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A 'KOHL BOX' FROM THE CILICIAN PLAIN IN THE FRAME OF THE ANALYTICAL AND ARCHAEOLOGICAL EVIDENCE

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ABSTRACT

This paper focuses on a Late Bronze Age "kohl box" from Tepebağ Höyük (Plain Cilicia, Turkey), one of the few well-dateable and securely-stratified examples of peculiar cosmetic containers found generally between Egypt and the northern Levant. To date, this category of artefacts has received scant scientific attention, partly because most known specimens come from museum collections or poorly-stratified contexts. The "kohl box" from Tepebağ Höyük is notable not only because it is well-dated (15th-3th centuries BCE), but also because it is the earliest known example from Anatolia.

The piece under study is a rectangular basalt object decorated with zoomorphic motifs and characterised by long narrow tubes containing residues of a black pigment. Morphological and chemical composition analyses with Scanning Electron Microscopy-Energy Dispersive Spectrometry (SEM-EDS) carried out on the residues reveal high concentrations of lead sulphide. Based on textual evidence from Egypt as well as similar chemical composition studies conducted on other similar finds, we can with confidence indicate that the Tepebağ Höyük example contained kohl.

An ethno-archaeological study of modern kohl manufacture in south-eastern Turkey further corroborates this hypothesis and provides interesting details regarding the possible secondary ingredients in kohl recipes. In addition, it confirms ancient sources that mention kohl also being an effective treatment against ophthalmic ailments.

KEYWORDS: cosmetic container, kohl box, galena, Eastern Mediterranean, Cilicia, Late Bronze Age

1. INTRODUCTION

For millennia and known by different names, kohl has been a cosmetic and medicinal preparation used by men and women of all statuses and socio-economic classes, and is still being used in many places today. The word 'kohl' is Arabic in origin, and derives from the word 'kahal' (Sweha 1982, 182; Hallmann 2009). The earliest use of kohl has been found in ancient Egypt. Depictions of eye shading are known from the Early Dynastic Period (CA. 3150-2650 BC) (Watts 1998, 10; Petrie 1927, 26; Mahmood *et al*. 2009, 108). In Ancient Egypt, kohl was used to make the eyes look bigger and brighter especially in the form of almonds. The almond painted shape of the Egyptian eyes was the most distinguished feature ancient Egyptian beauty (El-Kilany and Raoof 2017, 7). The first written documents about the kohl production are found in Egyptian papuruses. In Papyrus Ebers there is a recipe for eye-paint (Hallmann 2009,70). Two types of kohl production are mostly mentioned in that papyrus. The two commonest eye-paints were malachite and galena, the former being the earlier of the two (El-Kilany and Raoof 2017, 8; Lucas 1930,19 48; Hallmann 2009). Both malachite and galena are found in the graves in several conditions (Lucas 1930, 41; Lucas 1948, 99. For the composition of the ancient Egyptian kohl see Wiedemann 1892; Florence and Loret 1895; Brunton 1927). Kohl lumps of both malachite and galena were found in Tutankhamun's tomb (Hawass 1995). The material of the early kohl, malachite and galena, are both products of Egypt in Sinai and Aswan (Lucas 1948, 103).

In recent years, a number of chemical analyses have been performed on the remains left inside the kohl boxes now in museum collections (Lucas 1948; Hallmann 2009; Tapsoba *et al*. 2010; Mahmood *et al*. 2015; Habibullah *et al*. 2010; Liritzis *et al*. 2018), which have revealed that while kohl is composed of several ingredients, the main one is always galena (Galena is a bluish, grey, or black mineral of metallic appearance, consisting of lead sulphide. It is the chief ore of lead and the natural mineral form of lead sulfide. Divalent lead (Pb) cations and sulfur (S) anions form a close-packed cubic unit cell much like the mineral halite of the halide mineral group. It crystallizes in the cubic crystal system often showing octahedral forms. It is often associated with the minerals sphalerite, calcite and fluorite; lead sulfide; PbS). Moreover, it is understood that from early periods Egyptians commanded the technology and understood the chemical synthesis required for the production of kohl (Walter 2003; Mahmood *et al*. 2009; 2015; Tapsoba *et al*. 2010). Similar containers called also pyxis found containing powder, also found to contain lead oxide (PbO) (Liritzis *et al*. 2018, 43, fig. 12)

As it is understood from texts, paintings, and statues, kohl in ancient Egypt was mainly used to treat ailments of the eyes rather than for cosmetic purposes, though it is also thought that kohl was used to protect the eyes from the glare of the sun (Mahmood *et al*. 2009, 108; Ikram 2011; El-Kilany and Raoof 2017, 7). It is also believed that such cosmetics were associated with the Egyptian deities Horus and Ra, and were used during rituals and burial processes in which they played a 'magical', prophylactic role against various diseases. Some authors have expressed the opinion that this use might be based on the therapeutic and antibacterial properties of lead compounds (Tapsoba *et al*. 2010, 457, 460; Mahmood *et al*. 2009, 107). Medicinally, kohl is used to stop bleeding and after circumcision for hygienic measures (Al-Ashban et al. 2004, 292).

Apart from the ancient periods, analysis studies were conducted on modern cosmetic products that are used today and where the application is also included, and their toxicological effects were investigated. According to these studies, it has been understood that cosmetics contain high levels of lead (Al-Saleh *et al.* 2009; Malakootian et al. 2010; Bouftini *et al.* 2014; Gouitaa et al. 2016). It is determined that the drives used today contain over 80% lead (Şimşek-Önal 2019, 365; Ettinger *et al.* 2007; Hallmann 2009, 71). It has been revealed as a result of scientific studies that lead poses a risk to human health (World Healt Organization 2006). It has been determined that pregnant women and children are more likely to be affected by lead than adults (Gouitaa *et al.* 2016, 636; Şimşek-Önal 2019). Toxic effects and the widespread use of kohl, children are at a greater risk of serious and sometimes fatal toxicities of the nervous system (Al-Ashban *et al.* 2004, 292-3; Bouftini *et al.* 2014, 47; Şimşek-Önal 2019, 364). Kohl is still used today in Africa, Asia and Middle East, despite its considerable toxicity.

In the ancient time kohl was put in many differently shaped containers: little bottles, jars or special kohl tube. Containers for kohl have been discovered in a number of regions including Egypt, the Levant, Syria, Iran, and Anatolia, and are made from leather, terracotta, ivory, bone, metal, or stone (Petrie 1927, 26–28; Johnson 1996, 80; Catherine 2005; El-Kilany and Raoof 2017, 1, 8). In Ancient Egyptian, kohl containers vary in terms of shape and material by period (Johnson 1996, 80). The earliest examples of kohl boxes appeared in Egypt during the 7th Dynasty (late 3rd millennium BC). Ceramic and colorful hard stone were used in the Old Kingdom period in Egypt. Small jars were used as standard in the Middle Kingdom period. Alabaster and blue marble be-

came very popular in the New Kingdom Period. During the Eighteenth and Nineteenth Dynasties faince and glass were used manufacture of kohl container. Small narrow pots or tube-shaped are the most common kohl container forms (Johnson 1996, 80; El-Kilany and Raoof 2017, 8).

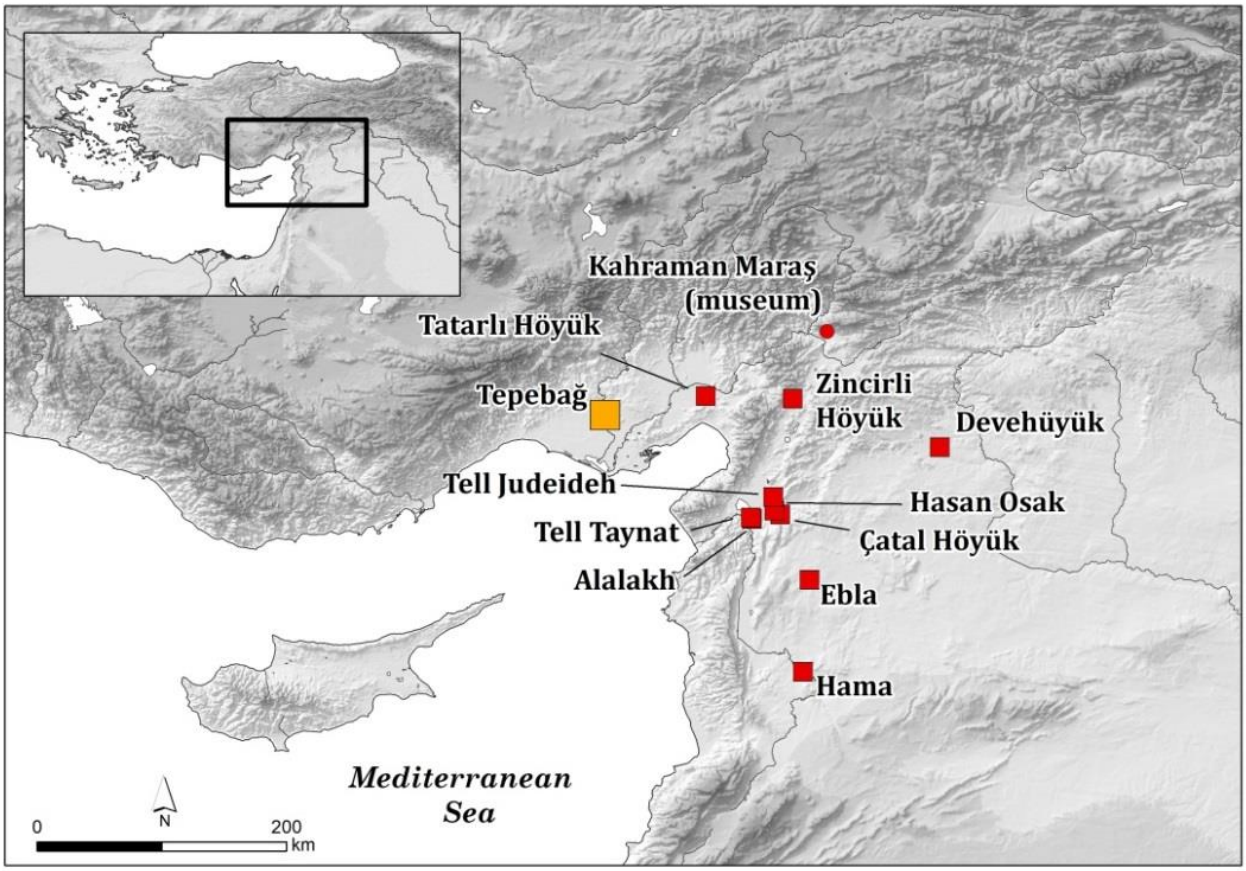


Figure 1. Map showing the location of kohl boxes from Tepebağ Höyük and surrounding region (map by Michele Massa)

The containers into which kohl was placed have been given a variety of names, such as 'kohl pot', 'kohl box', 'kohl container', '*Schminkdose*', 'stone rouge pot', and 'stone pectorale' (Petrie 1927, 26; Muscarella 1993; 1995). Kohl boxes are normally rectangular-shaped, and have two, three, or four tubes. Even though they are not preserved on most examples, kohl boxes also typically have hoops on their sides so that they can be strung and hung. Various opinions have been expressed about the intended use of kohl boxes due to these holes or hoops, but the number of examples recovered together with kohl sticks in excavations means that their original purpose is well understood (Muscarella 1995, 2, 5; Hayes 1959, 191–192; Petrie 1927, 28). More wood, bone, ivory or metal materials are used for kohl stick (Lucas 1948, 101; Johnson 1996, 80; El-Kilany and Raoof 2017, 8). The earliest kohl stick appear in the Eleventh Dynasty, before which time the kohl was probably put on with the finger (Lucas 1948, 101).

Most of the known kohl boxes from Anatolia and neighboring areas are unprovenanced museum finds and are generally scantily published (Muscarella 1995, 2). So far in Anatolia and northern Levant only a few have been recovered and published. The ones recovered from the diggings are mostly known from the settlements such as Zincirli Höyük (Andrae 1943, pl. 47a–b; Muscarella 1993, pl. 75: 2a–b), Deve Höyük (Moorey 1980, fig. 8: 137; Woolley 1914–1916, pl. 21: 10), Alalakh (Woolley 1955, fig. 75: AT/37/125), Hama (Ingholt 1940, pl. XXV: 5, 7), and Ebla (Castellino *et al*. 1966, 50, fig. LXXX), located in the south of Anatolia and northern Syria. There are a large number of unpublished kohl boxes from several settlements (Çatal Höyük, Tell Tayinat, Tell Judaidah and Hasan Osak) in the Amuq valley (Muscarella 1995, 2). Other than these, there are also examples in Maraş Museum included in the collection by purchase (Kökten 1960, 45, pl. 3: 1; Muscarella 1995, fig.2). A kohl box has been recovered at Tatarlı Höyük in the diggings conducted in

the plain of Cilicia in recent years[1]. Almost all stone kohl boxes have incised decorations on their surfaces, including human and animal figures, or geometric patterns such as concentric circles, chevrons, or stars (Muscarella 1995). Examples coming from stratified contexts, on the other hand, are all dated to the early 1st millennium BC (9th–7th centuries in particular) and are distributed across the northern Levant (Fig. 1).

2. AN ETHNOGRAPHY OF KOHL BOXES

Kohl is still used in Turkey, and indeed the author chose this topic in part because she lives in a region that keeps the culture and tradition alive, and is familiar with it. The author also uses traditionally-made kohl. As in the ancient period, kohl is used by people of all ages in a number of regions of modern Turkey, both for its health benefits and for cosmetic purposes. It is applied to newborn babies to prevent eye infections, and is used by adults who have discomfort in their eyes or simply wish to maintain ocular health. In Turkey, the containers preserving the kohl are called *sürmedanlık* (in Turkish), and carefully-made and ornamented kohl boxes have long been regarded as the most important pieces of traditional dowries. As a sample a modern kohl manufacture from Siirt, in southeastern Anatolia is describe below[2].

Kohl is made as follows: First, galena, also known as kohl stone, is soaked in water for forty days, wrapped in a piece of cloth. The water should be renewed every three to four days. At the end of this period, the galena is boiled in sheep bony water a while. After this process the galena is ground into powder using a metal mortar and pestle (Fig. 2), and breast milk is added: one glass of breast milk (approximately 200 ml) is used for a walnut-sized piece of galena.

Breast milk from mothers who have baby girls is preferred, as it is believed that the fat content of breast milk differs depending on whether the baby is a girl or a boy. After adding breast milk, the mixture is partially heated and stirred until dried. At this stage, the pulverized galena is much more adhesive and long-lasting compared to its initial state, and it is grey in colour. To give it a black colour, it is traditional for date seeds (*Phoenix dactylifera*) to be charred and crushed into powder, and then added to the preparation. In Anatolia, almonds or walnuts can be included in the mixture to produce different shades of kohl. In the final stage, the mixture is sieved using a piece of fine cheesecloth to ensure that it is consistently smooth. After this, the kohl is ready to use. Modern-day kohl boxes are made of metal, wood, or leather, but leather is generally preferred. The leather for a kohl container is normally from the foot or leg skin of a strong and healthy rooster. Dried and tanned in flour, the wider part of the leather is carefully sewn to form the bottom part of the kohl container, while the narrower part forms the mouth. Then it is decorated with coloured beads, sequins, paint, and pieces of string (Fig. 3).

Figure 2. Galena and powder (Photo: author)

A kohl stick is needed to apply the kohl stored in the container. These sticks should be smooth and straight, so as not to harm the eyes, and sticks are usually cut from the branches of juniper (*Juniperus communis*) or common boxwood (*Buxus sempervirens*), and planed until they are smooth. As a final touch, the handles of kohl sticks are ornamented, and are then ready for use.

Figure 3. Leather kohl boxes from modern-day southeastern Anatolia (Photo: author)

[1] Other than an excavation advertisement brochure, the publication of the artefact has not been made yet

[2] The information on modern-day kohl making was given by Makbule Taş who is living in Siirt region.

3. THE KOHL BOX FROM ADANA/TEPEBAĞ HÖYÜK

3.1. *The location and stratigraphy of Tepebağ Höyük*

Tepebağ Höyük, at the centre of modern Adana, is located in the heart of the Cilician Plain, a region that is of great importance to the history of civilization because of its access to land, river, and sea transport, its plentiful water resources, and because it functions as a bridge between Anatolia and Mesopotamia (Fig. 1). Located on the western bank of the Seyhan river and ca. 620 × 360 m in size, the settlement is one of the largest mounds in the region (Fig. 4), and has been continuously occupied from the Early Bronze Age to the present day, having maintained its significance in every period (Şahin 2016; 2017a; Novak *et al*. 2017). The mound rises about 15 m above the level of the plain, and its top is occupied by registered historic buildings and modest dwellings that date to the 18th century AD.

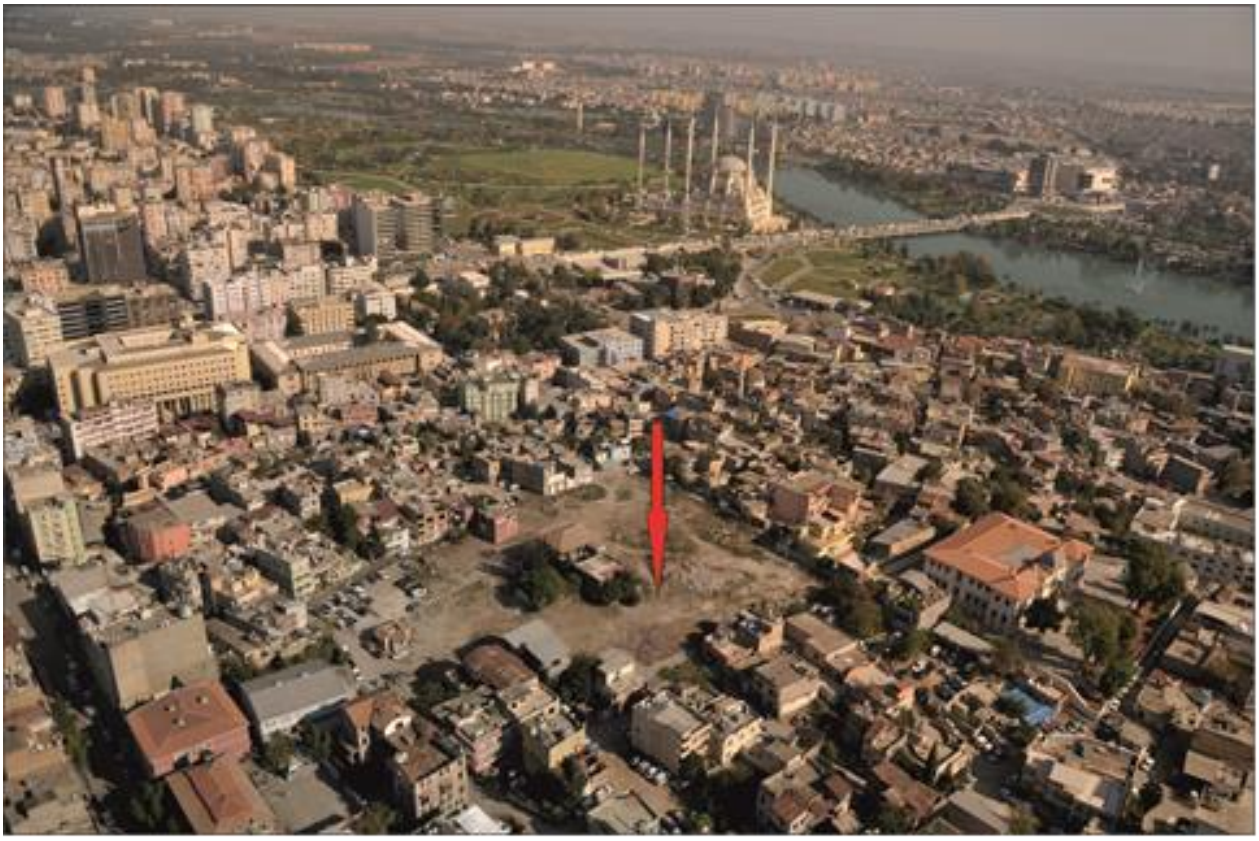


Figure 4. Aerial view of Tepebağ Höyük and Sarus river (Photo: Archive of Tepabağ excavations 2015-2016 seasons)

In 2015 and 2016, an area measuring 70 × 80 m at the top of the mound was cleared of modern structures to permit rescue excavations in collaboration with Adana Museum of Archaeology (Şahin 2016). To date, soundings have been carried out in fifteen 10 × 10 m trenches, two of which reached levels dated to the 2nd millennium BC—to the Late Bronze Age—at a depth of 4.5 m from the surface (Şahin 2017a; 2017b; Novak *et al*. 2017, 163–166) (Fig. 5).

In the work conducted between 2015 and 2016 at Tepebağ Mound, the stratigraphy of the mound has been identified as below (Table 1).

Figure 5. Tepebağ Höyük topographic plan and trenches (Drawing: author)

Table 1.

Stratigraphies of Tepebağ Höyük		
Level	**Phase**	**Period**
I	1	Early Period of Turkish Republic Era
II	2	Late Ottoman Period
	3	Ottoman and Medieval Period
III	4	Byzantine-Roman Period
IV	5	Hellenistic Period
	6	Clasical Period
V	7	Late Iron Age/Archaic Period
	8	Middle Iron Age
	9a	Early Iron Age
	9b	Transitional Iron Age
VI	10	Late Bronze Age II

3.2. *The kohl box*

The kohl box was recovered from the Late Bronze Age II fill in trench BH 32 during the 2016 excavation season. The box is made of basalt, is 9.3 cm in length, 4.5 cm in width, and 1.5 cm thick. It weighs about 120 g yet it is not complete, because one half is missing. It has two tubes and is decorated on both sides and on its bottom (Figs 6-7).

Figure 6. The kohl box from Tepebağ Höyük (Photo: Ebru İnceman)

On one of the wider sides there are two animal figures: one—half preserved—appears to be a bird of prey with outspread wings, and the image below seems to represent a quadruped, probably a donkey, running with its head turned backwards. It is likely the bird of prey is a hunting falcon or hawk, and the donkey below is trying to flee from its attack. On the other side there are two panels carved with straight lines and hatching (Fig. 7).

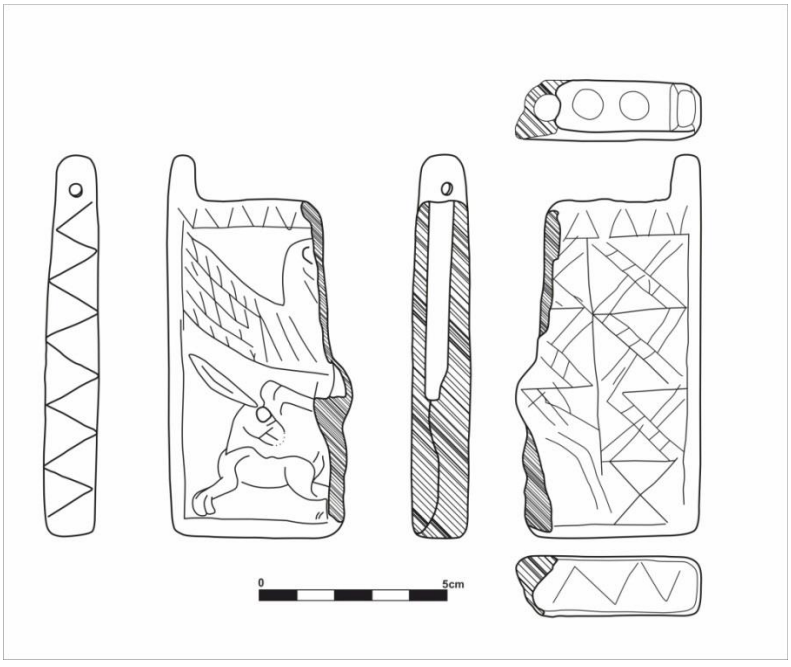


Figure 7. The kohl box from Tepebağ Höyük (Drawing: Yusuf Tuna)

The depiction of a bird of prey attacking an animal with its head turned backwards is known from an ivory artefact in the Pratt Collection of the Metropolitan Museum of Art in New York (Özgüç 1966, 44, pl. XXVII: 2; Dimand 1936, 221–222, fig. 3). However, in this case the animal is a deer and it is depicted as sitting, and while only the talon is preserved for the bird, it has been interpreted as a stylized representation of a member of the genus *Falco*, which is the symbol of the Egyptian god Horus (Dimand 1936, 222–223; Özgüç 1966, 17). Considered to have been influenced by Hittite, Syrian, and Egyptian ar-

tistic styles, this artefact was first dated to the 13th to 12th centuries BC (Dimand 1936; 1937), but once a part containing the missing wing was found it was understood to be of Anatolian (Acemhöyük) origin, and dated to the 19th to 18th centuries BC (Özgüç 1966, 46; Özgüç 2015, 28, fig. 16). In Anatolia it is the eagle, rather than the falcon, that was a popular motif in 2nd millennium BC seal impressions (Özgüç 1968, 44; Alp 1972, figs 71–84), though the falcon is identified as bird of prey in Hittite texts (Ertem 1965, 196). Donkeys are rarely depicted in Anatolia, appearing on a seal impression from Kültepe (Özgüç 1965, pl. 1: 1), and a lead figure (Emre 1971, fig. 28, pl. IX: 1a), and it seems that the donkey was considered among the less-valued animals (Ertem 1965, 7).

Ancient Egyptians were versatile in the ways that they depicted their deities, using different forms to represent their varying aspects. For example, a bird of prey was often associated with god Horus (Wilkinson 2003, 202; Watts 1998, 18, 20; Dimand 1936, 222), who was sometimes depicted as a peregrine, lanner, or other falcon species (Watts 1998, 20). Seth was often depicted as animals symbolically considered to be dangerous, but also sometimes as a donkey (Lucarelli 2017, 89; te Velde 1977; Donadoni 1981; Watts 1998, 20–21; Turner 2013, fig.6). Horus was often invoked by Egyptians to represent positive aspects, while Seth was sometimes associated with disruptive forces. The two were considered traditional rivals, and their contention for the throne of the gods had an important place in Egyptian mythology (Turner 2013 ; Wilkinson 2003, 198; Pinch 2002, 192). On this basis, it is possible to interpret the scene on the kohl box recovered from Tepebağ as representing the struggle between Horus and Seth.

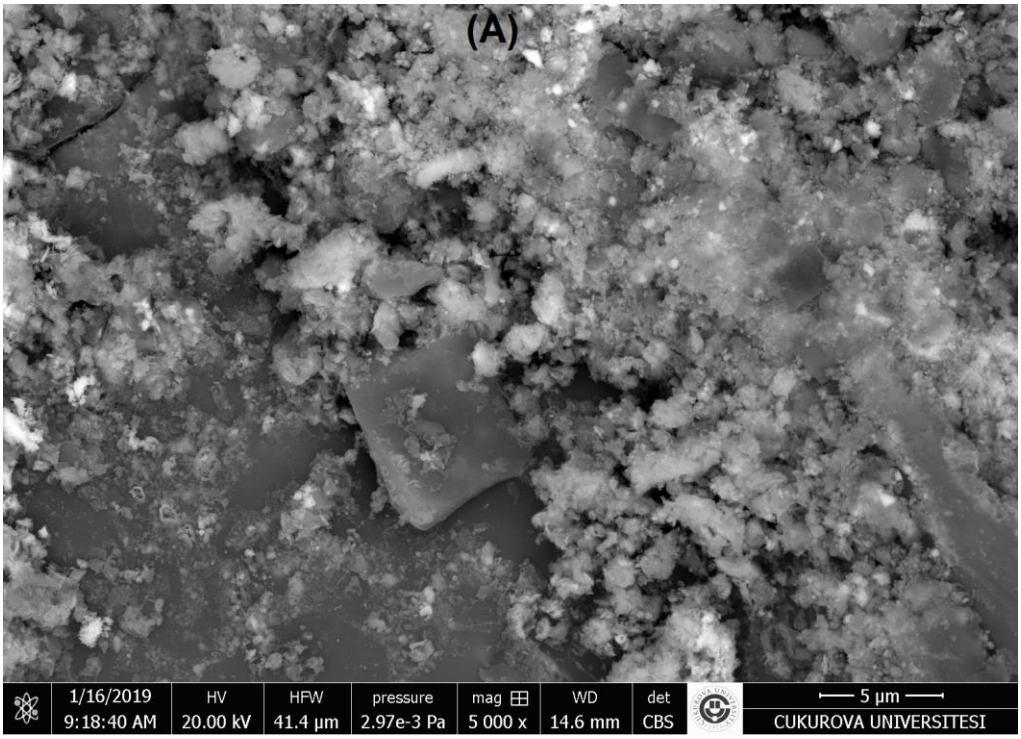
3.3. *Chemical composition and microscopic analysis*

According to scientists archaeometry, consists of the application of scientific tech-niques to the analysis of archaeological materials, to assist of archaeological studies and it is very useful and necessary (Liritzis *at al.* 2020). In this regard; regarding the composition of the Tepebağ Höyük kohl, preserved residues found at the bottom of the tubes were analysed at the Central Research Laboratory in Çukurova University using Quanta 650 Field Emission model of Scanning Electron Microscopy-Energy Dispersive Spectrometry (SEM-EDS).

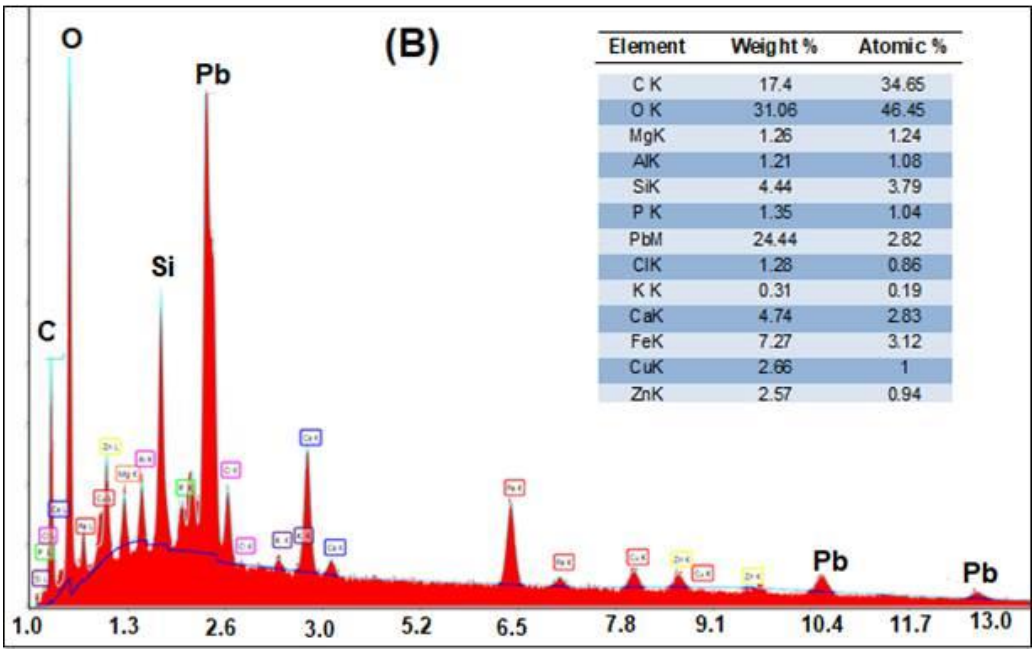
The microstructural analyses were carried out by a SEM-EDX (Quanta 650 Field Emission Model) equipped system with Amatek Edax trademark and model Octane Plus. Energy-dispersive spectrometer on flat tiny black gloss fragments previously sputter-coated with sample was coated with a thickness of 5nm gold (Au) using a fine coating ion sputtering device (Quorum-Q150R ES). The standard pin stubs made of aluminium and carbon tape are used in order to fix the sample. In order to obtain statistically the structure, EDS map of 3 different regions were taken. The operating settings were as follows: For EDS measurements; accelerating voltage 20kV, 4 spot size, 100 Live Time, 14.6 mm working distance and 131 Resolution (eV) in High Vacuum. For SEM measurements; accelerating voltage 20kV, 4 spot size, 100 Live Time, 14.6 mm working distance and 12 nm Resolution (SE) at 30 kV in High Vacuum. No standard was used during experimental measurement. All measurements were taken directly from sample, at room temperature and in high vacuum without any thermal treatment. In addition, the system was using TEAM software and this program automatically corrects the matrix effects via EZAF correction. Then all data transferred to the tables for evolutions (Fig. 8B).

In SEM images, several identifiable compounds were observed. The main one was galena, and the SEM images show its characteristic cubic appearance with particles that were about 5 µm in size surrounded by grey and white colour agglomerated nanoparticles (Fig. 8A). These white color compounds are notably determined via EDS as; cerrusite (lead carbonate; $PbCO_3$), phosgenite ($Pb_2Cl_2CO_3$) and laurionite (PbOHCl) as smaller particles covering the galena. The kohl also contained lead oxide (PbO), and it is thought that this compound was mixed into the kohl to reduce the harmful effects of direct sunlight on the eyes (Tapsoba *et al*. 2010, 458). A large quantity of carbon was found, which was probably added to colour the kohl black. This cosmetic material contains mostly lead-based chemicals (Fig. 8B). The similar structural compounds were also observed in different chemical composition (Walter 2003).

A significant point from the EDS analysis is that no antimony was found in the kohl. The galena ore used in kohl manufacture varies regionally, and while the galena found in Sinai, Saudi Arabia, and Iran is free of antimony, most of the galena found in Macedonia, Turkey, and Armenia contains traces of this element (Mahmood *et al*. 2015, 69). Accordingly, the chemical analysis of the kohl suggests that it was made with traditional ingredients, but that some were probably from distant sources. A detailed study of the chemical properties of the kohl is being prepared, and will be published in the near future.



8A



Element	Weight %	Atomic %
C K	17.4	34.65
O K	31.06	46.45
MgK	1.26	1.24
AlK	1.21	1.08
SiK	4.44	3.79
P K	1.35	1.04
PbM	24.44	2.82
ClK	1.28	0.86
K K	0.31	0.19
CaK	4.74	2.83
FeK	7.27	3.12
CuK	2.66	1
ZnK	2.57	0.94

8B

Figure 8. The morphological and chemical characterization of bottom materials in kohl-box. A) SEM images, B) EDS spectra and analysis.

3.4. The find context of the kohl box and the date of Late Bronze Age Tepebağ Höyük

The Late Bronze Age deposit was found below Iron Age architecture. However, due to time constraints it was not possible to determine how many phases the Late Bronze Age stratum contained, and no architectural remains have been found at this level (Fig. 9).

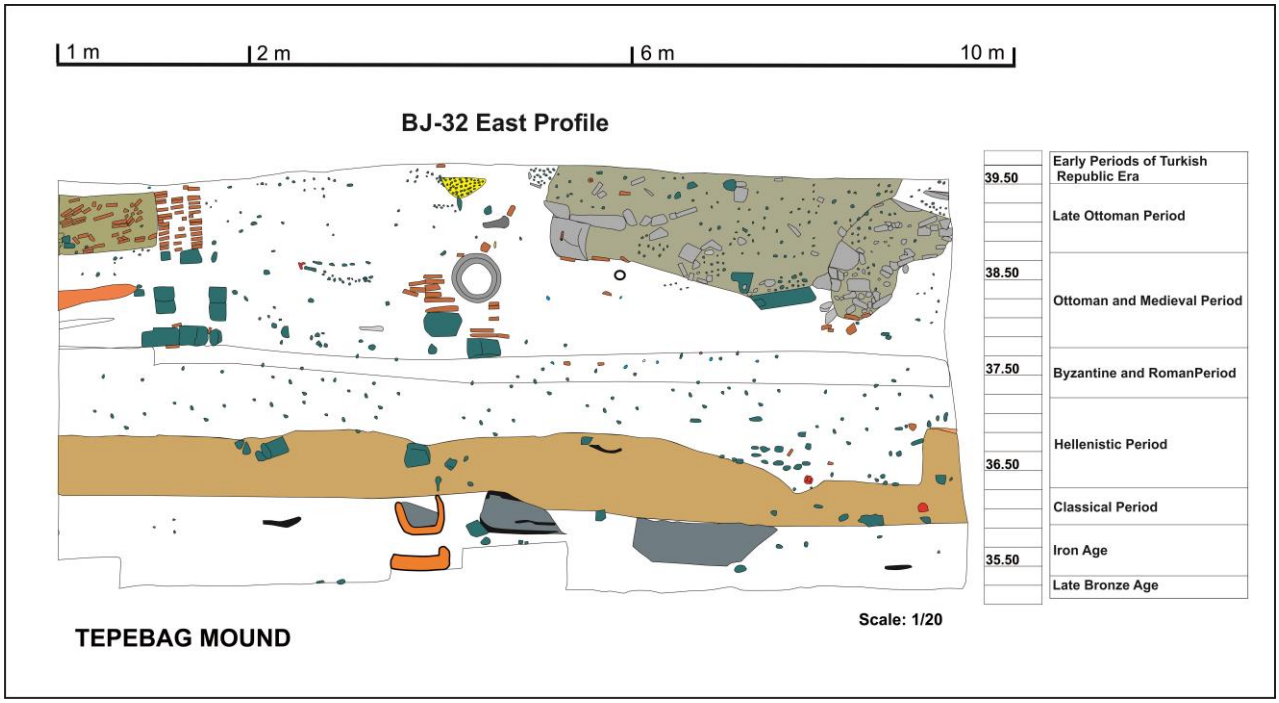


Figure 9. Vertical drawing for trench BJ-32 of Tepebağ Höyük (Drawing: Cem Fırat)

The kohl box was recovered from the Late Bronze Age II fill. Typical pottery of the Hittite Empire and Cypriot White Slip Ware II was uncovered in same deposits too (Şahin 2017a, fig. 8; 2017b, fig. 8). Notable among the Hittite Empire ceramics were the so-called 'drab ware' which provide a secure date between the 15th and 13rd centuries BC (Fischer 1963; Schoop 2011). Examples of drab ware forms recovered at Tepebağ Höyük (Fig. 10) have been found at settlements such as Kilise Tepe (Bouthillier *et al*. 2014, 141, fig. 46), Soli Höyük (Yağcı 2003; 2007, figs 12–15), Yumuktepe (Garstang 1953; Caneva and Köroğlu 2010, figs 109–110), Gözlükule (Goldman 1956; Ünlü 2016, fig. 4), Sirkeli Höyük (Novak and Kozal 2012, fig. 9; 2014, fig. 6), Tatarlı Höyük (Girginer *et al*. 2017, figs 6–7), and Kinet Höyük (Gates 2006; 2013, fig. 5), which are all located in the region.

The other significant ware group that can be used for dating the Tepebağ Late Bronze Age level is Cypriot White Slip Ware II, in use between the Late Cyprus IB and IIB periods (1600/1575–1190 BC) (Aström 1972, 762; Karegeorghis 2001; Kozal 2003, 70). The best examples of White Slip Ware II pottery have been recovered from the Uluburun shipwreck (Hirschfeld 2006, 105, figs 1–2; Pulak 2008, 296, fig. 193b). In Anatolia, the ware has mostly been recovered from southern coastal settlements such as Soloi-Pompeipolis (Yağcı 2003, 93–100, figs 15–18; 2007, fig. 18), Yumuktepe (Garstang 1940, 132-133;1953, 242), Gözlükule (Goldman 1956, 220, fig. 329; Kozal 2005), and Kinet Höyük (Gates 2000, 100, no. 9), although it was not as numerous in these places as at Tepebağ (Fig. 11).

Figure 10. Tepebag's Late Bronze Age pottery from the same context in which the kohl box was discovered (Drawing: Ebru İnceman)

Figure 11. Cypriot White Slip II / Milk Bowl fragments from Tepebağ Höyük (Drawing: Ebru İnceman)

Therefore, the presence of drab ware and Cypriot White Slip Ware II fragments in the stratum that contained the kohl box provides a secure Late Bronze Age II date (15th to 13rd centuries BC) (Novak *et al*. 2017) for the artefact in question, making it the earliest example ever found in the region.

4. CONCLUDING REMARKS

The creation of kohl required a significant level of knowledge, and boxes made to preserve it were highly-valued in daily life, having been crafted and decorated from some of the finest materials. Their desirability, plus the fact that they were small enough to be easily transported, no doubt facilitated the distribution of kohl boxes.

The kohl box from Tepebağ Höyük was found in a Late Bronze Age (15th to 13rd centuries BC) context, a time when there was a great deal of interregional trade in the Mediterranean. The fact that the galena found within it was free of antimony and its decorative scheme both suggest that this kohl box might have been imported directly from Egypt. It is known that Tepebağ had relations with Egypt in an earlier period. An Egyptian-style statue also recovered from Tepebağ during the construction of a house in 1882. It is now a part of the collection of the Metropolitan Museum of Art in New York, has been dated to the late 19th century BC (Winlock 1921, 209; Hayes 1953, 215; Ahrens 2011, 286–289, fig.1; Şahin 2016, fig. 9).

Whether it was carried by an Egyptian for personal use or arrived via a trade network, the Tepebağ kohl box provides clear and significant evidence for cultural communication and interactions in the Mediterranean region, and for the flow of people, goods, and ideas. The Cypriot pottery uncovered from the layer in which it was found also supports this view.

Goods and ideas had been exchanged in the eastern Mediterranean since at least the end of the 4th millennium BC. Egyptian imports have been recovered from Levantine settlements, notably Byblos (Dunand 1939; Redford 1992), or Ebla (Matthiae 1981; Sparks 2007), and it is now evident that trade networks covered the whole of the eastern Mediterranean, and increased in extent during the Middle and Late Bronze Ages (Ahrens 2011, 291; Massa and Palmisano 2018). The kohl box published here indicates that the Cilician Plain played a significant role in the trade networks of the 2nd millennium BC.

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REFERENCES

Ahrens, A. (2011) Strangers in a Strange Land? The Function ans Social Significance of Egyptian Imports in the Northern Levant during the 2nd Millenium BC. In K. Duistermaat and I. Regulski (eds.), *Intercultural Contacts in the Ancient Mediterranean (Orientalia Lovaniensia Analecta 202)*, Leuven, Peeters Publishers, pp. 285-307.

Al-ashban, R.M., Aslam, M., and Shah, A.H. (2004) Kohl (Surma): A toxic traditional eye cosmetic study in Saudi Arabia. *Public Health 118*, pp. 292-298.

Al-saleh, I., Al-Enazi, S., and Shinwari, N. (2009) Assessment of lead in cosmetic products. *Regul Toxicol Pharmacol 54*, pp. 105-113.

Alp, S. (1972) *Konya Civarında Karahöyük Kazılarında Bulunan Silindir ve Damga Mühürleri.* Ankara, Türk Tarih Kurumu.

Andrae, W. (1943) *Ausgrabungen in Sendchirli*. Berlin, Walter de Gruyter.

Aström, P. (1972) Absolute Chronology: The Late Cypriote Bronze Age. *The Swedish Cyprus Expedition IV (1D),* pp.755-762.

Bouftini, S., Bahhou, J., Turcant, A., and Achour, S. (2014) Lead Poisoning and use of Cosmetic Product: Kohl. *International Journal of Research in Applied, 2(5)*, pp. 45-48.

Bouthillier, C., Colantoni, C., Debruyne, S., Glatz, C., Hald, M.M., Heslop, D., Kozal, E., Miller, B., Popkin, P., Postgate, N.,. Steele C.S., and Stone, A. (2014) Further work at Kilise Tepe, 2007-2011: Refining the Bronze to Iron Age transition. *Anatolian Studies 64*, pp. 95-161.

Brunton, G. (1927) Qua and Badari I. London.

Caneva, I. and G. Köroğlu (2010) *Yumuktepe, Dokuzbin Yıllık Yolculuk.* İstanbul, Ege Yayınları.

Castellino, G., Cecchini, S.M., Alberto, D., Squarciapino, F.M., Pelio, F., Mario, I., Paolo M., and Gabriella M.S. (1966) *Missione archeologica in Siria Rapporto preliminare della Campagna 1965 (Tell Mardikh)*. Roma, Istituto di Studi del Vicino Oriente, Università.

Catherine, C. J. (2005) Kohl as traditional women's adornment in North Africa and Middle East. *Introduction to Harquus: Part 2: Kohl*, pp. 1-9.

Dimand, M. S. (1936) A Gift of Syrian Ivories. *The Metropolitan Museum of Art Bulletin XXXI(11)*, pp. 221-223.

Dimand, M. S. (1937) An Additional Gift of Syrian Ivories. *The Metropolitan Museum of Art Bulletin XXXII(4),* pp. 88-90.

Donadoni, S. (1981) Per la morfologia del dio Seth. *Mitteilungen des Deutschen Archaologischen Instituts, Abteilung Kairo 37*, pp. 115-122.

Dunand, M. (1939) *Fouilles de Byblos, Tome 1er, 1926-1932*. Paris, Paris Librarie Orientaliste Paul Geuthner.

EL-Kilany, E. and Raoof, E. (2017) Facial Cosmetics in Ancient Egypt. *Egyptian Journal of Tourism Studies 16(1)*, pp. 1-19.

Emre, K. (1971) *Anadolu Kurşun Figürinleri ve Taş Kalıpları*. Ankara, Türk Tarih Kurumu

Ertem, H. (1965) *Boğazköy Metinlerine Göre Hititler Devri Anadolu'sunun Faunası*. Ankara, Ankara Üniversitesi Basımevi.

Ettinger, A.S., Hu, H., and Hernandez-Avila, M. (2007) Dietary calcium supplemantation to lower blood lead levels in pregnancy and lactation. *The Journal Nutrional of Biochemistry 18(3)*, pp. 172-178.

Fischer, F. (1963) *Die Hethitische Keramik von Bozazköy. Boğazköy-Hattuşa IV*. Berlin, Gebr. Mann Verlag.

Florence, A. and Loret, B. (1895) Le collyre noir et le collyre vert, In J. de Morgan (ed.) Fouilles 'a Dahchour, Wien, pp.153-164.

Garstang, J. (1940) *Explorations in Cilicia, The Neilson Expedition: Fifth İnterim Report, Excavations at Mersin: 1938-39*. *Liverpool Annals of Archaeology and Anthropology 26 (3/4),* pp. 89-159.

Garstang, J. (1953) *Prehistoric Mersin Yümük Tepe in Southern Turkey: the Neilson Expedition in Cilicia*. Oxford, Clarendon Press.

Gates, M. H. (2000) Kinet Höyük (Hatay, Turkey) and MB Levantine Chronology. *Akkadica 119-120*, pp. 77-101.

Gates, M. H. (2006) Dating the Hittite Levels at Kinet Höyük: a Revised Chronology. In D. P. Mielke, U. D. Schoop and J. Seeher (eds.), *Strukturierung und Datierung in der hethitischen Archäologie/Structuring and Dating in Hittite Archaeology*, *BYZAS* 4, İstanbul, Ege Yayınları, pp. 293-309.

Gates, M. H. (2013) From Late Bronze to Iron Age on Syria's Northwest Frontier: Cilicia and the Amuq. In S. Mazzoni and S. Soldi (eds.), *Syrian Archaeology in Perspective Celebrating 20 Years of Excavations at Tell Afis*, Pisa, Edizioni ETS, pp. 95-116.

Girginer, K. S., Oyman-Girginer, Ö., Tufan, M.F., Gerçek A., and Gerçek, H. (2017) 2016 Yılı Tatarlı Höyük Kazısı Sonuçları. *Kazı Sonuçları Toplantısı 39*(2), pp. 229-241.

Goldman, H. (1956) *Excavations at Gözlü Kule, Tarsus, From the Neolithic through the Bronze Age*. Princeton, Princeton University Press.

Gouitaa, H., Bellaouchou, A., Fekhaoui, M., El Abidi, A., Mahnine, N., and R. Ben Akame, N. (2016) Assessment of lead levels in traditional eye cosmetic "kohl" frequently used in Morocco and Health hazard. *Environ. Sci. 7b (2),* pp. 631-637.

Habibullah, P., Mahmood, Z. A. Sualeh M., and Zoha S. M. S. (2010) Studies on the chemical composition of kohl stone by X-ray defractomer. *Pakistan Journal of Pharmaceutical Sciences 23 (1),* pp. 48-52.

Hallmann, A. (2009) Was Ancient Egyptian Kohl a Poison?. In Popielska-Grzbowska, J., Bialostocka, O. and Iwaszczuk, J. (eds.), *Proceedings of the Third Central European Conference of Young Egyptologists, The Pultusk Academy of Humanities, Acta Archaeologica Pultuskiensia* I, Pultusk, Pultusk Academy of Humanities, pp. 69-72.

Hawass, Z. (1995) *Silent Images Women in Pharaonic Egypt,* Cairo, International Printing House.

Hayes, W. C. (1953) *The Scepter of Egypt, A Background for the Study of the Egyptian Antiquities in Metropolitan Museum of Art I: From the Earliest Times to the End of the Middle Kingdom*. New Yor, Metropolitan Museum of Art.

Hayes, W. C. (1959) *The Scepter of Egypt, A Background for the Study of the Egyptian Antiquities in Metropolitan Museum of Art II: The Hyksos Period and the New Kingdom (1675-1080 B.C.)*. New York, Metropolitan Museum of Art.

Hirschfeld, N. **(**2006) Uluburun Batığı'nda Ele Geçen Kıbrıs Keramiği. In Ü. Yalçın, C. Pulak and R. Slotta (eds.), *Uluburun Gemisi: 3000 Yıl Önce Dünya Ticareti*, İstanbul, Ege Yayınları, pp.105-110.

Ikram, S. (2011) *Ancient Egypt an Introduction,* Egypt, The American University in Cairo Press.

Ingholt, H. (1940) *Rapport préliminaire sur sept Campagnes de Fouilles a Hama en Syrie* (1932-1938). Copenhagen, København, E. Munksgaard.

Johnson, J. H, (1996) Adornment in Mistress of the Heaven. In A.K. Capel and G. Markoe (eds.), *Mitress of the house, Mistress of the Heaven: Women in Ancient Egypt,* New York, Hudson Hill Press, pp.75-91.

Karageorghis, V. (Ed.). (2001) *The White Slip Ware of Late Bronze Age Cyprus.* Wien, Verlag der Österreichischen Akademie der Wissenschaften.

Kozal, E. **(**2003) Analysis of the Distribution Patterns of Red Lustrous Wheel-made Ware, Mycenaean and Cypriot Pottery in Anatolia in the 15th-13th centuries B.C. In B. Fischer, H. Genz, E. Jean and K. Köroğlu (eds.), *Identifying Changes: The Transition from Bronze to Iron Ages in Anatolia and its Neighbouring Regions*, İstanbul, Türk Eskiçağ Bilimleri Enstitüsü Yayınları, pp. 65-77.

Kozal, E. **(**2005) Unpublished Middle and Late Cypriot Pottery form Tarsus-Gözlükule. In A. Özyar (ed.), *Field Seasons 2001-2003 of the Tarsus-Gözlükule Interdisciplinary Research Project*, İstanbul, Ege Yayınları, pp. 135-144.

Kökten, İ. K. (1960) Maraş Vilayetinde Tarihten Dip Tarihe Gidiş. Türk Arkeoloji Dergisi 10, pp. 42-52.

Liritzis, I, Zacharias, N, Papageorgiou, I, Tsaroucha, A,Palamara, E (2018) Characterisation and analyses of museum objects using pXRF: An application from the Delphi Museum, Greece. *Studia Antiqua et Archaeologica 24(1)*, pp. 31–50.

Liritzis, I, Laskaris, N, Vafiadou A, Karapanagiotis I, Volonakis, P, Papageorgopoulou, C, Bratitsi, M (2020) Archaeometry: an overview. *Scientific Culture, 6 (1),* pp. 49-98.

Lucarelli, R. (2017) The Donkey in the Graeco-Egyptian Papyri. In S. Crippa and E. M. Ciampini (eds.), *Languages, Objects and the Transmission of Rituals. An Interdisciplinary Analysis on Ritual Practices in the Graeco-Egyptian Papyri (PGM)*, Venezia, Edizioni Ca'Foscari, pp. 89-103.

Lucas, A. (1930) Cosmetics, Perfumes and Incense ın Ancient Egypt. *The Journal of Egyptian Archaeology 16, (1/2)*, pp. 41-53.

Lucas, A. (1948) *Ancient Egyptian Materials and Industries*. London, Edward Arnold.

Mahmood, Z. A., Iqbal A., and Waseemuddin A. S. (2015). Kohl Use in Antiquity: Effects on the Eye, History of Toxicology and Environmental Health Toxicology. *Antiquity II*, pp. 68-78.

Mahmood, Z. A., Zoha, S. M. S., Usmanghani, K., Hasan, M. M., Ali, O., Jhan, S., Saeed, A., Zahid R., and Zubair, M. (2009) Kohl (surma): Retrospect and Prospect. *Pakistan Journal of Pharmaceutical Sciences 22*, pp. 107-122.

Malakootian, M., Pourshaaban, M. M., and Hassaini, H. (2010) Lead levels in powders of surma (kohl) used in Kerman. *Journal of Kerman University of Medical Sciences 17(2),*pp. 164-174.

Massa, M. and A. Palmisano (2018) Change and continuity in the long-distance exchange networks between western/central Anatolia, northern Levant and northern Mesopotamia, c. 3200-1600 BCE. *Journal of Anthropological Archaeology 49*, pp. 65-87.

Matthiae, G. S. (1981) I vasi egiziani in pietra dal Palazzo Reale G. *Studi Eblaiti 4*, pp. 99-127.

Moorey, P. R. S. (1980) *Cemeteries of the First Millennium B.C. at Deve Huyuk.* BAR International Series 87. Oxford, Oxford, England B.A.R.

Muscarella, O. W. (1993) The Metamorphoses of a Stone Cosmetic Container. In M. J. Mellink, E. Porada and T. Özgüç (eds.), *In Aspects of Art and Iconography: Anatolia and its Neighbors: Studies in Honor of Nimet Özgüç*, Ankara, Türk Tarih Kurumu, pp. 435-438.

Muscarella, O. W. (1995) Kohl Containers/Schminkdosen. *Notes in the History of Art, 14 (4),* pp. 1-7.

Novak, M. and Kozal, E. (2012) Sirkeli Höyük 2011 Yılı Çalışmaları. *Kazı Sonuçları Toplantısı 34(1),* pp. 413-428.

Novak, M. and Kozal, E. (2014) Sirkeli Höyük 2013 Yılı Çalışmaları. *Kazı Sonuçları Toplantısı 36 (*2), pp. 1-16.

Novak, M., D'agata, A. L., Caneva, I., Eslick, C., Gates, C., Gates, M. H., Girginer, K. S., Oyman-Girginer, Ö., Jean, E., Köroğlu, G., Kozal, E., Kulemann-Ossen, S., Lehmann, G., Özyar, A., Özaydın, T., Postgate, J. N., Şahin, F., Ünlü, E., Yağcı R., and Yaşin-Meier, D. (2017) A Comparative Stratigraphy of Cilicia. Results of the First Three Cilician Chronology Workshops. *Altorientalische Forschungen* 44 (2), pp. 150-186.

Özgüç, N. (1965) *The Anatolian Group of Cylinder Seal İmpressions from Kültepe*. Ankara, Türk Tarih Kurumu.

Özgüç, N. (1966) Excavations at Acemhöyük. *Anatolia X*, pp. 29-52.

Özgüç, N. (1968) *Seals and Seal Impressions of Level Ib from Karum Kanish*. Ankara, Türk Tarih Kurumu.

Özgüç, N. (2015) *Acemhöyük-Buruşhaddum I, Cylinder Seals and Bullae with Cylinder Seal Impressions*. Ankara, Türk tarih Kurumu.

Petrie, F. (1927) *Objects of Daily Use*. London, Bernard Quaritch.

Pinch, G. (2002) *Egyptian Mythology*. Oxford, Oxford University Press.

Pulak, C. (2008) The Uluburun Shipwreck and Late Bronze Age Trade. In J. Aruz, K. Benzel and J. M. Evans (eds.), *Beyond Babylon: Art, Trade, and Diplomacy in the Second Millennium B.C.(Metropolitan Museum of Art)*, New York, Metropolitan Museum of Art; 1st edition, pp. 289-386.

Redford, D. B. (1992) *Egypt, Canaan and Israel in Ancient Times*. New Jersey, Princeton University Press; New Ed edition.

Schoop, U. D. (2011) Hittite Pottery: A Summary. *Colloquia Antiqua 2*, pp. 241-273.

Sparks, R.T. (2007) *Stone Vessels in the Levant* (The Palestine Exploration Fund Annual Series VIII). New York, Routledge; 1 edition.

Sweha, F. (1982) Kohl along history in medicine and cosmetics. *Histoire des Sciences Medicales 17(2),* pp. 182-183.

Şahin, F. (2016) Tepebağ Höyük 2014-2015 Yılı Kazı Çalışmaları. *Kazı Sonuçları Toplantısı, 37(*2), pp. 191-208.

Şahin, F. (2017a) Adana/Tepebağ Höyük Kazısı 2015 Yılı Sonuçları. *38. Kazı Sonuçları Toplantısı, 38(*3), pp. 151-172.

Şahin, F. (2017b) A New Excavation in the Mediterranean: Adana's Tepebağ Höyük/Akdeniz Bölgesi'nde Yeni Bir Kazı: Adana-Tepebağ Höyük. *Anmed 15*, pp. 1-10.

Şimşek, H.G. and ÖNAL, A.E. (2019) The Effects of Lead of an Environmental Toxic Heavy Metal on Fetus Health. *Turkish Journal of Family Medicine and Primary Care 13(3)*, pp. 363-370.

Tapsoba, I., Arbault, S., Walter P., and Amatore, C. (2010) Finding Out Egyptian Gods' Secret Using Analytical Chemistry: Biomedical Properties of Egyptian Black Makeup Revealed by Amperometry at Single Cells. *Analytical Chemistry 82 (2),* pp. 457-460.

Te Velde, H. (1977) *Seth God of Confusion: A Study of His Role in Egyptian Mythology and Religion*. Leiden, Brill Academic Pub.

Turner, P. J. (2013) *Seth-A Misrepresented God in the Ancient Egyptian Pantheon?*. (BAR International Series 2473). Oxford, Archaeopress.

Ünlü, E. (2016) Tarsus-Gözlükule Höyüğü Geç Tunç IIb Katmanında Rastlanan Seramik Devamlılıkları. *CEDRUS IV*, pp. 1-9.

Walter, P. (2003) Inventing a science of make-up. In G. Tsoucaris and J. Lipkowski (eds.), *Molecular and Structural Archaeology: Cosmetic and Therapeutic Chemicals, NATO Science Series II* (117), Sicily, Kluwer Academic Publishers, pp. 1-9.

Watts, W. (1998) *The Art of Ancient Egypt: A Resource for Educator*. New York, Metropolitan Museum of Art.

Wiedemann, A. (1892) Varieties of Ancient Kohl, In W.M.F. Petrie (ed.) Medum, London, D. Nut, pp. 42-43.

Wilkinson, R.H. (2003) *The Complete Gods and Goddesses of Ancient Egypt*. New-York, Thames and Hudson; 1 edition.

Winlock, H.E. (1921) An Egyptian Statuette from Asia Minor. *The Metropolitan Museum of Art Bulletin 16 (10),* p p . 208-10.

World Health Organization International Agency For Research on Cancer. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Inorganic and Organic Lead Compounds.

International Agency for Research on Cancer; 2006. France. Accessed, 18 January 2020. https://monographs.iarc.fr/wp-content/uploads/2018/06/mono87.pdf.

Woolley, C.L. (1914-1916) A North Syrian Cemetery. *Liverpool Annals of Archaeology and Anthropology 7*, pp. 115-129.

Woolley, C.L (1955) *Alalakh, An Account of the Excavations at Tell Atchana in the Hatay, 1937-1949*. London, Society of Antiquaries.

Yağcı, R. (2003) Beyaz Astarlı (White Slip II) Kapları ve İ.Ö. II. Binde Kıbrıs-Soli İlişkileri. *Adalya VI*, pp. 1-14.

Yağcı, R. (2007) Hittites at Soli (Cilicia). *Studi Micenei ed Egeo-Anatolici 49*, pp. 797-814.