Anatolian Studies 60 (2010): 149–160

Tools and souvenirs: the shells from Kilise Tepe (1994–1998)

Sofie Debruyne

Flemish Heritage Institute, Brussels

Abstract

In the summers of 1994–1998 a rescue excavation took place at Kilise Tepe, an archaeological site occupied from the Early Bronze Age to the Byzantine period, located in the Göksu valley in Cilicia in southern Turkey. This article analyses the shell finds from environmental and archaeological perspectives. Three categories of molluscs are identified: terrestrial, freshwater and marine. The first two are the remnants of local fauna that lived on or near the site; the marine shells came from the Mediterranean shore adjacent to the Göksu delta and the delta itself. There are indications that freshwater mussels served as tools. Marine shells were worn as ornaments.

Özet

Türkiye'nin güneyinde yer alan Kilikya bölgesindeki Göksu vadisinde bulunan ve Erken Tunç Çağı'ndan Bizans dönemine kadar kesintisiz iskan edilmiş bir arkeolojik alan olan Kilise Tepe'de 1994–1998 tarihleri arasında kurtarma kazıları yapılmıştır. Bu makalede, kabuk buluntuları ekolojik ve arkeolojik açılardan incelenmektedir. Karasal, tatlı su ve deniz olmak üzere üç grup yumuşakça tespit edilmiştir. İlk iki grup, yerleşim yerinde veya yakınında yaşamış olan yerel faunanın kalıntılarıdır. Deniz kabukları ise Göksu deltasına yakın Akdeniz kıyısından veya bizzat deltanın kendisinden gelmektedir. Tatlı su midye kabuklarının alet olarak kullanıldığını gösteren belirtiler mevcuttur. Deniz kabukları ise süs eşyası olarak kullanılmıştır.

Kilise Tepe is located in Cilicia in southern Turkey (fig. 1). The mound occupies a conglomerate-capped limestone outcrop overlooking the Kurtsuyu and Göksu rivers. The Göksu valley has been a major route from the Mediterranean to the Anatolian plateau since ancient times. The position of Kilise Tepe in this valley, the security provided by the steep northern and western slopes of the outcrop, and the presence of arable land and a perennial spring make the site a favourable location for a settlement, as shown by its long occupation sequence. Leaving aside a short break of two centuries between the Iron Age and the Hellenistic period, the mound was inhabited from the Early Bronze Age to the Byzantine period (Postgate 2007b; Postgate, Thomas 2007a: 820).

Following plans for the construction of a dam in the 1980s, a rescue excavation was set up in order to investigate the archaeological record of Kilise Tepe before it was submerged. An international team working on behalf of the British Institute at Ankara and Silifke Museum excavated at the site in the summers of 1994–1998 (Postgate 2007a: 3).

The detailed report of these first five seasons of excavation has recently been published (Postgate, Thomas 2007a) and leaves few topics uninvestigated. This article fills one of the remaining gaps: the study of the shell remains collected during the excavations of 1994–1998. The studied material amounts to 3,455 specimens – with a Minimum Number of Individuals (MNI) of 2,788 – and includes terrestrial, freshwater and marine species. Besides quantitative data and 'classic' species lists, this paper offers a broad interpretation of the results by proposing theories on the source of the shells, the environment near the site and the use of the molluscs.

Methodology

After an initial assessment of photographs of a small reference collection in 2005, I studied the main corpus of the shell assemblage at Silifke Museum – where the finds from Kilise Tepe are stored – in 2006 and the remaining shell fragments from sieve samples in the UK in 2007. In the course of these different stages of research a database was constructed in which each individual shell or shell

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press



Fig. 1. The location of Kilise Tepe

fragment was inserted as a separate record (bivalve shells consist of two parts – i.e. two valves; since the finds from Kilise Tepe contained no visible pairs, valves were registered separately in the database and individually counted). For each record the following information was registered: taxon, size of the shell or shell fragment (height and length/width), completeness, valve, size and placement of holes, indications for working or natural alteration, indications for burning, artefact type and contextual information. Fossil shells were not included (for a description of those recovered from the site see Collon 2007), nor were four shell beads published by Collon and Symington (2007) (nos 2006, 2008, 2014 and 2015).

The principal sources for the taxonomic identifications were Schütt 2001 for the land snails, Schütt 1983 for the freshwater species and Poppe, Goto 1991 and 1993 for the marine shells. The taxonomy of the marine species was verified on the website of CLEMAM (checklist of European marine mollusca: http://www.somali.asso.fr/clemam/biotaxis.php). In addition to these sources, my personal reference collection, which contains specimens collected during surveys in the summer of 2006 in the vicinity of Kilise Tepe, on the shores of southern Turkey near Kızkalesi, in the hinterland of Kızkalesi and in the delta of the Göksu river, was an invaluable tool for identification.

Species

In total 3,455 shells and shell fragments were studied, the remains of at least 2,788 individuals. Of the entire collection, only 117 specimens remain unidentified. The remaining 3,338 have been identified to at least family level. In 3,329 cases, the genus could be determined; in 2,868 cases, the species. A detailed summary is given in table 1.

Terrestrial molluscs

The land snails amount to 810 specimens (24.3%). Five families are represented: Buliminidae, Ferussaciidae, Helicidae, Hygromiidae and Zonitidae. With the exception of the Ferussaciidae, these are among the major families of the modern terrestrial molluscan fauna in Turkey (Cook 1997: 412). *Eopolita derbentina* is the only species that does not occur in Mediterranean Turkey today (Riedel 1996: 23; Schütt 2001: 234).

Quantitatively, the collection is dominated by Ferussaciidae (n=409), followed by Helicidae (n=229) and Hygromiidae (n=165). The presence of Zonitidae (n=5) and Buliminidae (n=2) is almost negligible.

Freshwater molluscs

With a Number of Identified Specimens (NISP) of 2,323 (69.6%) the freshwater molluscs are clearly dominant in

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

	Taxon	NISP	%ISP	MNI	M%I	Complete	Broken	Fragment
Terrestrial gastropods								
Buliminidae	*Euchondrus ledereri* (Pfeiffer 1868)	2	0.1%	2	0.1%	2	-	-
Ferussaciidae	*Cecilioides tumulorum* (Bourguignat 1856)	409	12.3%	407	14.6%	379	28	2
Helicidae	*Helix* sp.	229	6.9%	115	4.1%	45	61	123
Hygromiidae	*Xeropicta vestalis* (Pfeiffer 1841)	158	4.7%	156	5.6%	103	53	2
Hygromiidae	*Xeropicta* sp.	7	0.2%	2	0.1%	1	1	5
Zonitidae	*Eopolita derbentina* (Boettger 1886)	4	0.1%	4	0.1%	-	4	-
Zonitidae	*Eopolita* sp.	1	0.0%	1	0.0%	1	-	-
Freshwater gastropods								
Melanopsidae	*Melanopsis praemorsa* (Linnaeus 1789)	2,105	63.1%	1,908	68.4%	429	1,479	197
Freshwater bivalves								
Unionidae	*Unio mancus* Lamarck 1819	16	0.5%	15	0.5%	6	9	1
Unionidae	*Unio* sp.	194	5.8%	10	0.4%	-	9	185
Unionidae	-	8	0.2%	2	0.1%	-	-	8
Marine gastropods								
Cassidae	*Phalium* sp.	5	0.1%	2	0.1%	-	-	5
Cerithiidae	*Cerithium vulgatum* Bruguière 1792	1	0.0%	1	0.0%	-	1	-
Columbellidae	*Columbella rustica* (Linnaeus 1758)	2	0.1%	2	0.1%	2	-	-
Conidae	*Conus mediterraneus* Hwass in Bruguière 1792	2	0.1%	2	0.1%	1	1	-
Cypraeidae	*Erosaria spurca* (Linnaeus 1758)	4	0.1%	4	0.1%	3	1	-
Muricidae	*Bolinus brandaris* (Linnaeus 1758)	4	0.1%	3	0.1%	2	1	1
Muricidae	*Hexaplex trunculus* (Linnaeus 1758)	4	0.1%	4	0.1%	3	1	-
Nassariidae	*Nassarius circumcinctus* (Adams 1852)	8	0.2%	8	0.3%	7	1	-
Nassariidae	*Nassarius gibbosulus* (Linnaeus 1758)	19	0.6%	19	0.7%	13	6	-
Patellidae	*Patella caerulea* Linnaeus 1758	26	0.8%	16	0.6%	4	12	10
Patellidae	*Patella* sp.	2	0.1%	1	0.0%	-	1	1
Ranellidae	*Charonia* sp.	1	0.0%	1	0.0%	-	-	1
Trochidae	*Osilinus turbinatus* (Born 1778)	5	0.1%	3	0.1%	2	-	3
Turritellidae	*Turritella communis* Risso 1826	3	0.1%	3	0.1%	-	1	2
Turritellidae	*Turritella turbona* Monterosato 1877	3	0.1%	3	0.1%	-	2	1
Marine bivalves								
Cardiidae	*Cerastoderma glaucum* (Poiret 1789)	77	2.3%	73	2.6%	40	33	4
Cardiidae	-	1	0.0%	1	0.0%	-	-	1
Donacidae	*Donax trunculus* Linnaeus 1758	2	0.1%	2	0.1%	1	1	-
Donacidae	*Donax* sp.	2	0.1%	1	0.0%	-	-	2
Glycymerididae	*Glycymeris violacescens* (Lamarck 1819)	14	0.4%	13	0.5%	8	5	1
Glycymerididae	*Glycymeris* sp.	20	0.6%	4	0.1%	3	-	17
	Total	**3,338**		**2,788**		**1,055**	**1,711**	**572**
	Unidentified	117				-	-	117
	Grand total	**3,455**				**1,055**	**1,711**	**689**

Table 1. Taxonomic identifications and quantities of the shell material excavated at Kilise Tepe. NISP = Number of Identified Specimens; %ISP = percentage of the total NISP; MNI = Minimum Number of Individuals (= minimum number of valves for bivalves); M%I = percentage of the total MNI; broken = more than half of the complete shell or valve; fragment = less than half of the complete shell or valve

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

the identified material. The large majority, 2,105, are gastropods of the family Melanopsidae, all of the species *Melanopsis praemorsa.* There is great morphological variability in the shells of *Melanopsis praemorsa.* The main distinctive feature is the sculpture of the shell surface. Entirely smooth shells exist, as well as shells with radial ribs in degrees of strength. These morphological differences have resulted in the distinction of many species and subspecies. Since the excavated shells had a smooth surface, they probably belong to the subspecies *Melanopsis praemorsa ferussaci* (Schütt 1983: 39–41, 76–77). The lack of sculpture on the shells may indicate that the *Melanopsis* originate from a spring, rather than a river, a topic discussed later in this paper.

The remaining 218 freshwater specimens are the remains of bivalves, mussels of the family Unionidae. They were in a very fragmented state, which made identification to species level difficult. Eventually, 16 specimens could be identified as *Unio mancus.*

Marine molluscs

The marine molluscs, with 205 identified specimens (6.1%), are poorly represented in the results. By contrast, they are by far the most diverse category. The 89 identified specimens of marine gastropods belong to eleven different families: Cassidae, Cerithiidae, Columbellidae, Conidae, Cypraeidae, Muricidae, Nassariidae, Patellidae, Ranellidae, Trochidae and Turritellidae; the Patellidae (n=28) and Nassariidae (n=27) are the most frequent.

In addition, 116 identified specimens of marine bivalves represent three families: Cardiidae, Donacidae and Glycymerididae; the Cardiidae (n=78) outnumber the others. All of the identified species live in the Turkish littoral waters of the Mediterranean Sea today (Demir 2003; personal observation).

Distribution by occupation phase

I will now discuss the frequency of the molluscan families by occupation phase (table 2). The analysis has not been specified to species level, since for each family only one or two species were identified. Where a family is represented by two different species (Muricidae, Nassariidae, Turritellidae), these are so morphologically similar that it is highly unlikely that the inhabitants of Kilise Tepe noticed the difference. For the convenience of comparison, the results have been grouped in four periods, following the chronological chart of Postgate, Thomas 2007a: 820; note that there, and here, 'Iron Age' includes Level IIa–d (1275–1150 BC), which has also been called 'Terminal Late Bronze Age':

EB	Early Bronze Age II/III	2700–2000 BC
MB/LB	Middle/Late Bronze Age	2000–1275 BC
IA	Iron Age	1275–650 BC
Hell/Rom/Byz	Hellenistic/Roman/Byzantine	300 BC – AD 1200

Terrestrial molluscs

The terrestrial snails (table 2) are most abundant in the Early Bronze Age: almost 48% of all terrestrial gastropods belong to this period. The other periods each yielded 17–18%. The high frequency in the Early Bronze Age is due to the large amount of Ferussaciidae (n=309). This number is strongly biased by 235 specimens found in one context: destruction debris in a room dating from the Early Bronze Age II (unit 1844). Given the fact that Ferussaciidae are burrowers, we can assume that the snails lived naturally in this deposit. Leaving aside the Ferussaciidae, and taking into account only the other two main terrestrial families (Helicidae and Hygromiidae), a different pattern emerges: terrestrial snails occur more frequently over time.

Freshwater molluscs

The relative frequency of freshwater gastropods (Melanopsidae) shows an increase in the Middle and Late Bronze Age (22.3%) and peaks during the Hellenistic to Byzantine periods (almost 57%) (table 2). The latter period is the longest in duration, but several conspicuous concentrations occur, such as clusters of 151, 176 and 277 specimens found in packing material (units 2615, 2613 and 2617 respectively) and 115 specimens found in ashy debris contexts (unit 2607).

The freshwater mussels (Unionidae) are markedly abundant in the Iron Age (86%) (table 2). During the Bronze Age they are almost negligible in the archaeological record and only 9% was found in Hellenistic, Roman and Byzantine levels. The high frequency in the Iron Age (n=172) is due to two Late Iron Age concentrations of freshwater mussel shells: 103 specimens in a packing deposit (unit 2378) and 53 specimens in occupation surfaces in a room (unit 2394). As noted above, the Unionidae of Kilise Tepe were in a very fragmented state. This means that the high quantities considered here represent only a few individuals. Of the 103 finds from unit 2378, five were complete and four broken; of the 53 finds from unit 2394, one was complete and three broken; all the other specimens were fragments.

Despite the low number of individuals it is interesting to note that no complete freshwater mussel valves were excavated elsewhere at Kilise Tepe. Furthermore, there are clear indications that at least some of the shells from these contexts were used as tools, a topic discussed later in this paper.

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

	EB	MB/ LB	IA	Hell/ Rom/ Byz
Terrestrial gastropods				
Buliminidae	-	-	2	-
Ferussaciidae	309	61	39	-
Helicidae	35	29	51	76
Hygromiidae	15	39	36	56
Zonitidae	-	-	-	3
Total	359	129	128	135
% of total period	65.8%	21.6%	21.5%	11.0%
% of total category	47.8%	17.2%	17.0%	18.0%
Freshwater gastropods				
Melanopsidae	151	411	233	1,046
Total	151	411	233	1,046
% of total period	27.7%	69.0%	39.1%	85.5%
% of total category	8.2%	22.3%	12.7%	56.8%
Freshwater bivalves				
Unionidae	5	5	172	18
Total	5	5	172	18
% of total period	0.9%	0.8%	28.9%	1.5%
% of total category	2.5%	2.5%	86.0%	9.0%
Marine gastropods				
Cassidae	-	2	1	-
Cerithiidae	-	-	-	1
Columbellidae	-	1	-	-
Conidae	-	1	-	-
Cypraeidae	-	2	1	-
Muricidae	-	-	5	1
Nassariidae	1	21	2	2
Patellidae	13	8	-	1
Ranellidae	-	1	-	-
Trochidae	1	-	2	-
Turritellidae	4	-	1	1
Total	19	36	12	6
% of total period	3.5%	6.0%	2.0%	0.5%
% of total category	26.0%	49.3%	16.4%	8.2%
Marine bivalves				
Cardiidae	3	10	38	11
Donacidae	-	-	1	3
Glycymerididae	9	5	12	4
Total	12	15	51	18
% of total period	2.2%	2.5%	8.6%	1.5%
% of total category	12.5%	15.6%	53.1%	18.8%
Total period	**546**	**596**	**596**	**1,223**
% of grand total	**18.4%**	**20.1%**	**20.1%**	**41.3%**

Table 2. Distribution of the different families by occupation phase

Marine molluscs

Marine molluscs are not well represented among the excavated material from Kilise Tepe. In total only 205 identified specimens were counted. The percentages given below thus relate to small counts.

With regard to the marine gastropods, table 2 shows that the quantities per family are very low in each period. In fact, only four modest peaks can be distinguished: 13 Patellidae in the Early Bronze Age, 21 Nassariidae in the Middle and Late Bronze Age, eight Patellidae in the Middle and Late Bronze Age and five Muricidae in the Iron Age. Since two of these peaks occur in the Middle and Late Bronze Age, this is the period that yielded most marine gastropods (49.3%). It should be noted, however, that the four peaks represent scattered finds. In general, contexts in which more than one marine gastropod was present are rare. Modest concentrations – minimum three specimens per context – were found in an Early Bronze Age III context (Patellidae, n=4), a Middle/Late Bronze Age packing deposit (Nassariidae, n=6) and a Late Bronze Age fill (Nassariidae, n=3).

Marine bivalves (table 2) are most frequent in Iron Age levels (53.1%). The high frequency in this period is due to the large number of Cardiidae (n=38). In fact, these are the most common marine bivalves in all periods, except for the Early Bronze Age, but their predominance in the Iron Age is striking. The second largest family, the Glycymerididae, is also most frequent in the Iron Age (n=12), and almost as common in the Early Bronze Age (n=9). Donacidae occur from the Iron Age onwards, but their numbers remain negligible. Marine bivalves most often occurred singularly. Small concentrations – minimum three specimens per context – were found in Late Iron Age packing material (Cardiidae, n=3) and Late Iron Age fill (Cardiidae, n=6).

Natural sources and environment

Since many molluscan species have specific ecological requirements, hypotheses can be formulated regarding the geographic origin of archaeological shell material and the natural environment of the site where they were excavated. In the following discussion, terrestrial, freshwater and marine species are dealt with separately, since they offer different environmental information.

Terrestrial sources and environment

None of the identified species are known to live in association with humans, nor in the direct vicinity of occupied buildings. They live in open environments (*Xeropicta vestalis*, *Euchondrus ledereri*), on river banks (*Eopolita derbentina*) or hidden underground, under stones or between rocks (*Cecilioides tumulorum*, *Eopolita derbentina*) (Schütt 2001: 151, 234, 297, 449).

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

Thus, it can be assumed that they were intentionally or accidentally introduced from the surroundings of Kilise Tepe or occupied less-populated areas of the site.

In order to draw environmental conclusions, a reasonable number of molluscs has to be present at an archaeological site. The 810 land snail shells and shell fragments excavated at Kilise Tepe may seem a good quantity, but, given the long period of occupation at the site, they are in fact relatively few in number. Still, the three largest families – Ferussaciidae (n=409), Helicidae (n=229) and Hygromiidae (n=165) – are represented strongly enough for a tentative interpretation.

Stratigraphically, there seem to be no sudden changes in the land snail fauna: Helicidae and *Xeropicta vestalis* are present in all periods. *Cecilioides tumulorum* was found only in the Bronze and Iron Age levels.

Given the continuity of the terrestrial species, the environment on and near Kilise Tepe does not seem to have undergone dramatic changes during the relatively long occupation sequence of the site and was similar to that of the present day. Generally, the snails are indicative of an open, lowland area with a relatively dry climate under the influence of the Mediterranean (Cook 1997: 412–14; Schütt 2001: 449; Ümit Kebapçi, personal communication). This interpretation corresponds to the results from the archaeo-botanical analysis which also shows that the environmental conditions of the area have not changed much since the Early Bronze Age (Bending, Colledge 2007: 594).

Freshwater sources and environment

Like the terrestrial snails, the freshwater molluscs show a clear continuity: Melanopsidae and Unionidae are represented throughout the sequence. The Kurtsuyu and Göksu rivers seem the logical source of these freshwater shells. Yet, the identified species partly contradict this hypothesis.

The natural habitats of *Melanopsis praemorsa* are permanent, well-oxygenated water sources (Ridout-Sharpe 1998: 349). Earlier, I noted that the shells of this species excavated at Kilise Tepe all have a smooth surface, and that this trait seems to be a habitat indicator. This idea is based on a small survey conducted in the summer of 2006, during which live specimens of *Melanopsis praemorsa* were collected from the Göksu and Kurtsuyu rivers, as well as from two natural springs in the direct vicinity of Kilise Tepe. Individuals from the rivers were clearly distinct from specimens from the springs by the sculpture of their shell surface: all the riverine *Melanopsis* were radially ribbed, while the ones from the springs had a perfectly smooth shell. Consequently, it is reasonable to assume that the smooth-surfaced *Melanopsis praemorsa* excavated at Kilise Tepe do not originate from one of the nearby rivers, but from natural springs.

As for the freshwater mussels, *Unio mancus* lives in sand and mud bottoms of waters which are stagnant or have a weak current (Cossignani, Cossignani 1995: 152). Since there are no indications for the presence of a lake close to Kilise Tepe, the Unionidae probably originate from weakly-flowing parts of the Kurtsuyu and Göksu rivers, or from irrigation channels.

Marine sources and environment

On a site as far from the sea as Kilise Tepe marine molluscs will have been brought in by humans. All of the identified marine species in this study live in the Turkish littoral waters of the Mediterranean Sea today (Demir 2003; personal observation). Presumably this was the case in antiquity as well. Consequently, the Mediterranean can be considered as the source of Kilise Tepe's marine shell material.

Most species originate from sandy shores; only limpets (Patellidae), top shells (Trochidae), cowries (Cypraeidae), dove shells (Columbellidae) and cones (Conidae) are inhabitants of rocky habitats (Poppe, Goto 1991; 1993; personal observation). This suggests that molluscs were collected from a stretch of coast where sandy beaches alternated with rocks. This description corresponds to the present environment of the Mediterranean shore adjacent to the Göksu delta. The estuary itself consists of sandy beaches and wetlands with salt and freshwater lakes. Since the Göksu river flows past Kilise Tepe and its valley provides an important route from the Mediterranean coast to the Anatolian plateau, it is indeed very likely that Kilise Tepe's marine shells originate from the estuary of this river and its neighbouring shores. The delta itself must have been littered with cockles (*Cerastoderma glaucum*), as is the case today, while the sandy beaches and rocky shores further to the northeast and southwest supplied the other marine molluscs. The question of whether the inhabitants of Kilise Tepe gathered these molluscs themselves or obtained them through exchange or trade will be considered below.

Intentional or accidental? The use of molluscs

Terrestrial molluscs

Kilise Tepe's land snails can be considered as natural inhabitants of the site and its surroundings. There are no indications that their shells were used or worked, nor that their flesh was eaten. Although *Helix*, commonly known as 'escargots', are edible (Bar 1977; Mienis 1985; Yıldırım et al. 2004), they were not consumed by the inhabitants of Kilise Tepe, at least not in the settlement itself. This is shown by the lack of concentrations of discarded shells: Helicidae occur singularly or in very low quantities – nine shells maximum per context.

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

Freshwater molluscs

With 2,105 specimens, *Melanopsis praemorsa* constitutes 63.1% of the entire identified shell assemblage and is therefore the most frequent mollusc at Kilise Tepe. Although this freshwater snail is not known as an edible species, consumption is a possible explanation for its predominance, given the occurrence of a few large concentrations in the Hellenistic to Byzantine levels (see above). However, a more probable hypothesis, at least for the more scattered material, is that the snails were brought to the settlement unintentionally whilst bringing in water, plants, rocks or clay from the water bodies in which they lived naturally.

The second group of freshwater molluscs, mussels of the family Unionidae, are far lower in number than *Melanopsis*. The 218 specimens represent a MNI of only 27. Freshwater mussels are edible, but the fragmented state and low frequency of their shells at Kilise Tepe argue against use as a food item. On the other hand, there are indications that at least some of the freshwater mussels served a specific purpose. Twelve specimens had damaged or worn-down margins, which suggests use as a tool, probably a scraper (fig. 2). It is interesting to note that all examples were found in Late Iron Age levels, more specifically in the two concentrations of mussel shell mentioned previously; i.e. 103 specimens in a packing deposit (unit 2378) and 53 specimens in occupation surfaces in a room (unit 2394). Of the finds from unit 2378 five complete valves, two broken ones and three fragments showed macroscopic traces of use wear. One complete and one broken valve from unit 2394 seem to have been used as tools. Although the numbers are too low for firm conclusions, the results are summarised in table 3. No specific wear pattern could be distinguished, although the users seem to have had a slight preference for left valves.[1]

Similar tools, also from freshwater mussels, have been found at Körtepe (early Chalcolithic) and Tülintepe (Chalcolithic and Early Bronze Age), both situated in the Altınova region of eastern Anatolia (Boessneck, von den Driesch 1976: 174; von den Driesch 1976: 36). Examples have also been identified at Late Chalcolithic and Early Bronze Age Hassek-Höyük in southeastern Turkey (Boessneck, von den Driesch 1981: 89; Boessneck 1992: 61). Furthermore, I have identified eight scrapers of *Unio tigridis* valves among excavated material from Chalcolithic Telul eth Thalathat II (northern Iraq), currently stored at Tokyo University Museum.

	Left valve	Right valve	Total
Wear anterior	3	1	**4**
Wear posterior	2	3	**5**
Wear anterior and posterior	2	0	**2**
Total	**7**	**4**	**11**

Table 3. Wear patterns on freshwater mussel tools (note: one worn specimen is not included in the table, since it is not possible to determine whether it is a left or a right valve)

Lammers-Keijsers (2008) has shown, by means of experiments on Caribbean material, that bivalve shells are suitable tools for a variety of purposes. They can be used to process plants, de-bark wood, scrape flesh from hides, decorate leather-hard clay or descale fish. They are, however, ineffective for fine woodworking and the working of hard materials, such as bone. In addition to her experimental research, Lammers-Keijsers has conducted use-wear analysis on shell tools from two sites on Guadeloupe and proved that traces of wear are preserved on shell artefacts. It would be interesting to perform a similar study on the freshwater mussel tools from Kilise Tepe and thus shed light on their precise function.

Marine molluscs

Kilise Tepe is an inland site, so marine molluscs were introduced by humans. Given the long period of occupation, the 205 marine molluscs are too low in number to consider them as regular trade or exchange items. In fact it is more likely that they are the remnants of occasional trips to the seashore that were undertaken by the inhabitants of the mound themselves. The site is about 50km, as the crow flies, from the Mediterranean coast near the Göksu delta, so it was possible to go there on foot, although this journey would have taken at least two days. The rich biodiversity of the estuary may have been one reason for making the trip. The study of the fish remains of Kilise Tepe reveals that, in addition to local freshwater species, marine and estuarine fish were occasionally part of the menu (Van Neer, Waelkens 2007: 610).

Among the identified marine molluscs, many edible species are present: all the bivalves and the gastropods *Phalium* sp., *Columbella rustica*, *Conus mediterraneus*, *Bolinus brandaris*, *Hexaplex trunculus*, *Patella caerulea*,

[1] The valves of Unionidae – and most other bivalves – are each other's mirror image, thus ensuring perfect closing. This means that each shell consists of a left valve and a right valve. When a valve is laid flat on a table with the outer surface visible and the umbo upward, the anterior margin – toward which the umbo is directed – is to the left on a left valve and to the right on a right valve. The umbo is the protruding part of the shell that was formed when the animal was a juvenile.

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

Charonia sp. and *Osilinus turbinatus* (based on the database of edible molluscs on the website 'Man and Mollusc' – http://www.manandmollusc.net/molluscan_food_files/molluscan_food_mp.html#table). However, 'edible' does not necessarily mean that they were actually consumed. Since no middens have thus far been found at Kilise Tepe, there is no evidence of the consumption of marine molluscs, at least not in the settlement itself. Marine shells occur singularly or in very low quantities – six shells maximum per context. Furthermore, it is clear that several of the edible specimens were dead when they were collected on the beach, thus inedible. This is shown by the worn and abraded state of their shells, caused by the effects of wind, water, sand and/or marine organisms. This is the case for most of the *Bolinus brandaris* (n=3), half of the *Hexaplex trunculus* (n=2) and a few *Cerastoderma glaucum* (n=3), Glycymerididae (n=10), *Conus mediterraneus* (n=1), *Nassarius gibbosulus* (n=1) and *Phalium* sp. (n=2). Further examples of dead-collected molluscs are three valves of *Glycymeris violacescens* with drill holes of predator gastropods, of which two also had naturally abraded margins.

So if not for food, why were marine shells brought to Kilise Tepe? I propose that they were no more than souvenirs taken home after a trip to the sea. Taking into account the long period of occupation at the site, the marine shells are too few and too scattered to indicate systematic use of any kind. Nonetheless, 33 of these souvenirs were attractive and/or meaningful enough to their holder to be worn as ornaments.

First, the material from Kilise Tepe contains a few examples of possible blanks for ornaments, i.e. two highly polished fragments of *Glycymeris* sp. An example of a finished man-made ornament is a specimen of *Conus mediterraneus* with its apex holed by grinding. Its whorls seem to have been accentuated by polishing. Holed *Conus* have also been excavated at Neolithic Çatalhöyük (Reese 2005: 125) and Early Bronze Age Kurban Höyük (Reese 1990: 411, 413).

Other ornaments from Kilise Tepe are lips of *Phalium* sp., two specimens of which were found, both naturally abraded. Such fragments of the aperture of helmet shells frequently occur among archaeological assemblages from the Mediterranean and Near East. The occurrence of holes indicates that some lips were worn as ornaments; unholed specimens may have been tied to strings (Reese 1989: 38).

Among the finds from Kilise Tepe many pierced shells are also identified as ornaments, such as the holed Muricidae (n=3) (fig. 3) and Nassariidae (n=11) (fig. 4). They have a hole opposite the aperture of the shell, which makes them suitable for threading. The same applies to the bivalves with holed umbos: Cardiidae (n=3) (fig. 5) and Glycymerididae (n=11) (fig. 6). It is difficult to determine whether the holes were man-made or accidental. Artificially created examples include three Glycymerididae with ground umbos and one Cardiid that seems to have been broken as a result of the piercing process. The holes in the other shells were possibly created by natural agents, but even if this is the case, this does not contradict their possible use as ornaments. Empty shells may even have been picked up from the beach because they already had a hole. In addition to this, it is notable that several of the Glycymerididae had abraded margins (n=12). Although one would be inclined to interpret these shells as artificially shaped specimens, it is more probable that the abrasion is due to beach wear, with the exception of one specimen, the margins of which were deliberately polished in a round shape.

Holed shells of the above species are regularly found at archaeological sites in Anatolia, as illustrated by the following examples. At Neolithic Beşik-Sivritepe holed *Glycymeris* sp. have been excavated (Boessneck 1986: 332). Holed *Nassarius gibbosulus*, *Bolinus brandaris*, *Hexaplex trunculus* and Cardiidae have been found at Neolithic Çatalhöyük (Reese 2005: 124–26). At Kurban Höyük holed *Cerastoderma* sp. and *Glycymeris* sp. have been excavated from Early and Middle Bronze Age levels (Reese 1990: 411–12). Holed *Nassarius gibbosulus* were present at Beycesultan in the Middle Bronze Age (Mellaart, Murray 1995: 191). Holed examples of *Nassarius* cf. *gibbosulus*, *Cerastoderma glaucum* and *Glycymeris* sp. have been found in Hittite to Roman-Byzantine levels at Alişar Hüyük (Gries 1937). A *Bolinus brandaris* with two holes has been found at Hittite Boğazköy (Vogel 1952: 152). At late Roman Sagalassos a pierced *Cerastoderma glaucum* has been found (De Cupere 2001: 13).

One specific context at Kilise Tepe suggests that shell ornaments were not only appreciated for their aesthetic appeal, but also for their symbolic value. In the fill behind the altar in the Level IIc Stele Building of about 1200 BC (unit 6209) marine shell ornaments were found in association with astragali, and clay and stone beads (Postgate, Thomas 2007b: 125). The shell beads were a holed *Bolinus brandaris* (fig. 3, right specimen) and a holed *Glycymeris* sp. (fig. 6, upper row, second specimen from the left).

Table 4 shows the chronological distribution of the shell ornaments from dated contexts. Looking at the chart, a few interesting patterns emerge – the increase of holed Glycymerididae over time, the abundance of holed Nassariidae in the Middle and Late Bronze Age, and the presence of holed Muricidae in Iron Age levels only. These patterns, however, are based on very low quantities of shells; an insufficient basis for firm conclusions.

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

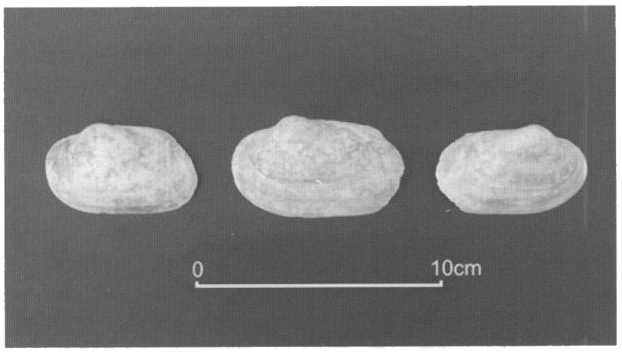


Fig. 2. Scrapers of freshwater mussel shells

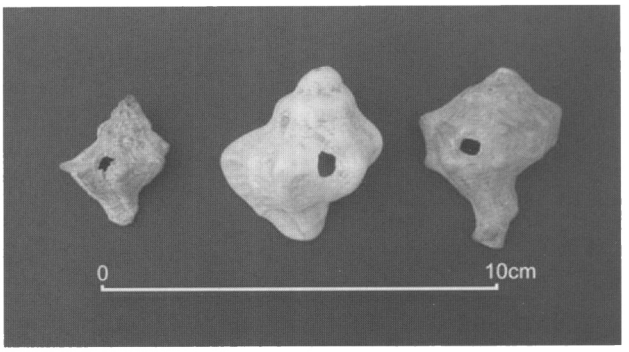


Fig. 3. Holed Muricidae

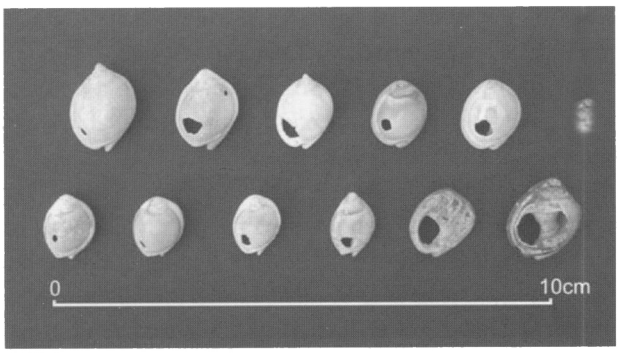


Fig. 4. Holed Nassariidae

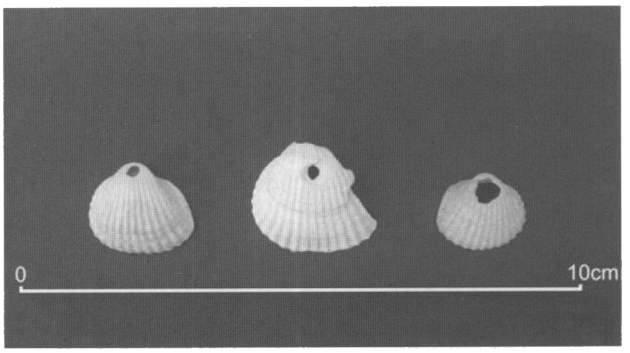


Fig. 5. Holed Cardiidae

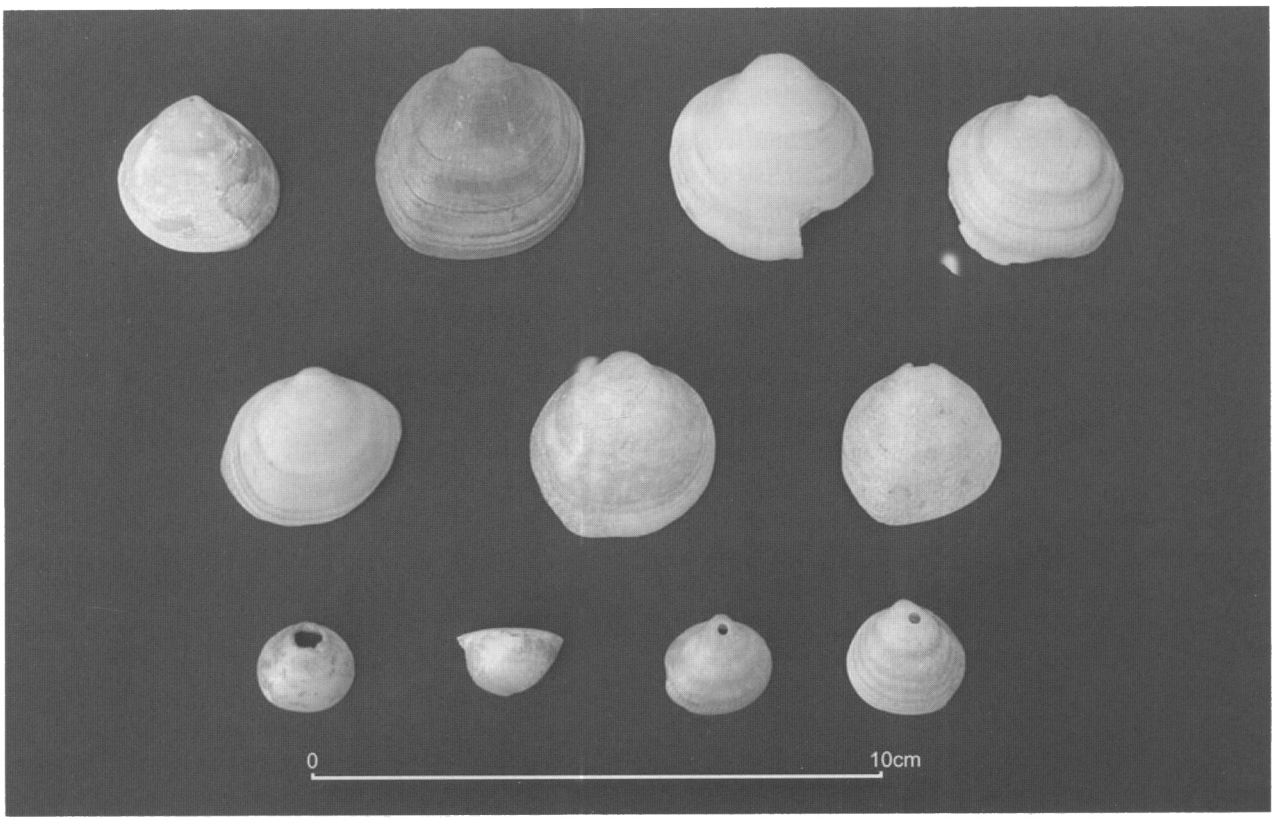


Fig. 6. Holed Glycymerididae

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

	EB	MB/ LB	IA	Hell/ Rom/ Byz	Total
Holed Muricidae	-	-	3	-	**3**
Holed Nassariidae	1	6	2	1	**10**
Holed Cardiidae	-	2	-	-	**2**
Holed Glycymerididae	1	2	3	3	**9**
Holed Conidae	-	1	-	-	**1**
Polished fragments	-	-	2	-	**2**
Cassid lips	-	1	-	-	**1**
Total	**2**	**12**	**10**	**4**	**28**

Table 4. Distribution of the shell ornaments by occupation phase (note: the table lists only the 28 ornaments that could be dated, out of a total of 33)

Conclusions

Excavations at Kilise Tepe from 1994–1998 yielded molluscan remains of terrestrial, freshwater and marine origin. The snails of the first category represent local fauna that naturally inhabited the site's surroundings and less-populated areas of the mound itself. The identified species suggest that the environment consisted of an open, lowland area with a relatively dry climate under the influence of the Mediterranean.

The second group, the freshwater molluscs, originates from different ecological niches in the vicinity of the site: natural springs on the one hand and weakly-flowing parts of the river or irrigation channels on the other hand. While the freshwater snails were probably introduced unintentionally while bringing in water, plants, rocks or clay, some of the freshwater mussels served a practical purpose as tools, possibly scrapers.

The marine molluscs are the least represented, but by far the most diverse category. The most likely source of these shells is the Mediterranean shore adjacent to the Göksu delta and the delta itself. Many of the seashells were worn as ornaments.

Two topics deserve further study. The first is the presence of shell in pottery fabrics, as visible in thin sections (Knappett 2007). Through microscopic analysis it might be possible to determine whether the shell inclusions are of terrestrial, freshwater or marine origin. Are they the remnants of molluscs that naturally occurred in the clay (or body of water from which the clay was taken) or were they added intentionally as a temper? Secondly, it would be interesting to perform use-wear analysis on the freshwater mussel tools.

Acknowledgements

First of all, I am indebted to Nicholas Postgate (University of Cambridge), joint director of the Kilise Tepe project, for allowing me to study the shells and for making my research at Silifke Museum possible. In this respect I would also like to thank the McDonald Institute for Archaeological Research and Trinity College, both part of the University of Cambridge, for providing the funds for my stay in Turkey, and İlhame Öztürk, director of Silifke Museum and joint director of the Kilise Tepe project, for giving me permission to study the material and for being so kind as to lend me the museum's digital camera. I would also like to take this opportunity to thank Yakop Kahveci, the owner of the Yaka Hotel in Kızkalesi, for allowing me to boil freshwater snails in the hotel kitchen.

In addition, Sarah Blakeney should not be forgotton. During a study season at Silifke Museum in 1999 she composed a reference collection of the shell material on the basis of morphological characteristics, thus laying the foundation of this analysis. Further, I would like to express my sincere gratitude to Takenori Sasaki (Tokyo University Museum) for guiding my first steps in malacology. I also wish to thank Aydın Örstan (Carnegie Museum of Natural History), Zeki Yıldırım (Süleyman Demirel University) and Ümit Kebapçi (Süleyman Demirel University) for helping me with the identification of the land and freshwater species. Furthermore, I am grateful to Wim Van Neer and Bea De Cupere (both from the Royal Belgian Institute of Natural Sciences) for providing me with useful information on the molluscan remains of Sagalassos. Yoshi Nishiaki (Tokyo University Museum) should be thanked for giving me permission to mention the finds from Telul eth Thalathat. Finally, I would like to thank David Thomas (La Trobe University) and Marc Verhoeven for commenting on previous drafts of this article.

Bibliography

Bar, Z. 1977: 'Human consumption of land snails in Israel' *Basteria* 41: 53–58

Bending, J., Colledge, S. 2007: 'Chapter 49. The archaeobotanical assemblages' in N. Postgate, D. Thomas (eds), *Excavations at Kilise Tepe 1994–1998. From Bronze Age to Byzantine in Western Cilicia* (British Institute at Ankara Monograph 30). Cambridge: 583–95

Boessneck, J. 1986: 'Die Weichtieresser vom Beşik-Sivritepe' *Archäologischer Anzeiger* 1986/3: 329–38

— 1992: 'Besprechung der Tierknochen- und Molluskenreste von Hassek Höyük' in M.R. Behm-Blancke (ed.), *Hassek Höyük. Naturwissenschaftliche Untersuchungen und lithische Industrie* (Istanbuler Forschungen 38). Tübingen: 58–74

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

Boessneck, J., von den Driesch, A. 1976: 'Addendum II. Die Tierknochenfunde aus den Ausgrabungen von 1971 und 1972 auf dem Tülintepe' in *Keban Projesi 1972 Çalışmaları / Keban Project 1972 Activities* (Orta Doğu Teknik Üniversitesi Keban Projesi Yayınları / Middle East Technical University Keban Project Publications 1/5). Ankara: 173–74

— 1981: 'Tierknochen vom Hassek-Höyük' *Istanbuler Mitteilungen* 31: 88–90

Collon, D. 2007: 'Chapter 43. Fossils' in N. Postgate, D. Thomas (eds), *Excavations at Kilise Tepe 1994–1998. From Bronze Age to Byzantine in Western Cilicia* (British Institute at Ankara Monograph 30). Cambridge: 541–43

Collon, D., Symington, D. 2007: 'Chapter 38. Beads' in N. Postgate, D. Thomas (eds), *Excavations at Kilise Tepe 1994–1998. From Bronze Age to Byzantine in Western Cilicia* (British Institute at Ankara Monograph 30). Cambridge: 499–503

Cook, L.M. 1997: 'Geographic and ecological patterns in Turkish land snails' *Journal of Biogeography* 24: 409–18

Cossignani, T., Cossignani, V. 1995: *Atlante delle conchiglie terrestri e dulciacquicole italiane.* Ancona

De Cupere, B. 2001: *Animals at Ancient Sagalassos. Evidence of the Faunal Remains* (Studies in Eastern Mediterranean Archaeology 4). Turnhout

Demir, M. 2003: 'Shells of mollusca collected from the seas of Turkey' *Turkish Journal of Zoology* 27: 101–40

Gries, P. 1937: 'Shells' in H.H. von der Osten, W.M. Krogman, *The Alishar Hüyük. Seasons of 1930–32* (The University of Chicago Oriental Institute Publications 30 / Researches in Anatolia 9). Chicago: 324–27

Knappett, C. 2007: 'Chapter 22. Detailed fabric descriptions' in N. Postgate, D. Thomas (eds), *Excavations at Kilise Tepe 1994–1998. From Bronze Age to Byzantine in Western Cilicia* (British Institute at Ankara Monograph 30). Cambridge: 273–93

Lammers-Keijsers, Y. 2008: *Tracing Traces from Present to Past: A Functional Analysis of Pre-Columbian Shell and Stone Artefacts from Anse à la Gourde and Morel, Guadeloupe, FWI* (Archaeological Studies Leiden University 15). Leiden

Mellaart, J., Murray, A. 1995: *Beycesultan. Vol. 3. Part 2. Late Bronze Age and Phrygian Pottery and Middle and Late Bronze Age Small Objects* (British Institute of Archaeology at Ankara Occasional Publications 12). London

Mienis, H.K. 1985: 'Enkele verdere gegevens betreffende de consumptie van landslakken in Israel' *Correspondentieblad van de Nederlandse Malacologische Vereniging* 225: 63–65

Poppe, G.T., Goto, Y. 1991: *European Seashells. Volume I. (Polyplacophora, Caudofoveata, Solenogastra, Gastropoda).* Wiesbaden

— 1993: *European Seashells. Volume II. (Scaphopoda, Bivalvia, Cephalopoda).* Wiesbaden

Postgate, N. 2007a: 'Chapter 1. Introduction to the project and the publication' in N. Postgate, D. Thomas (eds), *Excavations at Kilise Tepe 1994–1998. From Bronze Age to Byzantine in Western Cilicia* (British Institute at Ankara Monograph 30). Cambridge: 3–8

— 2007b: 'Chapter 2. The site of Kilise Tepe' in N. Postgate, D. Thomas (eds), *Excavations at Kilise Tepe 1994–1998. From Bronze Age to Byzantine in Western Cilicia* (British Institute at Ankara Monograph 30). Cambridge: 9–13

Postgate, N., Thomas, D. (eds) 2007a: *Excavations at Kilise Tepe 1994–1998. From Bronze Age to Byzantine in Western Cilicia* (British Institute at Ankara Monograph 30). Cambridge

— 2007b: 'Chapter 13. Level II: the end of the Bronze Age and the Iron Age' in N. Postgate, D. Thomas (eds), *Excavations at Kilise Tepe 1994–1998. From Bronze Age to Byzantine in Western Cilicia* (British Institute at Ankara Monograph 30). Cambridge: 121–64

Reese, D.S. 1989: 'On Cassid lips and helmet shells' *Bulletin of the American Schools of Oriental Research* 275: 33–39

— 1990: 'Marine and worked shells' in G. Algaze (ed.), *Town and Country in Southeastern Anatolia. Vol. II: The Stratigraphic Sequence at Kurban Höyük* (The University of Chicago Oriental Institute Publications 110). Chicago: 410–16

— 2005: 'Chapter 6. The Çatalhöyük shells' in I. Hodder (ed.), *Inhabiting Çatalhöyük: Reports from the 1995–99 Seasons* (Çatalhöyük Research Project 4 / British Institute at Ankara Monograph 38). Cambridge: 123–27

Ridout-Sharpe, J. 1998: 'Chapter 24: The Mollusca' in E. Peltenburg (ed.), *Excavations at Kissonerga-Mosphilia, 1979–1992* (Lemba Archaeological Project, Cyprus 2.1B, Department of Archaeology Occasional Paper 19). Edinburgh: 338–51 http://www.arcl.ed.ac.uk/arch/publications/cyprus/kissonerga/

Riedel, A. 1996: 'The Zonitidae sensu lato of Turkey. A distribution analysis (Gastropoda: Stylommatophora)' *Malakologische Abhandlungen* 18/1: 1–24

Schütt, H. 1983: 'Die Molluskenfauna der Süßwässer im Einzugsgebiet des Orontes unter Berücksichtigung benachbarter Flußsysteme' *Archiv für Molluskenkunde* 113, 1/6: 17–91

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press

— 2001: *Die türkischen Landschnecken* (Acta Biologica Benrodis Supplementband 4). Solingen

Van Neer, W., Waelkens, M. 2007: 'Chapter 51. Fish remains from Bronze Age to Byzantine levels' in N. Postgate, D. Thomas (eds), *Excavations at Kilise Tepe 1994–1998. From Bronze Age to Byzantine in Western Cilicia* (British Institute at Ankara Monograph 30). Cambridge: 607–12

Vogel, R. 1952: '11. Reste von Jagd- und Haustieren' in K. Bittel, R. Naumann, *Boğazköy-Hattuša. Ergebnisse der Ausgrabungen des Deutschen Archäologischen Instituts und der Deutschen Orient-Gesellschaft in den Jahren 1931–1939. I. Architektur. Topographie. Landeskunde und Siedlungsgeschichte.* Stuttgart: 128–53

von den Driesch, A. 1976: 'Addendum. Zu den Tierknochenfunden vom Körtepe' in *Keban Projesi 1972 Çalışmaları / Keban Project 1972 Activities* (Orta Doğu Teknik Üniversitesi Keban Projesi Yayınları / Middle East Technical University Keban Project Publications 1/5). Ankara: 35–39

Yıldırım, M.Z., Kebapçi, Ü., Gümüş, B.A. 2004: 'Edible snails (terrestrial) of Turkey' *Turkish Journal of Zoology* 28: 329–35

https://doi.org/10.1017/S0066154600001071 Published online by Cambridge University Press