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ARAŞTIRMA MAKALESİ

LONG-RANGE METAL WEAPONS FROM KURUL FORTRESS IN THE LIGHT OF RECENT FINDINGS

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ABSTRACT: Kurul Fortress is one of the fortified Northern Anatolian settlements noticeable for its finds representing the Late Hellenistic Period. The general character of the settlement reflects a fortified settlement with adjacent regular rooms surrounded by a main defensive wall supported by towers. According to the archaeological evidence obtained, it is understood that the settlement was fortified during the Pontic king Mithradates VI Eupator. The reign of Mithradates VI has an important role in military history due to the wars against the Roman Republic. In ancient sources, there are statements about how the third war (74-63 BC) brought destruction to the settlements in Pontos geography. Excavations carried out at Kurul Fortress present finds parallel to those described in ancient sources, with traces of fire reflecting a great destruction and numerous weapon finds. During excavations from 2010 to 2022, a total of 1,289 weapons were found, 967 of which are metal. Among the metal weapons in which iron and lead are used as raw materials, long-range weapons constitute the largest percentage. With this study, it is aimed to reconsider the long-range metal weapons found at Kurul Fortress with regard to the current data.

Keywords: Northern Anatolia**,** Late Hellenistic Period, Mithradates VI, War, Long-Range Metal Weapons.

SON BULGULAR IŞIĞINDA KURUL KALESİ UZUN MENZİLLİ METAL SİLAHLARI

ÖZ: Kurul Kalesi, Geç Hellenistik Dönem'i temsil eden buluntularıyla öne çıkan tahkimli Kuzey Anadolu yerleşmelerinden biridir. Yerleşmenin genel karakteri kulelerle desteklenmiş bir ana savunma duvarının çevrelediği bitişik düzenli mekânlara sahip bir kale yerleşimini yansıtmaktadır. Elde edilen arkeolojik kanıtlara göre yerleşmenin Pontos kralı VI. Mithradates Eupator Dönemi'nde tahkim edildiği anlaşılmaktadır. VI. Mithradates'in hükümdarlık dönemi Roma Cumhuriyeti'ne karşı girişilen savaşlar nedeniyle askerî tarihte önemli bir yere sahiptir. Antik kaynaklarda özellikle üçüncü savaşın (MÖ 74-63) Pontos coğrafyasındaki yerleşmelere nasıl bir yıkım getirdiğiyle ilgili anlatımlara rastlanmaktadır. Kurul Kalesi'nde yürütülen kazılar, büyük bir yıkımı yansıtan yangın izleri ve çok sayıdaki silah buluntusuyla antik kaynaklarda anlatılanlara koşut bulgular sunmaktadır. 2010-2022 yılları arasında yürütülen kazılarda 967'si metal olmak üzere toplam 1.289 silah ele geçmiştir. Ham madde olarak demir ve kurşunun kullanıldığı metal silahlar arasında en büyük yüzdeyi uzun menzilli silahlar oluşturmaktadır. Bu çalışmayla Kurul Kalesi'nde ele geçen uzun menzilli metal silahların güncel verilerle yeniden ele alınması amaçlanmaktadır.

Anahtar Kelimeler: Kuzey Anadolu, Geç Hellenistik Dönem, VI. Mithradates, Savaş, Uzun Menzilli Metal Silahlar.

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Introduction

Kurul Fortress is located on top of Kurul Rocks (571 m) rising in the southeast of the city centre of Ordu, one of the Northern Anatolian provinces. Other important elevations surrounding the city centre are Boztepe (450 m) and Yoroz (810 m), which are closer to the sea (Şenyurt-Akçay, 2016: 224). However, since Kurul Rocks are very close to the Melet (*Melanthios*) River, it is in a more advantageous position from a strategic point of view. The Melet River, the largest freshwater source of the city, flows from the eastern skirts of these rocks into the Black Sea. This river draws a natural border between the Central and Eastern parts of the Black Sea Region and provides the transition between the inner parts of Anatolia and the coastal parts of the Black Sea with its valley since ancient times (Şenyurt-Akçay, 2016: 223; Şenyurt-Akçay, 2017: 180). It is also known that in times of war, enemy forces mainly followed river valleys like this one to advance in the invaded lands (Ekinci vd., 2015: 432-433). Kurul Rocks have a location and elevation where commercial or military transition can be easily controlled. In addition to being a transit route, the Melet River is also rich in fish species, which are important sourcses of food (Turan vd., 2008: 700, Şek. 1). Bronze hooks and lead fishing rod and net weights found at Kurul Fortress are indicative of the fishing activities in the Melet River and the Black Sea (Şenyurt-Akçay, 2016: 234, Lev. 9.5). Another strategic feature of the location of Kurul Fortress is that the Black Sea and the coastal part can be observed here from a wide angle (Şenyurt-Akçay, 2016: 223-224).

The eastern and southern slopes of Kurul Rocks, surrounded by the Melet River, are very steep (Şenyurt-Akçay, 2016: 224). It is possible to say that these steep slopes served as a natural barrier against the attacks that may come from the outside to the fortress. The most suitable parts of the rocks to reach the fortress are the western and northern slopes. The gate of the fortress, which has an elaborate architecture, is positioned on the western part of the rocks.

Strabo (XII. 3. 28) wrote that after Mithradates VI (120-63 BC) took the tribes of Tibaranoi and Chalybes under his rule, he had 75 strongholds (*phrouria*) built in these lands and moved most of his treasure to these fortified settlements. He also stated that the locations where these strongholds were built were the forests, deep valleys and areas covered with steep cliffs within the rugged geography formed by the Paryadres Mountains (Str. XII. 3. 28). The facts that the rocks where Kurul Fortress is located are covered with trees and that there is a deep valley formed by the Melanthios River just to the east of this place are the geographical features that exactly match the description of Strabo.

According to these explanations, it is possible to say that the settlement strategy of Mithradates VI consisted of strongholds built on steep rocks and these settlements played a key role in the administration of the country (Højte, 2009: 103). This strategy of the king is closely related to his political and military struggle with Rome. Mithradates VI Eupator spent about 20 years of his life fighting with Rome, and these wars went down in history as the Mithradatic Wars. The Third Mithradatic War (74-63 BC) is of great importance for the Late Hellenistic history of the Black Sea Region where the Pontos geography was exposed to two major invasions by Lucullus and Pompey (Arslan, 2007: 345-388, 480-483). According to Strabo (XII. 3. 38), Mithradates' strongholds were destroyed by the Roman army commanded by Pompey the Great during the second invasion. As a result of the excavations that have been going on for 13 years, it has been understood that the settlement at Kurul Fortress also ended with a layer of rubble and fire, which indicates such a destruction (Şenyurt-Akçay, 2016: 230-231, 233; Şenyurt-Akçay, 2017: 185, 189; Şenyurt-Durugönül, 2018: 309, 332; Şenyurt-Zoroğlu, 2018: 183, 185; Şenyurt vd., 2017: 4, 6, 8; Zoroğlu, 2021: 32, 34, Res. 3.4; Zoroğlu, 2023: 31).

The architectural structure at Kurul Fortress has a narrow and long plan in accordance with the summit of the rock (Akçay-Bulut, 2022: 179-180, Fig. 1). The rooms forming the buildings are arranged in an adjacent order on this limited surface (Akçay-Bulut, 2022: 180). Bronze coins constitute the most important group of finds for dating. Accordingly, it has been understood that the majority of these coins were dated to the reign of Mithradates VI Eupator

(Şenyurt-Akçay, 2016: 235-238, Lev. 12; Şenyurt vd., 2017: 6-7, Res. 10; Akgönül, 2018: 13-42, 51-63, Çiz. 2.1, 2.2, Şek. 2.1). Another important find for dating is a mould-made relief bowl from the workshop of Philon (Şenyurt-Akçay, 2016: 233-234, Lev. 11; Şenyurt-Yorulmaz, 2020: 306, 308, 313, Lev. 3: 13). These finds enabled the date of the fire layer associated with the last architectural phase of the fortress to be determined as 65/64 BC (Şenyurt-Akçay, 2016: 234). Weapons also occupy an important place among the many artefacts found from the destruction debris of the fortress. As of 2022, the total number of weapons reached 1,289. The largest share in this group belongs to metal weapons with 967 pieces.

Long-Range Metal Weapons

The rainy climate of the Black Sea Region is the biggest obstacle for the metal weapons to reach the present time in a well-preserved condition. However, the classifications and descriptions of almost all of them have been completed. Most of the weapons consist of catapult bolts, arrowheads and sling-bullets (908 in total). It is possible to consider them as long-range weapons of the ancient world. The predominance of long-range types is related to the fact that Kurul is a fortified settlement built at a high altitude because such weapons are 'missiles', which are the most necessary weapons to capture or defend a fortress in this location. Of the remaining 59 weapons, 24 are short-range throwing weapons such as *pila* and javelins, and 35 are close combat weapons. The spear-sickle (*falx muralis*), which is a composite weapon, is the most different example among close combat weapons (Zoroğlu, 2021: 72-74, 371-372, Kat. No. D4; Şenyurt-Zoroğlu, 2018: 190-191, Fig. 14). When the long-range metal weapons are examined in terms of raw materials, it is seen that all of the 775 examples were made of iron, except for the 133 lead sling-bullets.

Catapult Bolts

Torsion artillery constitutes one of the most common siege warfare machines of the Hellenistic and Roman periods (Figure 1). Until the end of the 1st century AD, in Roman artillery terminology, the bolt-shooting types of these weapons were called *catapulta* and *scorpio*, and the stone-throwing types were called *ballista* (Vitr. *De arch*. I. 1. 8; X. 10. 1; 11. 1-3; 9; 13. 6-7; 15. 4; 16. 1; Caes. *B Gall*. VII. 25; Marsden, 1969: 1 fn. 1, 180, 184, 188; Campbell, 2011: 689; Develi, 2009: 229, 231). However, the *scorpio* is also considered to be a smaller calibre bolt-shooter than the *catapulta* (Caes. *B Gall*. VII. 25 fn. 2; Veg. *Mil*. IV. 22; Marsden, 1969: 188-189; Campbell, 2003: 24; Develi, 2009: 229). In the range tests carried out by manufacturing modern examples of bolt- or arrow-shooting engines, distances of up to 370 m have been reached (Marsden, 1969: 86).

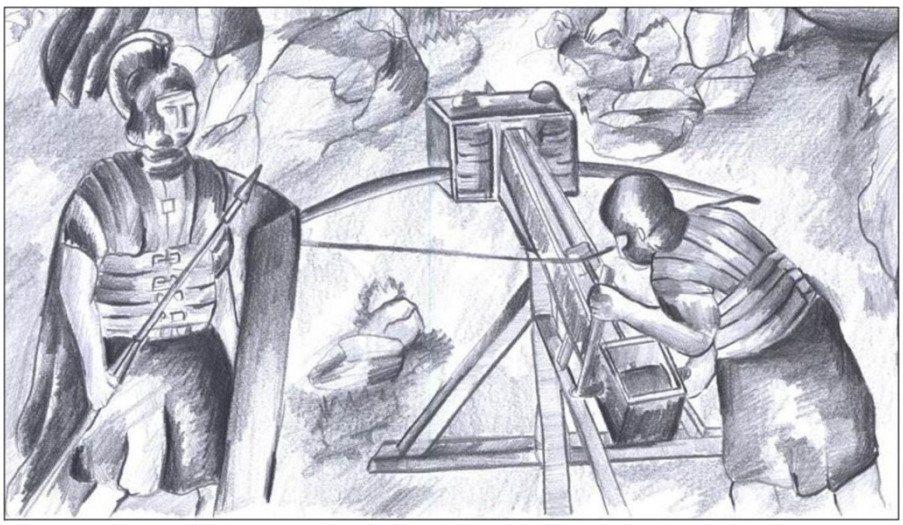

Figure 1. Reconstruction of a bolt-shooter on the battlefield (Painting Gizem Aydoğdu, from *Kurul Kalesi Hellenistik Dönem Savaş Araç Gereçleri*, by U. Zoroğlu, 2021, p. 40, Şek. 4.1a).

Bolt-shooters' missiles were heavier and more destructive than a standard arrow because catapult bolts were designed with a pyramidal-headed and square-sectioned to pierce helmets and armour (Bishop-Coulston, 2006: 59). Extant examples show that these iron components were fixed to wooden shafts with the help of socket and tang. 298 catapult bolts were found during the excavations at Kurul Fortress (Zoroğlu, 2021: 41-47, 145-241, Kat. No. A1-97; Şenyurt-Zoroğlu, 2018: 183-186, Fig. 2-3; Şenyurt vd., 2017: 8, Res. 12). While 287 of these are socketed (Figure 2/a-c), only 11 are tanged (Figure 2/d). In addition, the weights of the bolt-heads from the fortress reach up to 280 g. Very low numbers of 5 g have also been observed in weight measurements, but these measurements are not reliable because of the excessive deterioration of the finds. Another example found during the 2020 excavations draws attention with its size and weight. The length of this bolt-head is 160 mm, its socket diameter is 33 mm and its weight is 280 g (Figure 2/a). These dimensions reflect not only the armour-piercing feature of the missile, but also its potential devastating impact on architecture. Vegetius (*Mil*. IV. 18) spoke of the existence of such powerful bolt-heads and explained their devastating effect through the damage they inflicted on the siege towers. Changes in the measures of the bolt-heads from the fortress indicate the use of both light and heavy bolt-shooters.

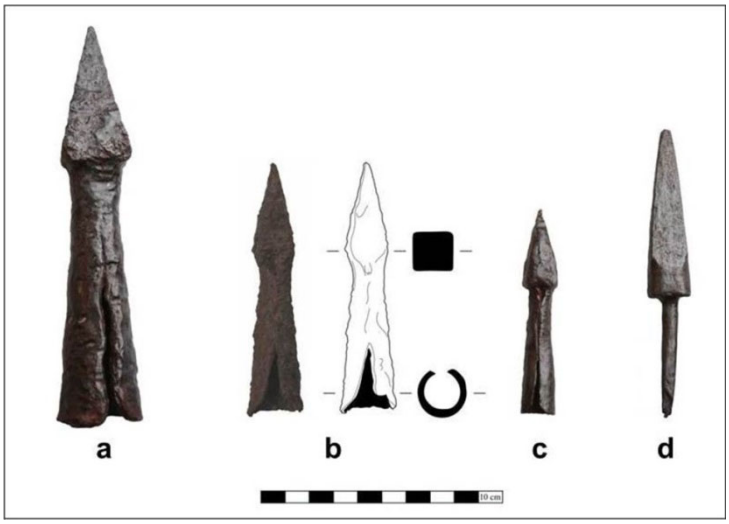

Figure 2. Iron catapult bolts from Kurul Fortress; a-c) Socketed, d) Tanged.

It is noticeable that ancient authors said that flaming artillery bolts were used during the Mithradatic Wars (Plut. *Sull*. XII. 3; App. *Mith*. 74). This type of use of missiles had also been the subject of the works of Vitruvius (*De arch*. X. 16. 12) and Vegetius (*Mil*. IV. 18; 44). Moreover, Vegetius (*Mil*. IV. 18) wrote that the burning process was accomplished by wrapping a combustible mixture of sulphur, resin, bitumen and tow onto the metal component and then setting the missile on fire with a caustic oil. This information provided by the ancient authors also made an important contribution to the ideas that could be put forward about the causes of the fire layer that was unearthed at Kurul Fortress and spread all over the settlement.

Arrowheads

The number of arrowheads found at Kurul Fortress has reached 477. Of these, 393 are three-bladed (Zoroğlu, 2021: 54-55, 278-311, Kat. No. B14-47; Şenyurt-Zoroğlu, 2018: 187-188, Fig. 6-7) and 84 are two-bladed (Zoroğlu, 2021: 50-53, 265-277, Kat. No. B1-13; Şenyurt-Zoroğlu, 2018: 186, Fig. 4-5). All three-bladed (trilobate) arrowheads are tanged and barbed (Figure 3/a-b). However, the barbs of some examples were not preserved. The weights of the three-bladed arrowheads from Kurul Fortress vary between 2 and 28 g, but their average weight is 4-5 g. Three-bladed arrowheads were the most preferred arrowheads during the Hellenistic and Roman periods and spread as far as ed-Dur in the United Arab Emirates (Delrue, 2007: 239-241, 247-248, Fig. 3).

Of the 84 two-bladed (bilobate) arrowheads found at Kurul Fortress, 82 are tanged (Figure 3/c-d) and 2 are socketed (Figure 3/e). Tanged examples, which make up the majority, are represented by barbed (Figure 3/c) and leaf-shaped (Figure 3/d) types. Some examples of both types have a 'stem' formed by thickening the upper part of the tang (Figure 3/c-d). Stem is the name given to the part where the arrowhead is fixed to the wooden shaft and wrapped with an organic material such as a tendon (Bozer vd., 2020: 340, Fig. 1). The weights of the barbed ones vary between 4 and 19 g, and the leaf-shaped ones vary between 2 and 10 g. The two socketed examples (Zoroğlu, 2021: 51, 265-266, Kat. No. B1-2) are quite small, typologically resembling a miniature spear rather than a leaf (Figure 3/e). Their lengths are 42 and 47 mm, and the socket diameters are 5 and 6 mm. The socket diameters of these arrowheads, which weigh only 2 g, point to a very thin wooden shaft. Different types of small arrowheads were found at Daskyleion (Kasar-İren, 2020: 183-184, Type IA2a-d, Figs. 8-9). It is suggested that they were used for hunting small animals and bird species (Kasar-İren, 2020: 181-183,193). A similar purpose might be suggested for the small arrowheads from Kurul Fortress. As a matter of fact, there are many bones belonging to small animal species among the faunal remains found at the fortress.

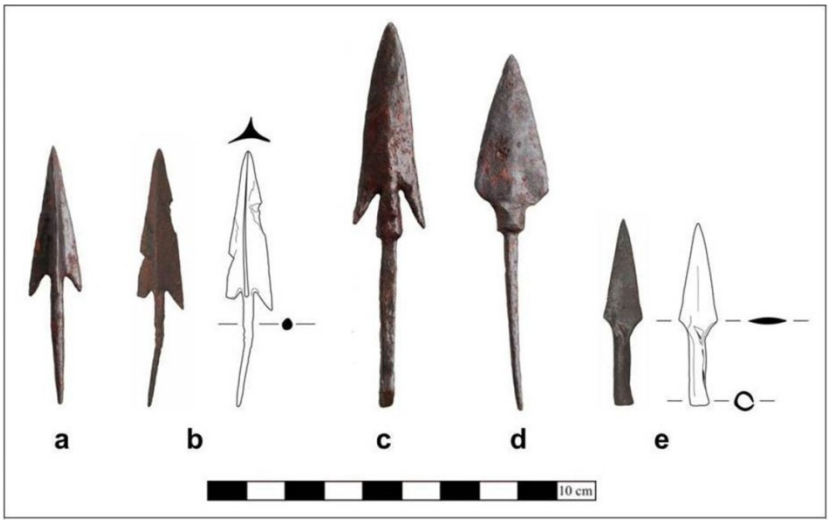

Figure 3. Iron arrowheads from Kurul Fortress; a-b) Three-bladed, tanged and barbed, c) Two-bladed, tanged and barbed, d) Two-bladed, tanged and leaf-shaped, e) Two-bladed, socketed and spear-shaped.

A composite bow reinforcing lath (ear lath) made of antler found during the 2020 excavations at Kurul Fortress is an important clue regarding the type of bow which was used together with the arrowhead types mentioned above (Zoroğlu, 2023: 34, Res. 5: A-B, 6: A-B). After the invention of composite bows by the Asian communities, these bows spread to the West and found a place in the Roman army. Firearms were used until they were invented due to the long-range characteristics resulting from the bow's reflex structure. For example, it is understood from the inscriptions on the archery monuments that the Ottoman composite bows may have reached a range of up to 846 m (Bir vd., 2006: 47).

Sling-Bullets

The sling (*funda* in Latin) is a simple weapon consisting of two strings attached to either end of a palm-sized pouch, but is very effective at long-range. The end of one of the strings is looped to pass the finger, and the end of the other string is knotted to make it easier to hold (Korfmann, 1973: 37-38; Griffiths-Carrick, 1994: 4-5, 9-10, Fig. 4A-B; Dohrenwend, 2002: 33; Seevers-Dennis, 2018: 1, Fig. 1). Then, at the end of a twisting motion on the side of the body or above the head (Figure 4), the knotted string is released and the bullet inside the pouch is thrown forward (Korfmann, 1973: 38; Griffiths-Carrick, 1994: 4; Dohrenwend, 2002: 33-35; Seevers-Dennis, 2018: 1-4, Figs. 2, 4-9). Beside this technique, there is a second method known to have been used less often. Accordingly, a bullet is thrown with a subsidiary tool called

a ‘staff sling’ (*fustibalus* in Latin), which is formed by connecting the strings to the end of a throwing staff (Korfmann, 1973: 37-38; Dohrenwend, 2002: 29; Seevers-Dennis, 2018: 2, Fig. 3). Bullets are the most important finds providing evidence for the use of slings in archaeological excavations.

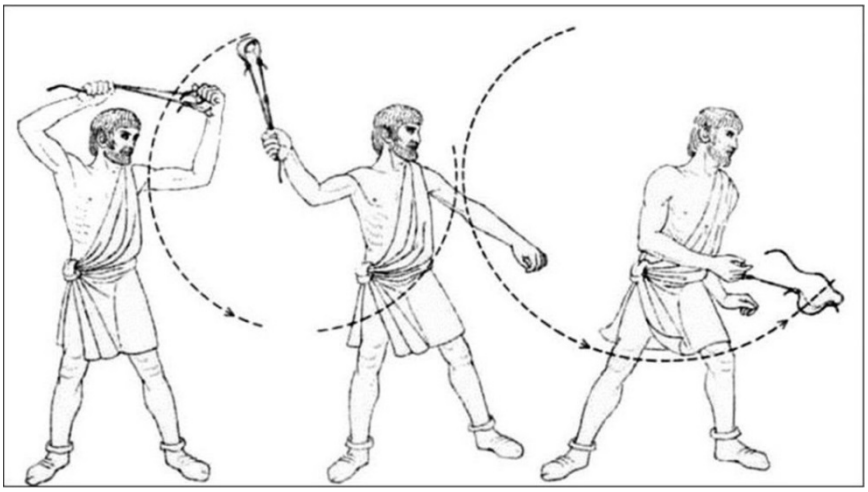

Figure 4. Reconstruction of the slinger's anticlockwise arm movement during the throw (Adapted from “The Sling as a Weapon”, by M. Korfmann, 1973, p. 38. Copyright 1973 by Scientific American, Inc).

The lead sling-bullets from Kurul Fortress consist of 133 examples (Zoroğlu, 2021: 57-59, 313-318, Kat. No. B49-54). While these are typologically divided into three types as octahedral (Figures 5/d-e; 6/a-c), biconical (Figures 5/a-b, f; 6/d-f) and ovoid (Figure 5/c). Their weights vary between 18 and 74 g. On some examples, there is a hole with an average diameter of 4-5 mm, which indicates that they were opened deliberately (Figures 5/c, e-f; 6/a-c). Perforated sling-bullets are also known from Burnswark Hill in Scotland, which was attacked by the Romans in the 2nd century AD (Metcalfe, 2016; Reid, 2016: 23-25; Reid-Nicholson, 2019: 469, Fig. 5/Type III). It was first suggested by Dr John H. Reid (Metcalfe, 2016) that these holes, which were previously thought to be poison reservoirs, were made to make a sharp buzzing. This sound was able to be recreated in experimental studies in which Reid himself participated (Reid, 2016: 25; Reid-Nicholson, 2019: 470). In another experiment posted on a social media platform by Jörg Sprave (2016), the buzzing sound can be clearly heard. As a result, perforated (whistling) sling-bullets are considered psychological weapons aimed at scaring the enemy (Reid, 2016: 25; Reid-Nicholson, 2019: 470; Seevers-Dennis, 2018: 6-7). Among Caesar's accounts of the African War (*Bell. Afr*. 83), there are some clues about the existence, usage technique and effectiveness of these weapons.

Smaller and irregular holes were also observed on a few lead sling-bullet found at Kurul Fortress. These are most likely due to a flaw in the manufacturing process. In addition, a total of 10 small lumps covering the surface of some sling-bullets draw attention (Figures 5/a-b; 6/f). These lumps are arranged in two groups of five. One of the lumps is in the centre, while the other four lumps form a rhombus around it. However, they do not create any image that would make any sense or symbolize an object. Probably their purpose was to cause more damage when they hit the body of the enemy soldier. Thorny medieval maces, which were manufactured to inflict more damage on the enemy in wars, can be given as an example of this idea.

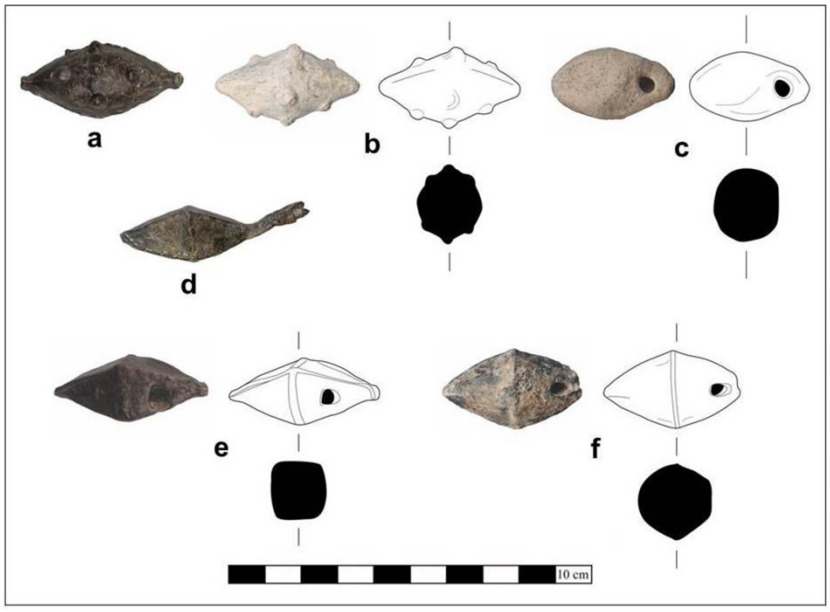

Figure 5. Lead sling-bullets from Kurul Fortress; a-b) Biconical and lumpy, c) Ovoid and perforated, d) Octahedral and simple, e) Octahedral and perforated, f) Biconical and perforated.

During the excavations carried out at Kurul Fortress in 2021 and 2022, significant data were obtained in terms of lead sling-bullets. A total of 126 sling-bullets were found, 7 of which were found in the large storage area unearthed between these years, and 119 in the corridor just the south of this area. These sling-bullets consist of octahedral and biconical examples, with each of the simple, perforated and lumpy types among them. But more importantly, all of these were found in bulk with mould mark (Figures 5/a, d; 6/a-f). Some of the sling-bullets are interconnected in groups of three (Figure 6/a-f). This is due to the channels that allow the molten lead to spread into the mould. Almost all of the sling-bullets have protrusions left from these channels. There are examples in which both perforated and lumpy lead bullets are interconnected. However, no finds are similar to the terracotta mould of Olynthus (Korfmann, 1973: 40; Seevers-Dennis, 2018: 6, Fig. 12) were found together with the sling-bullets. This situation brings to mind the idea that the 'lost-wax' casting method (*cire perdue*) may have been used.

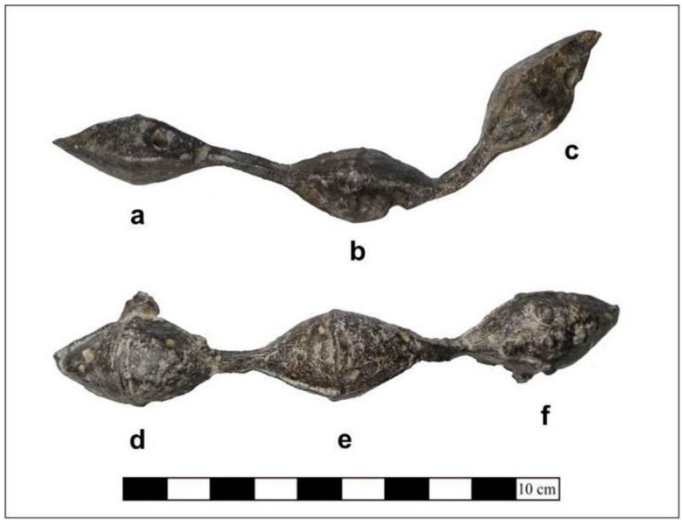

Figure 6. Lead sling-bullets with mould mark from Kurul Fortress; a-c) Octahedral and perforated, d-e) Biconical and simple, f) Biconical and lumpy.

The origin of the lost-wax casting method is thought to date back to the Chalcolithic Period, before 4000 BC (Davey, 2009: 152). According to this method (Noble, 1975: 368), first a

wax model of the object to be manufactured is made, and then this model is covered with moist clay, leaving a small hole. The mould, which is rested for a while to dry, is heated a little by turning it upside down with the hole facing down. The wax melts and flows through this hole, leaving behind a cavity in the shape of the object to be manufactured. After the mould is re-heated until all wax residues are removed, the molten metal is poured into the cavity left by the wax. After the metal solidifies, the clay mould is broken and the object is removed (Figure 7). With this last stage, the manufacture is also completed. In line with these explanations, it is possible to say that the reason why no mould examples have been found at Kurul Fortress until today is related to the melting of the wax model and the breaking of the clay mould. The lost-wax casting method makes it possible to manufacture very detailed objects in the most perfect way. For this reason, it is highly probable that the same method was used in other metal weapons that require details such as the three-bladed arrowheads found at Kurul Fortress.

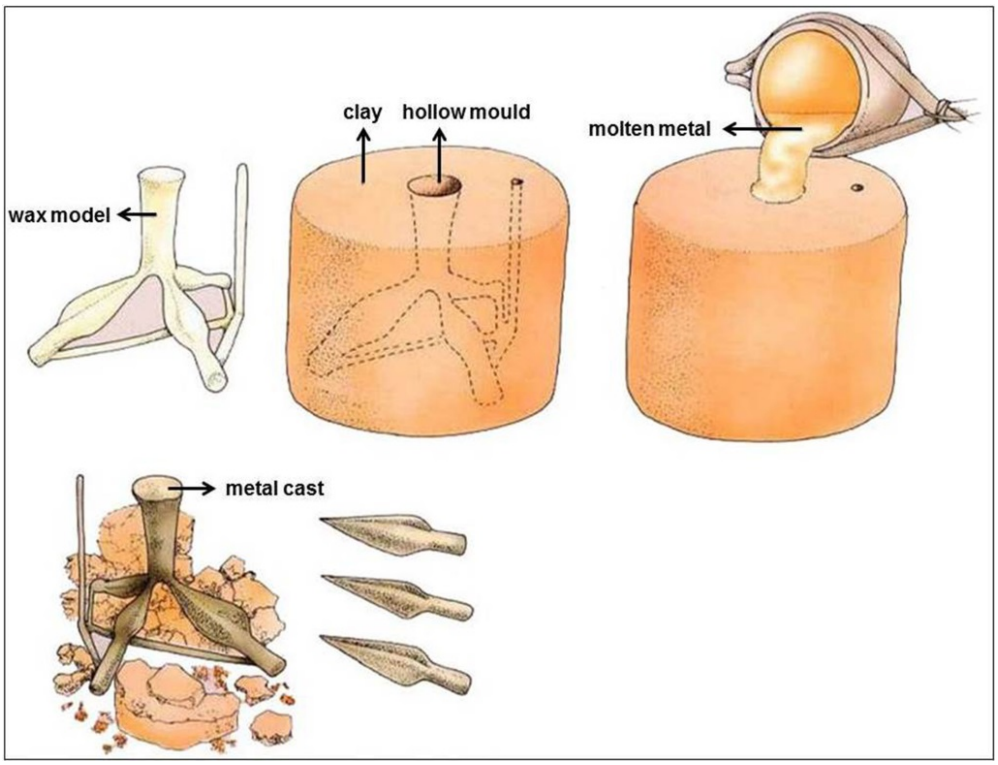

Figure 7. Reconstruction of weapon manufacture using the lost-wax casting method (Adapted from "Meluhha: spread of lost-wax casting in the Fertile Crescent. Smithy is the temple. Veneration of ancestors", by S. Kalyanaraman, 2014. Bharatkalyan97 A homage to Hindu civilization, http://bharatkalyan97.blogspot.com/2014/01/meluhha-metallurgical-roots-and-spread.html).

There is also another way of lead sling-bullet casting. This method consists of pouring molten lead into holes drilled in the sand with the help of a finger, stick or spear point (Seevers-Dennis, 2018: 6). However, this method was mostly used in order not to waste time under the adverse conditions of the battle (Seevers-Dennis, 2018: 6). This method including a very fast manufacturing process is not suitable for the manufacturing of perforated and lumpy sling-bullets from Kurul Fortress, which require fine workmanship. It is more of a viable process for simple bullets.

Conclusion

The weapons to be used in the siege and defence of a settlement in antiquity, as it is today, were directly related to the location of that settlement. The most suitable weapons for damaging fortified settlements built at a high altitude were the long-range types. The weapons found in the excavations carried out at Kurul Fortress between 2010 and 2022 prove this situation in the best way. Out of a total of 1,289 weapons, 1,230 include long-range examples.

Within this huge amount, the number of metal missiles is 908. If a generalization is made, it is possible to say that the importance of long-range weapons for Kurul Fortress is actually valid for all Mithradates VI strongholds. Ancient sources point out that these settlements were built at similar altitudes, as confimed by archaeological evidence.

Bolt-shooters were complex machines that were extremely important for besieging and defending these fortified settlements. The changes in the calibres of the 298 catapult bolts found at Kurul Fortress are the most important evidence showing that both light and heavy bolt-shooters were used. The relation of especially large calibre and heavy bolt-heads with the destruction and burning of the fortress is getting clearer. Ancient sources give information about how these bolts were fired and their destructive power was utilized especially during the Mithradatic Wars.

Almost all of the arrowhead types of the Hellenistic and Roman Republican periods are represented in the weapon assemblages from Kurul Fortress. The fact that the Late Hellenistic Period was a period of wars for the Black Sea Region and Anatolia was a part of the geography where communities specialized in archery lived together might be shown among the reasons for this diversity in arrowheads. In addition to this, the questioning which bow type is used with Kurul Fortress arrowheads – the number of which has reached 477 – is also of great importance. The answer to this question might be a composite bow reinforcing lath manufactured of antler found in the 2020 excavations. An unworked antler found in the following year might be another clue to composite bows manufactured in the fortress. It is possible to say that these finds are the earliest evidence of composite bows found in Anatolia.

Lead sling-bullets were the most important finds in terms of weapons found in 2021 and 2022. These have survived to the present-day in bulk with mould mark. This information reflects a crucial clue about the weapons manufactured in the fortress. The fact that no mould examples have been found so far allows us to suggest the lost-wax method, which is one of the earliest known casting methods in human history. The presences of perforated and lumpy examples that require fine workmanship among the lead sling-bullets also strengthen this idea. Kurul Fortress maintains to preserve its importance for the Mithradates VI Eupator phase of military history with its findings on the weapon types and weapon manufacturing practices.

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