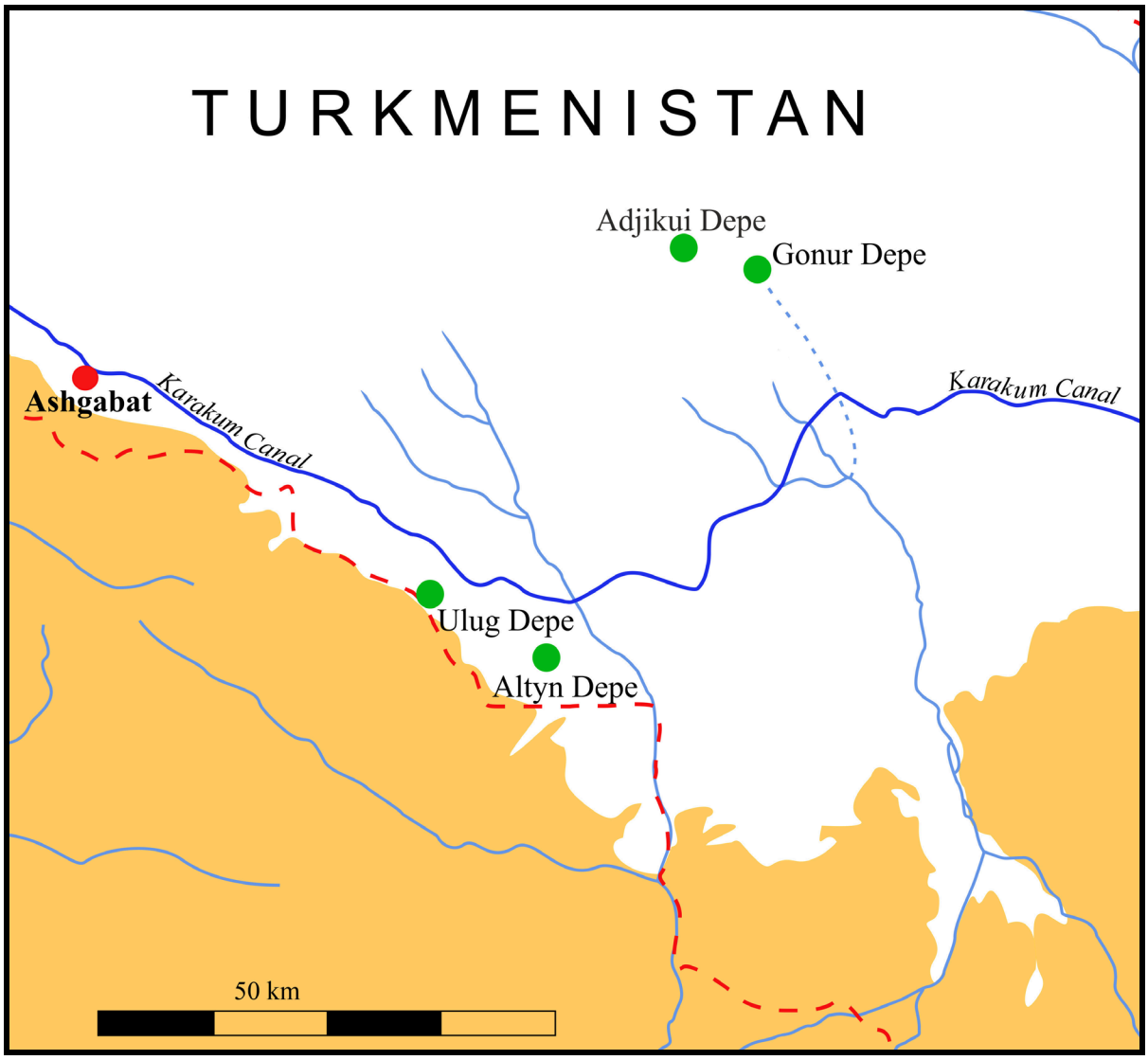

Figure 2. Map of the Bronze Age sites on the territory of Turkmenistan, the materials of which are used in the article. Scale bar is 200 km long, separated into five 50 km segments.

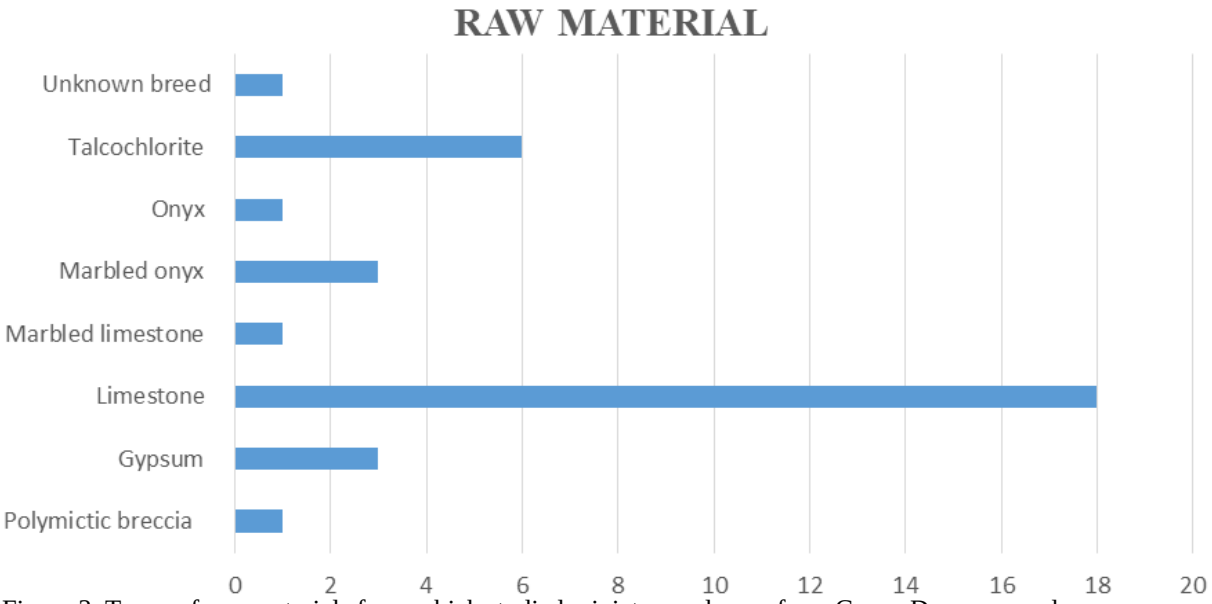

Figure 3. Types of raw materials from which studied miniature columns from Gonur Depe are made.

This part of the collection was studied using technological-morphological, use-wear, and mineralogical analyses. The use-wear analysis of the technology of their manufacture was carried out using an MBS-2 binocular stereomicroscope, with a magnification of up to 98×. Photo capture was carried out with a Canon EOS 400D digital camera with a Canon EF 24-105 mm and 50 mm f / 2.5 Compact Macro lens on a turntable, which made it possible to create 3D models to characterize the shape of each object (Figure 4).

Figure 4. The principle of photofixation of a miniature column. Adjikui Depe (from the depositories of the National Museum of Turkmenistan, Ashgabat). Scale bar is 10 cm long, separated into three 1 cm segments.

Mineralogical analysis was carried out by V.A. Agakhanova, a researcher of the All-Russian Research Institute of Oil Geology (Moscow, Russia).

3. Results

3.1. Technical and morphological analysis

In modern literature, despite the uniqueness of stone miniature columns, there is no uniformity in their description, which makes it difficult to conduct an objective comparative analysis of finds from different archaeological sites. In this regard, a detailed technical and morphological description of products from Gonur Depe was carried out. The standard list took into account the shape, proportions (the ratio of the miniature column height to the base diameters), the location of the grooves (on the bases, along the side), the design of the top base, as well as weight. The side shapes of the studied miniature columns, similar to a chess

rook, have various modifications (Figure 5). Their height varies from 15.5 to 38.0 cm, and the weight varies from 1.46 to 14.90 kg (Figures 6 and 7).

Figure 5. The main types of miniature columns from Gonur Depe (a, d. from the depositories of the National Museum of Turkmenistan, Ashgabat; b, c. from the depositories of the Local history museum of Mary province, Mary): a. truncated-conical with a hat; b. cylindrical; c. biconical with a hat; d. biconical; e. biconical slightly profiled. Scale bar is 10 cm long, separated into 1 cm segments.

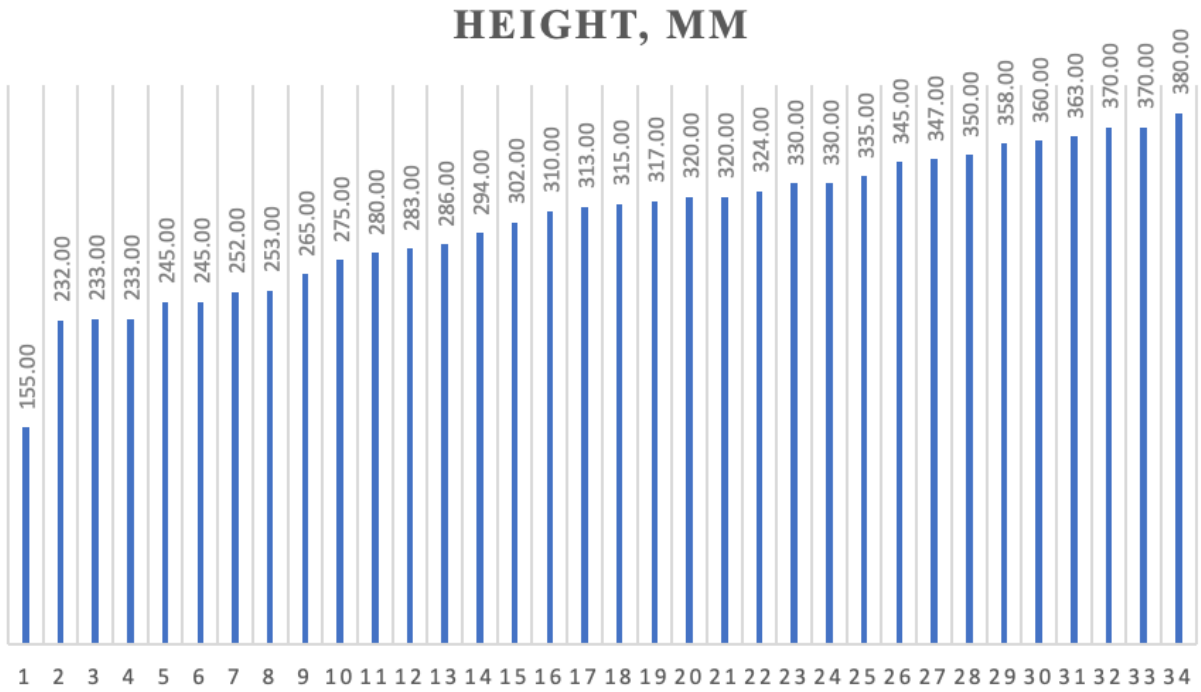

Figure 6. The height of the studied miniature columns from Gonur Depe (all together with one fragment of a miniature column (Figure 22)).

The bases are flat, less often slightly convex; the diameter of the top base is usually less than the bottom one.

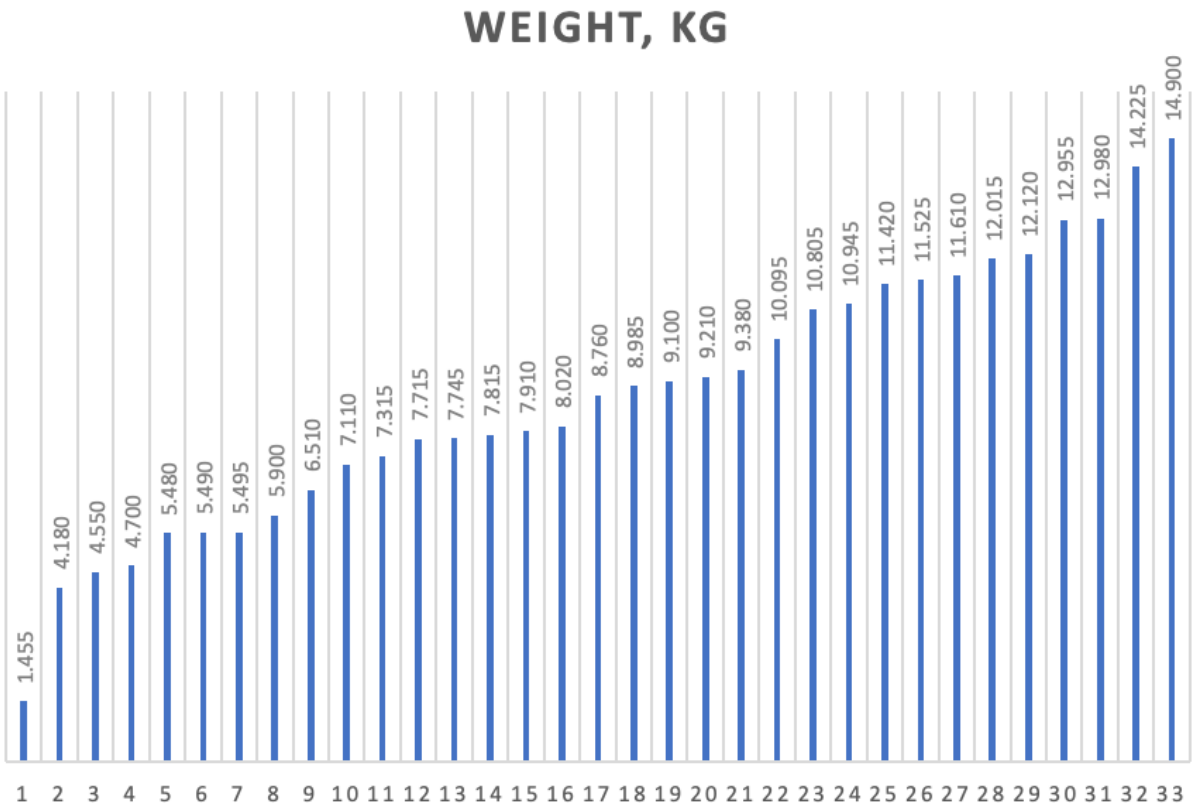

Figure 7. The weight of the studied miniature columns from Gonur Depe.

One of the significant details of most miniature columns is the presence of grooves made along the diameter of the top (7 to 14 cm long) and bottom bases (8 to 18 cm long) in the same direction (Figure 8). According to the profile type, the grooves are divided into: rectangular (Figure 8a-d) and arched (Figure 8e-f). In turn, among them, according to the shape of the ends of the grooves, subtypes can be distinguished: with a rectangular profile and identical ends (Figure 8a-b); with a rectangular profile and a deep trapezoidal expansion at one end (Figure 8c-d); with an arched profile and a deep trapezoidal flare at one end (Figure 8e-f). The shape of the ends of the grooves on the top and bottom bases is the same (Figures 9, 12a and c, 15a and c, 16a and c, 18a and c, 21c and f, 22a and c).

An exception is the option when the grooves of the top and bottom bases are made partially from one side; while we are talking about a finished product (Figure 9).

Sometimes the grooves from the bases pass to the side and connect to each other. By size, they can be divided into narrow and wide, by profile - into rectangular and arched (Figure 10).

Only one item has a convex stripe on the side instead of deep grooves, which connects the grooves on the bases (Figure 11).

A variant of the location of the above-described grooves are grooves that partially descend onto the side from the top and bottom bases (Figure 12).

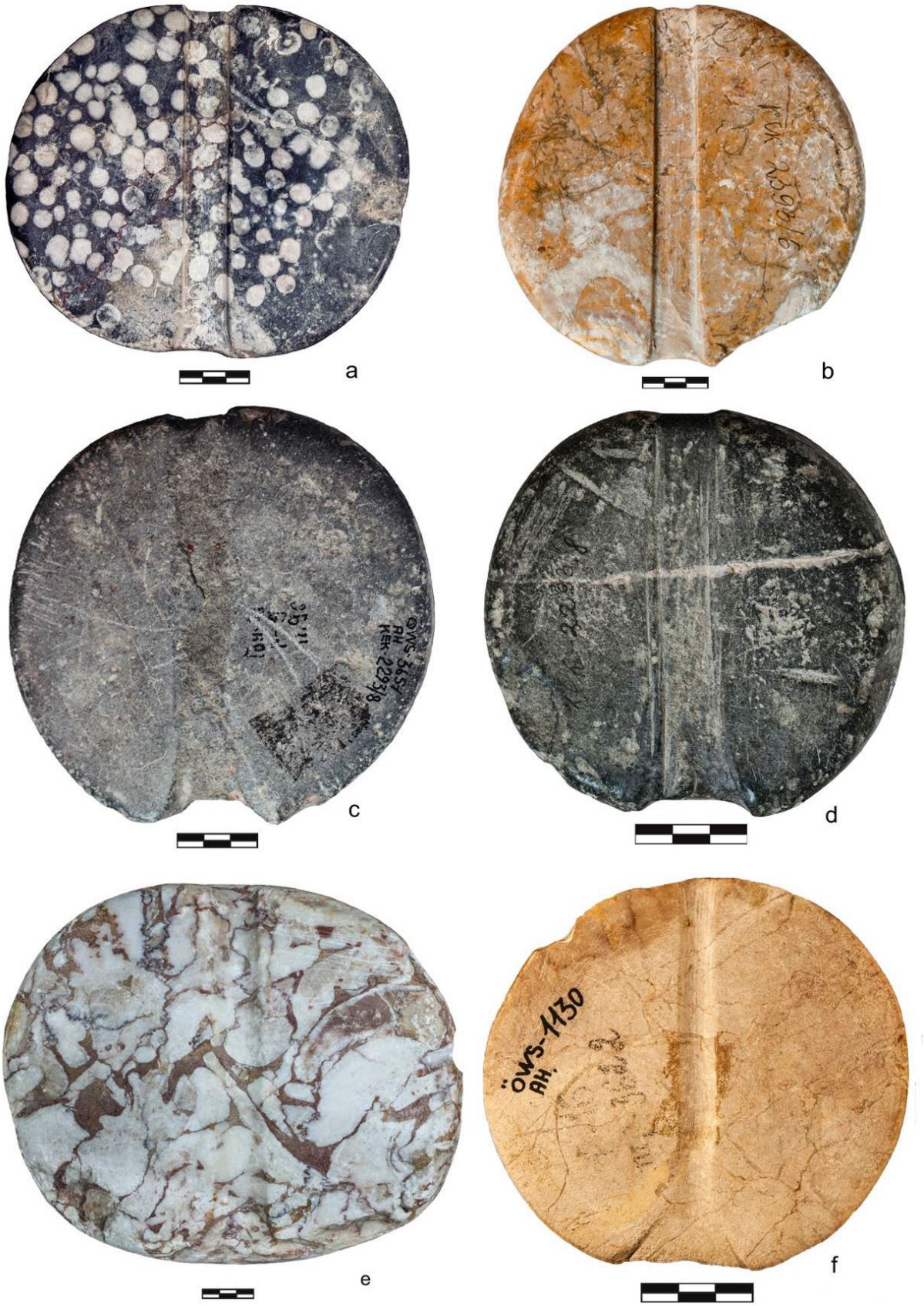

Figure 8. The main types of grooves on the top and bottom bases of miniature columns from Gonur Depe: a, b. with a rectangular profile and identical ends; c, d. with a rectangular profile and a deep trapezoidal extension at one end; e, f. with an arched profile and a deep trapezoidal extension at one end. Scale bar is 3 cm long, separated into three 1 cm segments.

Figure 9. Bases of a miniature column from Gonur Depe: a. top base; b. bottom base. Scale bar is 3 cm long, separated into three 1 cm segments.

Figure 10. Types of grooves on the side of miniature columns from Gonur Depe (a, b. from the depositories of the National Museum of Turkmenistan, Ashgabat; c. from the depositories of the Local history museum of Mary province, Turkmenistan): a. narrow groove with a rectangular profile; b. narrow groove with an arched profile, c. wide groove with an arched profile. Scale bar is 3 cm long, separated into three 1 cm segments.

Figure 11. Miniature column from Gonur Depe with convex stripes instead of grooves on the side (from the depositories of the National Museum of Turkmenistan, Ashgabat). Scale bar is 3 cm long, separated into three 1 cm segments. Scale bar is 3 cm long, separated into three 1 cm segments.

The technical and morphological analysis showed the absence of a strict correlation between the variability of the miniature column sizes, the location of the grooves, and different shapes of the objects. It should be emphasized that a wide groove or strip is present along the side in all cases only on one side. On the truncated-conical miniature columns with a hat, there are no grooves along the side.

Analogies to the studied artifacts in shape, size, and additional details were found in materials from other simultaneous sites of Turkmenistan: Altyn Depe (Figure 13) (Alekshin 1979: fig. 27; Masson 1981: 54, 64, 65, 69, fig. 22: 1), Ulug Depe, and Adjikui Depe (Figure 14); single items were found in Tajikistan: Tandyryoll (Vinogradova 2004: 132, fig. 10: 36); Iran: Gissar Tepe and other sites from different regions of the country and adjacent territories (Schmidt 1937: 157, 172-175, 185, 200, 216-218, 219-223, 311, fig. 96-99, Pl. XLI, XLIII, XLIV; Amiet 1986: 193-204, 285: fig. 101, 102; 307: fig. 148: 5, 311: fig. 157, 158); from destroyed sites of the Bronze Age of Northern Afghanistan (Pottier 1984: 16-48, 91, 98, 99, 141: fig. 7, 175: fig. 41, 187: Pl. V, 216: Pl. XXXIV, 217: XXXV); in Pakistan: Quetta (Jarrige 1988: 114-116).

Figure 12. A variant of the arrangement of the grooves on the side of miniature columns from Gonur Depe (from the depositories of the National Museum of Turkmenistan, Ashgabat): a-c. narrow groove with a rectangular profile; d. wide groove with a rectangular profile. Scale bar is 3 cm long, separated into three 1 cm segments. Scale bar is 3 cm long, separated into three 1 cm segments.

Figure 13. Various types of miniature columns from Altyn Depe: a, b. truncated-conical with mushroom-shape top base; c. cylindrical; d, e. biconical (photo from the scientific archive of the Institute for the History of Material Culture, Russian Academy of Sciences (RAS) I 117934, I 117939, I 117937, I 117932, I 117938) (d. miniature column reused). Scale bar is 10 cm long, separated into 1 cm segments.

Figure 14. Various types of miniature columns from Ulug Depe (a, b) and Adjikui Depe (c) (from the depositories of the National Museum of Turkmenistan, Ashgabat): a, c. truncated-conical; b. biconical. Scale bar is 10 cm long, separated into 1 cm segments.

3.2. Use-wear analysis

The use-wear analysis revealed numerous technological traces of the miniature column manufacturing process, invisible to the naked eye. Several unfinished items were found in the collection: one of the miniature columns was half polished, the other half remained only rubbed, which made it possible to find out the sequence of operations for their manufacture (Figures 15 and 16). At the first stage, specially selected large pieces of stone were processed by percussion (Figure 15a and f), which gave the miniature column the required dimensions and configuration. Then, using pecking (Figure 15d), the excess material was removed, and

this operation was done with great skill: blows with a sharp tool were applied evenly over the entire surface of the miniature column, which made it possible to form the desired shape.

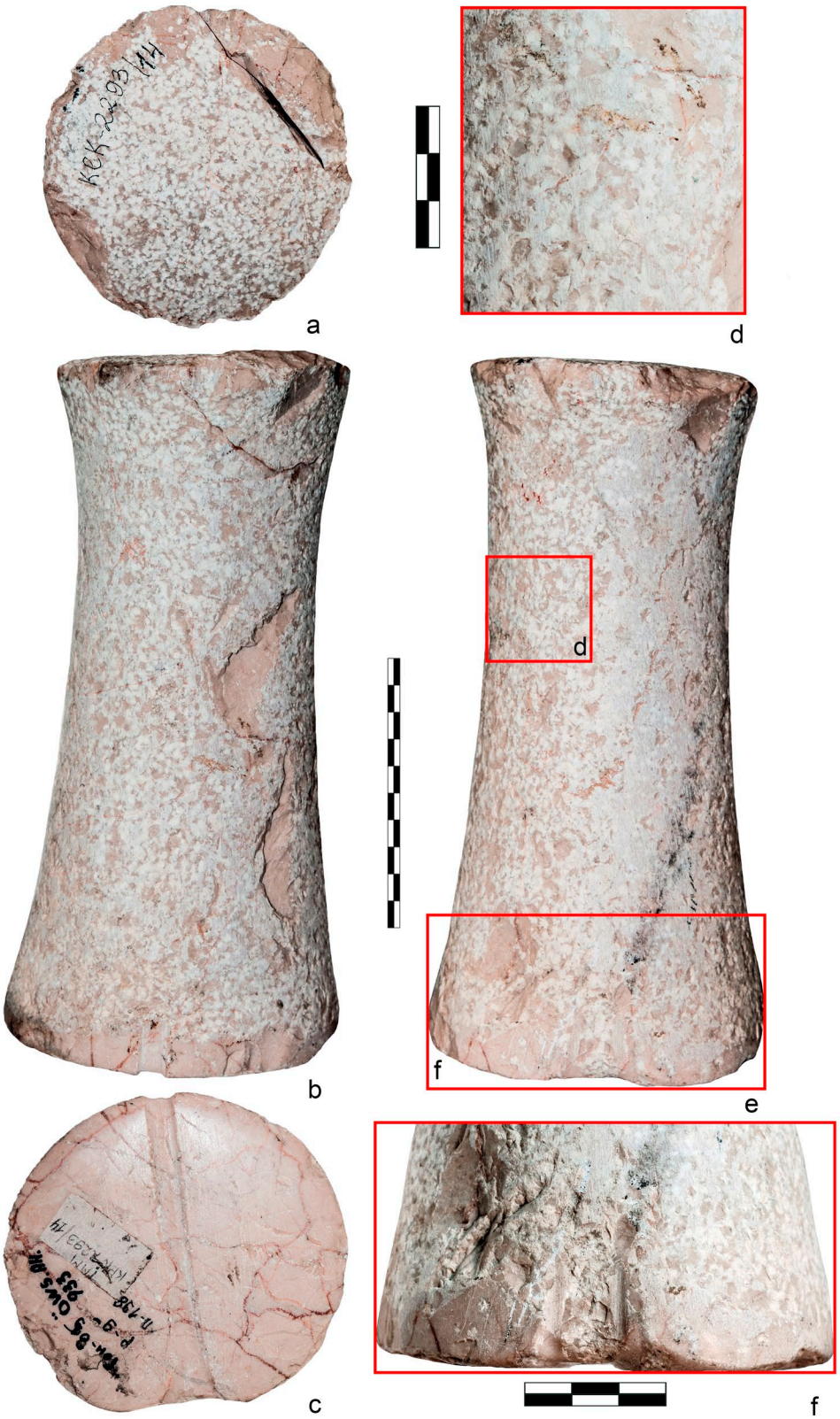

Figure 15. A miniature column from Gonur Depe with traces of primary and secondary processing (from the depositories of the National Museum of Turkmenistan, Ashgabat): a. top base with traces of percussion and pecking; b, e. side; c. bottom base with traces of polishing; d. traces of pecking; f. groove sawing traces. Scale bar for a a, d and f is 3 cm long, and for b, c, and e, is 10 cm long, both separated into 1 cm segments.

After that, the surface was ground with coarse and fine abrasives (Figure 16l). The final treatment was polishing (Figure 16m). Traces left by this procedure on finished products covered the traces of previous operations and made the entire surface of the product shine.

Figure 16. A miniature column from Gonur Depe with traces of secondary processing (from the depositories of the National Museum of Turkmenistan, Ashgabat): a. top base with traces of percussion; b, e, g. side; c. bottom base with traces of pecking in the groove; d, f. traces of pecking; k. traces of grinding; l. ground side; m. polished side. Scale bar is 3 cm long, separated into three 1 cm segments.

Well-preserved traces of processing indicate that the grinding and polishing of the miniature columns was carried out along their long axis (Figure 17).

Figure 17. Abrasive traces along the side of a miniature column from Gonur Depe (from the depositories of the Local history museum of Mary province, Turkmenistan). Scale bar is 3 cm long, separated into three 1 cm segments.

It is worth noting that if it was necessary to make thinning under the top base - the "hat" - to create biconical with a hat (Figure 5c) and truncated-conical with a hat (Figures 5a and 18) miniature columns, the surface was processed in a circle (Figure 18e).

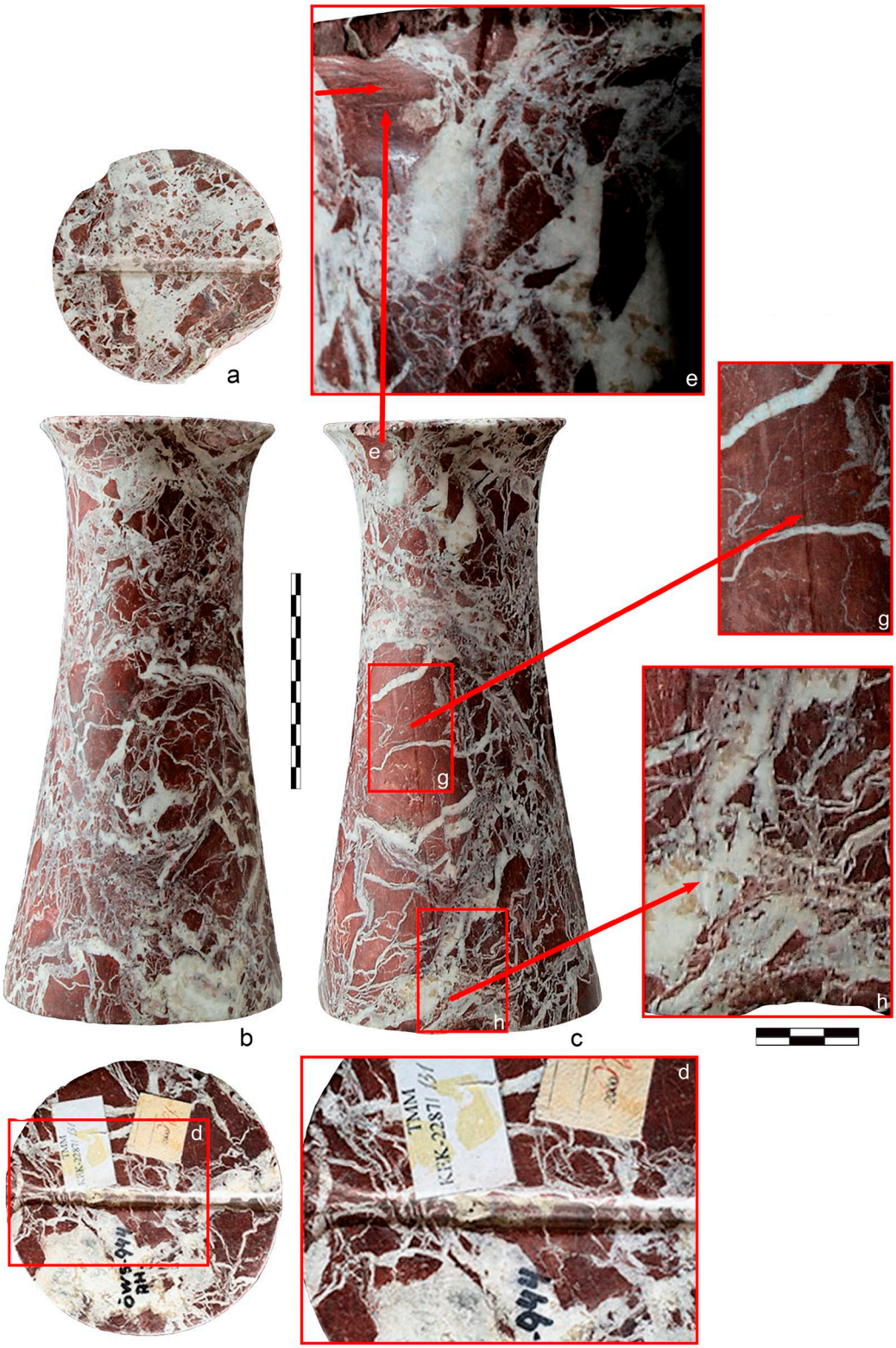

Figure 18. Truncated-conical miniature column with a hat with circular traces of processing (from the depositories of the National Museum of Turkmenistan, Ashgabat): a. top base; b, f. side; c. bottom base; d. traces of sawing the groove; e. traces of grinding; g, h. trace from the marking tool. Scale bar is 10 cm long, separated into 1 cm segments, except for h, which is 3 cm long, separated into 1 cm segments.

Particular attention is drawn to the methods of obtaining the above-described grooves having a rectangular or arched profile (Figure 19).

Figure 19. Types of groove profiles on the base of miniature columns from Gonur Depe: a, b. rectangular, c. arched. Scale bar is 3 cm long, separated into three 1 cm segments.

At first, their contours, as the remnants of the marking lines show, were scratched with a sharp, thin blade; the contours were cut out (Figure 20a-c), and the grooves up to 0.8 cm deep were made using pecking (Figures 8c, 16d-f, 20d, 21j-k), then the grooves were ground and polished (Figures 15c and 20e).

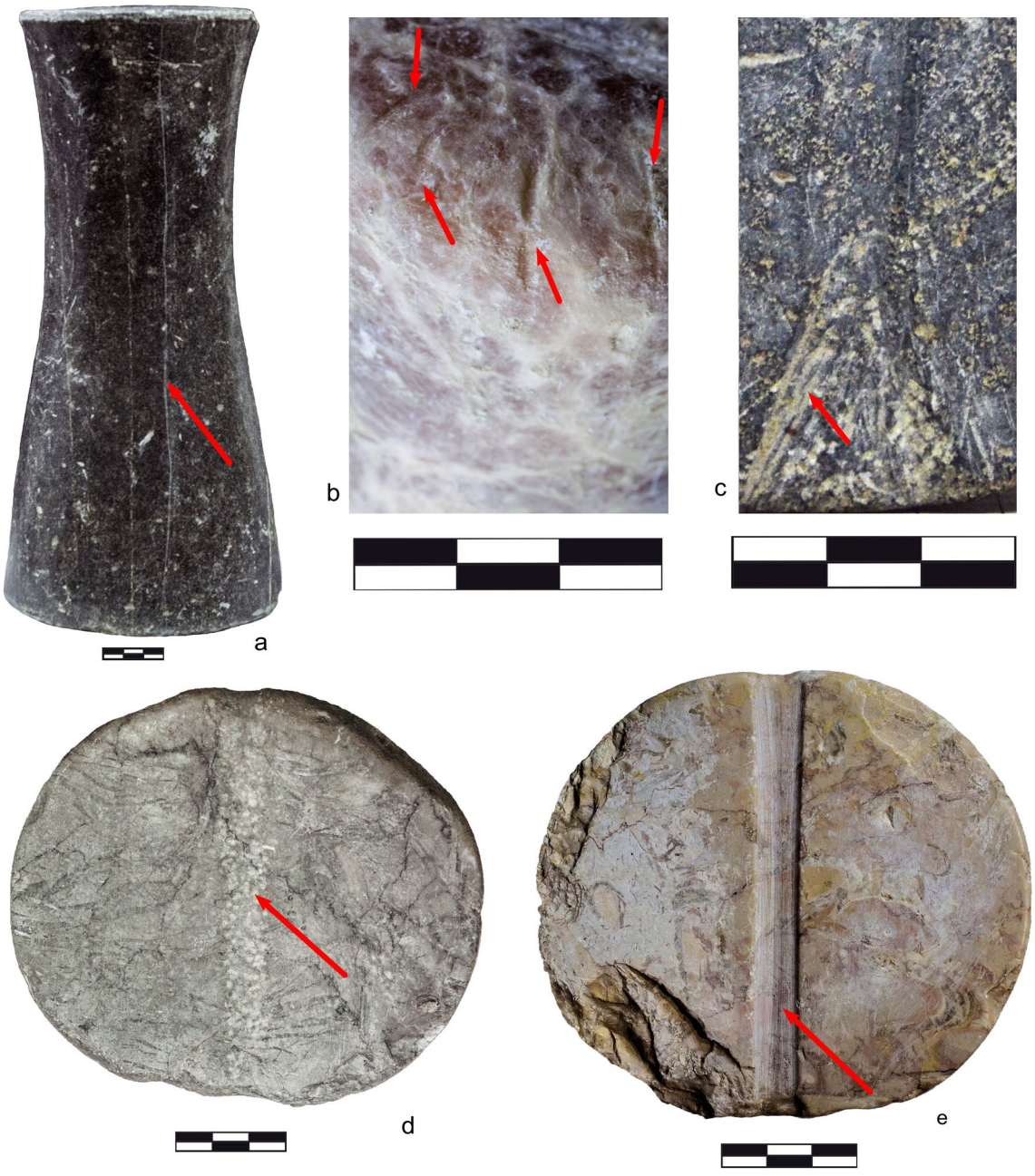

Figure 20. The main technological methods of manufacturing grooves on miniature columns: a. marking the groove by scratching; b. marking the groove by cutting; c. marking the groove by sawing; d. traces of pecking; e. sawing marks. Scale bar is 3 cm long, separated into three 1 cm segments.

Specific traces of cutting on the straight lateral sides of the grooves (Figure 8d, 15f, 16d, 20e, 21d, e, g, and h, 22a and c, 23b and c).

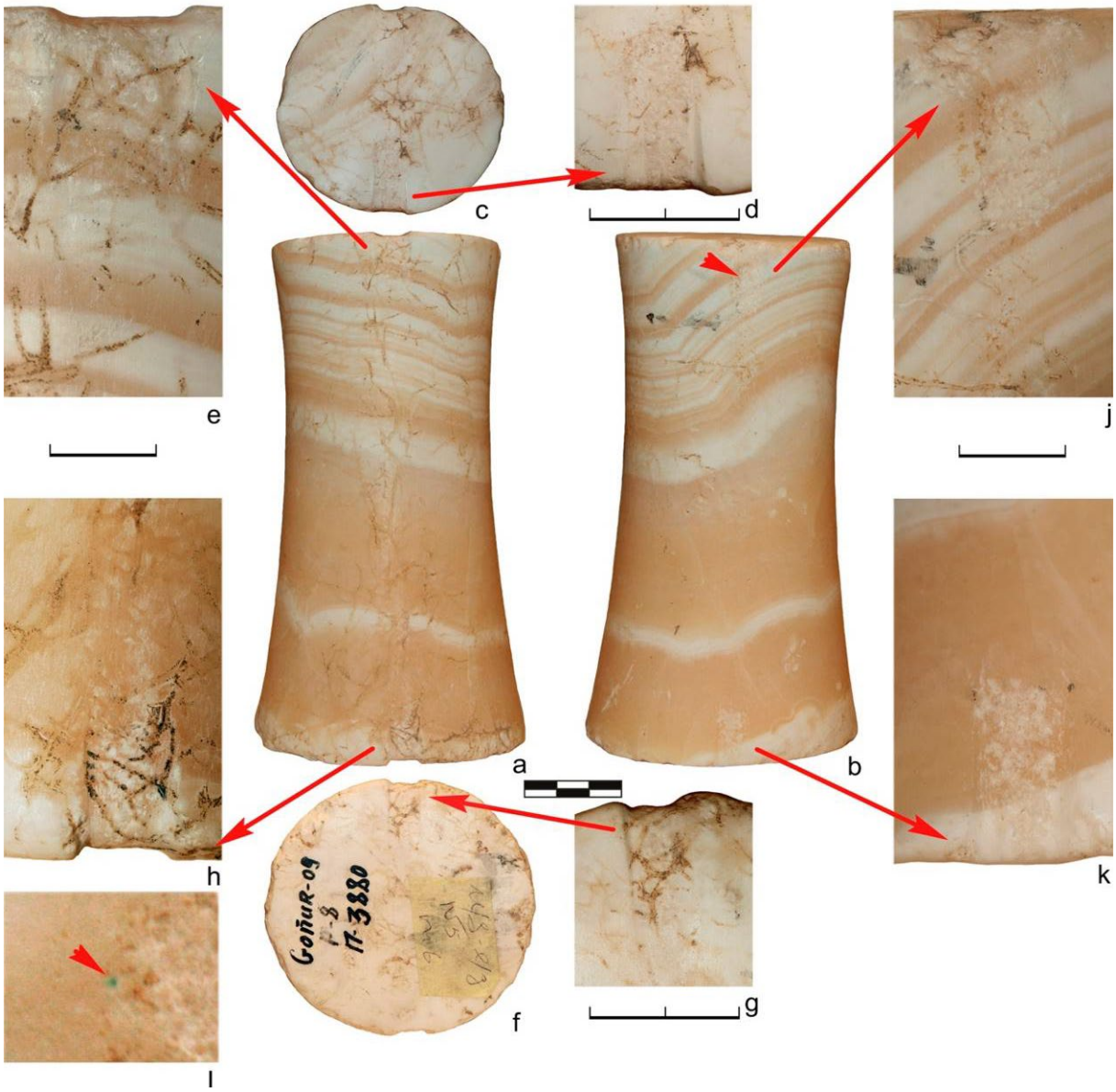

Figure 21. The main technological methods of manufacturing grooves on a miniature column from Gonur Depe (from the depositories of the Art Museum, Ashgabat): a, b. side; c. top base; f. bottom base; e, h, g, j, k. sawing and pecking marks; l. traces of a copper grain. Scale bar is 3 cm long, separated into three 1 cm segments.

It is interesting to note that instead of grooves, on the sides of the two miniature columns, narrow stripes were found connecting the ends of the top and bottom grooves, formed by friction against soft material (Figures 12, 21a and b, 22b).

Similar stripes connecting the ends of the top and bottom grooves and formed by friction against soft material were found on stone discs from Gonur Depe (Figure 23b).

Figure 22. Deliberately broken miniature column from Gonur Depe with narrow stripe connecting the ends of the top and bottom grooves (from the depositories of the National Museum of Turkmenistan, Ashgabat): a. top base with traces of intentional blows; b. side with traces of polishing with a soft material; c. bottom base; d. broken side of the column. Scale bar is 3 cm long, separated into three 1 cm segments.

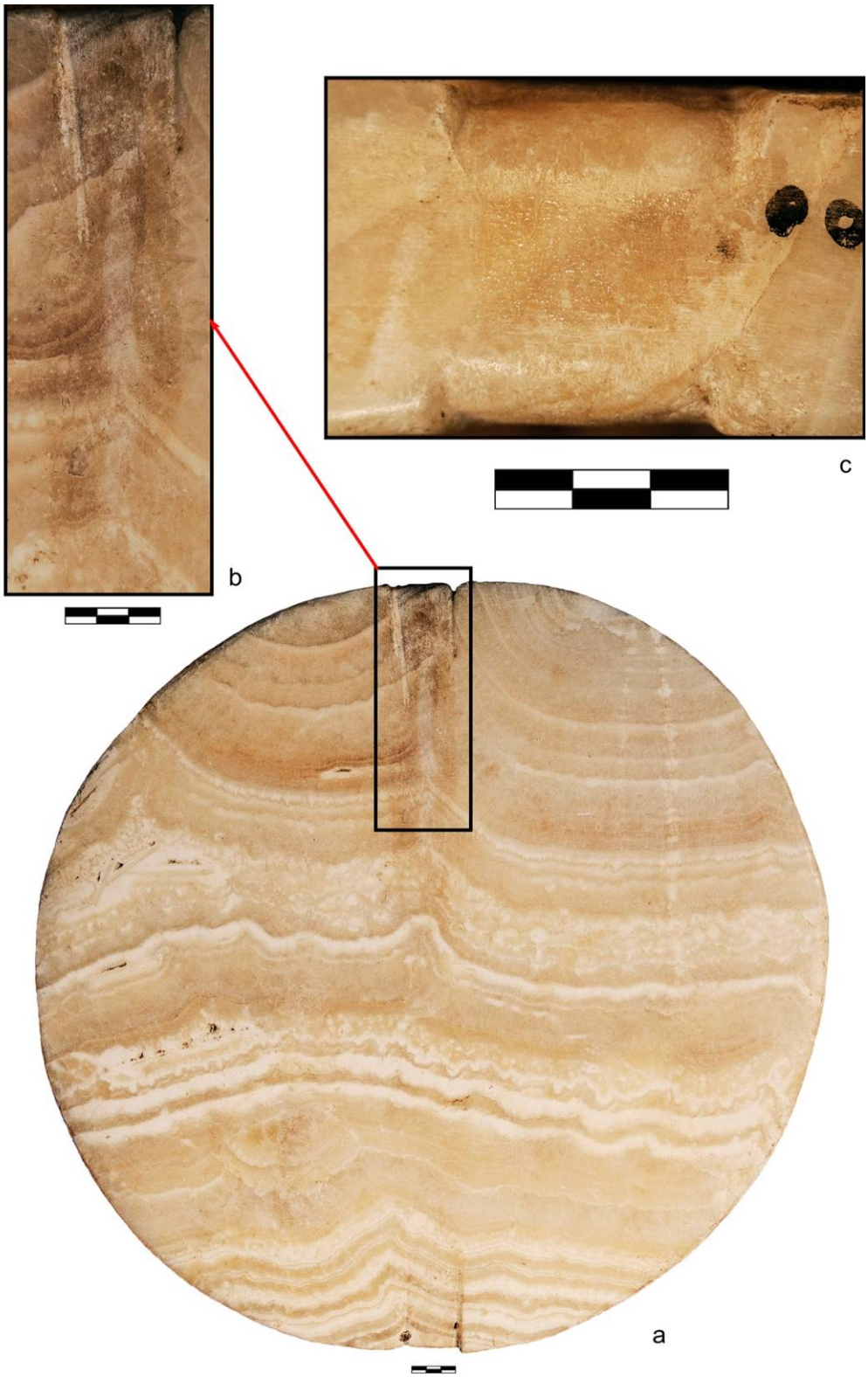

Figure 23. Stone disc from Gonur Depe (from the depositories of the National Museum of Turkmenistan, Ashgabat): a. photograph of a frontal view of a stone disc with symmetrical grooves at the edges of the circle, connected by a strip made by polishing; organic residues were found on the strip; b. traces of cutting the groove and decayed organic matter in it; c. lateral side of a stone disc with a cut groove, the surface of which has traces of processing by grinding and polishing. Scale bar is 3 cm long, separated into three 1 cm segments.

4. Discussion and conclusion

Comparison of miniature columns from Gonur Depe and other Bronze Age sites of Turkmenistan with similar artifacts from adjacent territories, described in archaeological literature, shows that the same types of minerals served as raw materials for them: gypsum, limestone, marbled limestone, marbled onyx, onyx, talcochlorite, and polymictic breccia. The identification of places of manufacture of these products and sources of raw materials require special research. It should be noted that there are no stocks of raw materials and production waste at Gonur Depe, which would otherwise indicate the existence of stone processing workshops in the settlement. The main forms of miniature columns, such as truncated-conical with a hat and biconical with a hat, biconical, cylindrical, as well as biconical slightly profiled, find complete analogies in the Turkmen sites: Altyn Depe (Figure 13) (Alekshin 1979: fig. 27; Masson 1981: 54, 64, 65, 69, fig. 22: 1), Ulug Depe and Adjikui Depe (Figure 14), Togolok 1 and 24; the Tajikistan site: Tandyryoll (Vinogradova 2004: 132, fig. 10: 36); the Iranian site: Gissar Tepe and other sites from different regions of the country and adjacent territories (Schmidt 1937: 157, 172-175, 185, 200, 216-218, 219-223, 311, fig. 96-99, Pl. XLI, XLIII, XLIV; Amiet 1986: 193-204, 285: fig. 101, 102; 307: fig. 148: 5, 311: fig. 157, 158); destroyed sites of the Bronze Age of Northern Afghanistan (Pottier 1984: 16-48, 91, 98, 99, 141: fig. 7, 175: fig. 41, 187: Pl. V, 216: Pl. XXXIV, 217: XXXV); the Pakistani site: Quetta (Jarrige 1988: 114-116).

Many details of the manufacture of the miniature columns were revealed only after studying their surface with a binocular stereomicroscope. These are areas with traces of pecking, traces of marking grooves, narrow scratches formed as a result of grinding.

It should be noted that the horizontal position of many miniature columns is stable, since there are flat areas on the circumferences of their bases, straightened by the ends of the side slots (Figure 24).

Figure 24. Horizontal position of truncated-conical miniature columns with a hat from Gonur Depe (from the depositories of the National Museum of Turkmenistan, Ashgabat). Scale bar is 3 cm long, separated into three 1 cm segments.

A miniature column, deliberately broken in Antiquity along the long axis of the side, was also discovered in the collection. This is evidenced by well-distinguishable traces of blows with a sharp object (Figure 22a). Currently, despite the existence of many hypotheses, the functionality of the miniature columns remains a matter of contention. The finds of these items in burials and places of ritual significance are indisputable evidence of their votive character. It is interesting to note that in one of the burials, together with stone columns, a

metal censer was found, similar to them in shape (Figure 2) (Sarianidi 2005: 212, fig. 74; 2008: 182, fig. 90).

Of particular interest is the presence of grooves on the bases and sides of the miniature columns. Some authors consider them as channels through which ritual fluid flowed (Antonova 2001: 86; Sarianidi 1992: 87). Interpretation of the purpose of the columns, like many other ritual objects, is usually difficult, due to the specifics of their use, which often leaves no fixed traces. In the future, after studying the entire collection of stone columns of Gonur Depe, it is planned to conduct experiments that clarify the manufacturing technology of these products, and also experimentally test the existing hypotheses of their functional purpose.

The study of Gonur Depe miniature columns allows us to speak of a well-developed technology for their manufacture, which included the selection of stone raw materials, the high quality of its processing, which made it possible to obtain products of excellent shape, many of which look like works of art. This testifies to the high level of stone-working production of the Bronze Age.

Acknowledgements

We express our sincere gratitude to the directorate and museum staff of the National Museum of Turkmenistan, the Local history museum of Mary province and the Art Museum (Turkmenistan) for the opportunity to work with archaeological materials from the Bronze Age sites. For their scientific advice, we also thank Vadim A. Alekshin, Senior Researcher of the Institute for the History of Material Culture of the Russian Academy of Sciences, Lyubov B. Kircho, Leading Researcher of the Institute for the History of Material Culture of the Russian Academy of Sciences, and Yuri E. Berezkin, Leading Researcher of the Peter the Great Museum of Anthropology and Ethnography (Kunstkamera) of the Russian Academy of Sciences.

The development of a comprehensive methodology of experimental-traceological analysis (FMZF-2022-0012 “The oldest inhabitants of the North of Eurasia: human settlement in the Stone Age, production technologies”).

Data accessibility statement

The data used here belong to the authors, and the rest are cited. The authors confirm that data supporting the results of this study are available in the article.

References

Abdullaev, K. 2009, *Культ хаомы в древней Центральной Азии.* Международный институт центральноазиатских исследований (International Institute for Central Asian Studies), Samarkand, 117 p. (in Russian) (“The cult of haoma in ancient Central Asia”)

Alekshin, V.A. 1979, Могила знатного горожанина на Алтын-Депе. *Успехи среднеазиатской археологии (Successes of Central Asian archeology),* 4(8): 81-82. (in Russian) (“The grave of a noble citizen in Altyn Depe”)

Amiet, P. 1986, *L’âge des échanges inter-iraniens 3500-1700 avant J.-C.* Éditions de la Réunion des musées nationaux, Paris, 332 p. (in French) (“The age of inter-Iranian exchanges 3500-1700 BC”)

Antonova, E.V. 2001, Реконструкция смысла археологической вещи. Поиски пути. In: *Древние цивилизации Евразии история и культура Материалы Международной научной конференции, посвященной 75-летию действительного члена Академии наук Таджикистана, академика РАЕН, д.и.н., проф. Б.А. Литвинского (Москва, 14-16 октября 1998 г.) (Ancient Civilizations of Eurasia History and Culture Materials of International Scientific Conference, dedicated to the 75th anniversary of full member of the Academy of Sciences of Tajikistan, academician of the Russian Academy of Natural Sciences, Doctor of Historical Sciences, Professor B.A. Litvinsky (Moscow, October 14-16, 1998))* (Sedov, A.V., Ed.), Vostochnaya literatura, Moscow: p. 75-87. (in Russian) ("Reconstruction of the meaning of an archaeological thing. Finding a way")

Boroffka, N. & Sava, E. 1998, Zu den steinernen «Zeptern/Stössel-Zeptern», «Miniatursäulen» und «Phalli» der Bronzezeit Eurasiens. *Archäologische Mitteilungen aus Iran und Turan*, 30: 17-113. (in German) ("On the stone "sceptres/stem sceptres", "miniature columns" and "phalli" of the Bronze Age in Eurasia")

Frankfor, A.P. 1997, Печати Окса: разнообразие форм и изменяемость функций. *Вестник древней истории (Bulletin of Ancient History),* 4: 60-68. (in Russian) ("Seals of Oks: variety of forms and variability of functions")

Jarrige, J.-F. 1988, Le complexe culturel de Mehrgarh (Période VIII) et de Sibri. Le «Trésor» de Quetta. In: *Les cités oubliées de l'Indus. Archéologie du Pakistan (catalogue de l'exposition du Musée National des Arts Asiatiques Guimet)* (Jarrige, J.-F., Ed.). Association Française d'Action Artistique, Paris: p. 111-128. (in French) ("The cultural complex of Mehrgarh (Period VIII) and Sibri. The "Treasure" of Quetta")

Korobkova, G.F. 2004, Хозяйственно-производственная деятельность населения Алтын-депе (по данным комплексного изучения каменных орудий). In: *Орудия труда и системы жизнеобеспечения населения Евразии (Tools and life support systems of the population of Eurasia)* (Korobkova, G.F., Ed.), Evropeiskii dom, St. Petersburg: p. 92-137. (in Russian) ("Economic and industrial activities of the population of Altyn Depe (according to a comprehensive study of stone tools)")

Masson, V.M. 1981, *Алтын-Депе*. Nauka, Leningrad, 176 p. (in Russian) ("Altyn Depe")

Pottier, M.H. 1984, *Matériel funéraire de la Bactriane Méridionale de l'Âge du Bronze*. Éditions Recherche sur les Civilisations, Paris, 232 p. (in French) ("Burial material from Southern Bactria from the Bronze Age")

Sarianidi, V.I. 1990, *Древности страны Маргуш*. Ylym, Ashgabat, 316 p. (in Russian) ("Antiquities of the country of Margush")

Sarianidi, V.I. 1992. Два уникальных флакона из Бактрии. *Вестник древней истории (Journal of Ancient History)*, 3: 81-89. (in Russian) ("Two unique bottles from Bactria")

Sarianidi, V. 2005, *Gonur-Depe. City of Kings and Gods*. Miras, Aşgabat, 324 p.

Sarianidi, V. 2008, *Margush. Mystery and Truth of the Great Culture*. Türkmendöwlethabarlary, Aşgabat, 341 p.

Schmidt, E.F. 1937, *Excavations at Tepe Hissar, Damghan*. Publications of the Iranian Section of the University AQ2 Museum, University Museum, University of Pennsylvania Press, Philadelphia, 478 p.

Skakun, N.N. 1972, Функциональное исследование каменных наконечников стрел эпохи бронзы. *Каракумские древности (Karakum antiquities)*, 4: 161-166. (in Russian) (“A functional study of the stone arrowheads of the Bronze Age”)

Skakun, N.N. 1977, Каменные орудия эпохи бронзы (по материалам Алтын-депе 1970-1972 гг.). *Каракумские древности (Karakum antiquities)*, 6: 98-101. (in Russian) (“Stone tools of the Bronze Age (based on materials from Altyn Depe 1970-1972)”)

Skakun, N.N. 2003, Flint arrowheads from the Bronze Age settlement of Altyn Depe. Southern Turkmenia: Form and uses. *Paléorient*, 29(1): 147-156. doi: 10.3406/paleo.2003.4759

Vinogradova, N.M. 2004, *Юго-Западный Таджикистан в эпоху поздней бронзы*. Institute of Oriental Studies of the Russian Academy Sciences, Nauka, Moscow, 298 p. (in Russian) (“Southwest Tajikistan in the Late Bronze Age”)

Zaitseva, G.I., Dubova, N.A., Sementsov, A.A., Reimer, P., Mallory & J. Jungner, H. 2008, Радиоуглеродная хронология памятника Гонур-депе. *Труды Маргианской археологической экспедиции (Proceedings of the Margiana Archaeological Expedition)* (Sarianidi, V.I., Ed.), 2. Staryy sad, Moscow: p. 166-179. (in Russian) (“Radiocarbon chronology of the Gonur Depe site”)

Технология изготовления каменных миниатюрных колонок из памятника эпохи бронзы Гонур-депе (южный Туркменистан)

Наталия Н. Скакун, Вера В. Терехина

Институт истории материальной культуры РАН. 191186 Дворцовая наб., 18, Санкт-Петербург, Россия. - Электронная почта: Скакун: skakunnatalia@yandex.ru; Терехина: terehinavera@mail.ru

Резюме:

В эпоху бронзы во многих культурах Евразии камень продолжает широко использоваться для изготовления различных бытовых и сакральных предметов. Однако технология их изготовления остается недостаточно изученной. Это в полной мере относится к материалам эпохи бронзы южной части Туркменистана, где раскопаны многослойные поселения протогородского типа. Среди них Гонур-депе (2500-1500 гг. до н.э.) - уникальный памятник с многочисленными глинобитными жилыми постройками, дворцовым комплексом, сложными оборонительными сооружениями, а также различными погребальными комплексами, представленными богатым керамическим материалом, разнообразными находками из бронзы, золота, серебра и изделиями из камня: точильные камни, пестики, ступки, амулеты, сосуды, печати, украшения, шкатулки, длинные стержни-«посохи», диски, миниатюрные колонки.

Наши исследования посвящены изучению технологии изготовления миниатюрных колонок, большинство из которых были обнаружены в культовых комплексах (в основном в погребениях, а также в престижных помещениях). Сырьем для них служили мягкие горные породы: гипс, известняк, мраморный известняк, мраморный оникс, оникс, талькохлорит и полимиктовая брекчия. Эта часть коллекции изучена с помощью технико-морфологического, трасологического и минералогического анализов.

В современной литературе, несмотря на уникальность каменных миниатюрных колонок, отсутствует единообразие их описания, что затрудняет проведение объективного сравнительного анализа находок из разных археологических памятников. В связи с этим было проведено подробное техническо-морфологическое описание изделий из Гонур-депе. Стандартная характеристика учитывала форму, пропорции (отношение высоты миниатюрной колонки к диаметрам баз), расположение желобов (на базах, вдоль боковой поверхности), форму верхней базы, а также вес. Формы исследуемых миниатюрных колонок, похожих на шахматную ладью, имеют различные модификации. Их высота варьируется от 15,5 до 38,0 см, а вес - от 1,46 до 14,90 кг. Базы плоские, реже слабовыпуклые; диаметр верхней базы обычно меньше нижнего. Одной из существенных деталей большинства миниатюрных колонок является наличие желобов, выполненных по диаметру верхней (длиной от 7 до 14 см) и нижней баз (длиной от 8 до 18 см) в одном направлении. По типу профиля желоба разделяются на прямоугольные и арочные. В свою очередь, среди них по форме концов желобов можно выделить подтипы: с прямоугольным профилем и одинаковыми концами; с

прямоугольным профилем и углубленным трапециевидным расширением на одном конце; с арочным профилем и углубленным трапециевидным раструбом на одном конце. Форма концов желобов на верхней и нижней базах одинакова.

Исключением является вариант, когда желоба верхней и нижней баз выполнены частично с одной стороны (при этом изделие полностью закончено).

Иногда желоба от баз спускаются на боковые поверхности и соединяются друг с другом. По размеру их можно разделить на узкие и широкие, по профилю - на прямоугольные и арочные.

Только у одной колонки на боковой поверхности вместо углубленных желобов имеется выпуклая полоса, которая соединяет концы желобов обеих баз.

Вариантом расположения вышеописанных желобов являются желоба, частично спускающиеся на боковую поверхность от верхней и нижней баз.

Технико-морфологический анализ свидетельствует об отсутствии строгой корреляции между изменчивостью размеров миниатюрных колонок, расположением желобов и различной формой предметов. Следует подчеркнуть, что широкий желоб или полоса вдоль боковой поверхности во всех случаях присутствует только с одной стороны. На усеченно-конических миниатюрных колонках со шляпкой желоба на боковой поверхности отсутствуют.

Экспериментально-трасологический анализ выявил многочисленные технологические следы процесса изготовления миниатюрных колонок, невидимые невооруженным глазом. На первом этапе специально отобранные крупные куски камня обрабатывались методом ударной техники, что придавало изделию необходимые размеры и конфигурацию. Затем с помощью пикетажа удалялся лишний материал, причем эта операция производилась с большим мастерством: удары острым инструментом наносились равномерно по всей поверхности миниатюрной колонки, что позволяло придать ей нужную форму.

После этого поверхность шлифовалась грубыми и мелкими абразивами. Завершающим этапом обработки являлась полировка. Хорошо сохранившиеся следы свидетельствуют о том, что шлифовка и полировка миниатюрных колонок производилась вдоль их длинной оси.

Особое внимание было обращено на способы получения вышеописанных желобов, имеющих прямоугольный или арочный профили. Сначала их контуры, как показывают остатки разметочных линий, процарапывались острым тонким лезвием. Желоба глубиной до 0,8 см выбирались с помощью пикетажа, затем шлифовались и полировались.

Интересно отметить, что по бокам двух миниатюрных колонок вместо желобов были обнаружены узкие пролощенные полосы, соединившие концы желобов верхней и нижней баз. Подобные полосы были обнаружены также на каменных дисках из Гонур-депе.

Таким образом, изучение миниатюрных колонок из Гонур-депе позволяет говорить о хорошо отработанной технологии их изготовления, которая включала подбор каменного сырья, высокое качество его обработки, что давало возможность получать изделия правильной формы, многие из которых выглядят как произведения искусства. Это свидетельствует о высоком уровне камнеобрабатывающего производства эпохи бронзы южной части Туркменистана.

Ключевые слова: Туркменистан; бронзовый век; камнеобрабатывающее производство; каменные миниатюрные колонки; технико-морфологический и экспериментально-трасологический анализы