



### PARİON STUDIES III

# Propontis ve Çevre Kùltürleri Propontis and Surrounding Cultures

Yayına Hazırlayan  
VEDAT KELEŞ

# Trade of Terracotta Water Pipes in the Propontis Region: Parion Example

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**Abstract:** Propontis (Sea of Marmara), by being located between the Aigaion Pelagos (Aegean Sea) and Euxinos Pontos (Black Sea) as the Hellespontos and Bosphorus, is considered as a “mid sea”. And as a result of its geographic situation, holds a significant place for the trade between the Aigaion Pelagos (Aegean Sea), Pontus Euxinos and further regions. Important information regarding the trade conducted and the traded goods in this sea is gained from ancient sources as well as shipwrecks belonging to trade vessels. In the waters between the ancient cities of Parion (Kemer) and Priapos (Karabiga) located on the southern shores of the Propontis fishers (and previously sponge divers) are known to have come across historical artifacts under the sea and in some circumstances to have taken these artifacts. These items are sometimes reported to the museums or to nearby excavations. Among these shipwreck finds, terracotta water pipes from the antiquity are known to exist. This presentation’s objective is to present a detailed depiction of these terracotta water pipes which are a proof of the trade for these items in Propontis.

**Keywords:** Parion, Propontis, Shipwreck, Terracotta Water Pipe, Trade

## Introduction

Ancient sources mention water to be conveyed by masonry channels and tunnels (*canales structiles*) as well as lead pipes (*fistulis plumbeis*), wooden pipes (*canales lignei*) or terracotta pipes (*tubulis fictilibus*)<sup>1</sup>. Information gained through ancient sources regarding conveying water is attested through archaeological evidences<sup>2</sup>. The resources used for the forming of the aqueduct for water conveyance is observed to have changed and diversified depending on technology throughout the ages.

## Terracotta Pipes

Terracotta pipes are mentioned by ancient sources to be easier and cheaper in implementation<sup>3</sup>. Vitruvius, Columella and Palladius mention the water conveyed by clay pipes to taste better and to be healthier than their lead counterparts<sup>4</sup>. In this scope Vitruvius, explains as<sup>5</sup> “... *That the taste is better when it comes from clay pipes may be proved by everyday life, for though our tables are loaded with silver vessels, yet everybody uses earthenware for the sake of purity of taste* ...”. While Columella<sup>6</sup> mentions as “... *rain water is*

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<sup>1</sup> Palladius, IX.11.1; Plato, 6.761a-c; Plinius, XVI.81, XXXI.31; Vitruvius, VIII.6.1.

<sup>2</sup> Landels 2000, 37; Hodge 2002, 106, 112.

<sup>3</sup> Palladius, IX.11.1; Plinius, XXXI.31; Vitruvius, VIII.6.8, 10.

<sup>4</sup> Columella, I.5.2; Palladius, IX.11.2-3; Vitruvius, VIII.6.8, 10-11.

<sup>5</sup> Vitruvius, VIII.6.11.

<sup>6</sup> Columella, I.5.2.

*after all most suitable for the body's health, and is regarded as uncommonly good if it is conveyed through earthen pipes ...".*

Regarding the placing and laying of terracotta pipes; Vitruvius, mentions terracotta pipes of at least two *digiti* (3,7 cm) thick and having one tongued end to fit into the joining pipe to be used. He also adds, their joints to be sealed with a mixtures of quicklime and oil<sup>7</sup>.

Plinius, explains the cheapest way of conveying water from the source is by forming an aqueduct by the utilizing of terracotta pipes of at least two *digiti* thick. He also explains the pipe with higher inclination to be fitted into the lower, and the joints to be coated with a sealant produced with quicklime macerated in oil<sup>8</sup>.

Palladius, mentions the pipes of two *digiti* thick and narrow on one end to allow inserting one to another and the joints to be plastered with quicklime mixed with oil<sup>9</sup>.

Sealing the joints of terracotta pipes with a sealant paste produced by quicklime and oil (olive oil) mentioned by ancient sources is observed through many excavations<sup>10</sup>. Archaeological data from Ephesos, reveals the oil in the sealant paste to be olive oil<sup>11</sup>. Olive oil, having water repellent features was a material which was easily procured throughout the Greek and Roman Worlds during antiquity.

## Production and Selection

Approaching terracotta water pipes typologically, they are observed to have a narrow mouth, oposing this mouth the base and the related footing where another pipe would be inserted is found. Terracotta pipes are known to be produced on the potter's wheel and the footing of the pipe is also the base where they stand on the potter's wheel. The production on the potter's wheel also limits their length to 40-70 cm<sup>12</sup>.

In regards to the information presented production of terracotta pipes have three essential requirements;

1. Technical infrastructure or workshop
2. Artisan population of required qualification
3. Resources of sufficient quantity and quality

Without fulfilling the aforementioned three essential requirements, it can be stated that the production of terracotta water pipes would not be possible. Considering these essentials they are observed to be mutual with pottery production, therefore it can be stated that all cities which produce pottery can also be producers of terracotta pipes. Regarding settlements which do not fulfill the essentials for production, the words of Vitruvius<sup>13</sup> "*Clay pipes for conducting water have the following advantages. In the first place, in construction: if anything happens to them, anybody can repair the damage*" should be considered. Because in contrast to terracotta pipes, lead pipes require different stages of essential elements; labourous mining, expertise casting and welding for the gathering of resources and preparing as well as the laying of pipes. When lead pipes which are more expensive and troublesome in the scope of production and application, are compared with their terracotta counterparts, the chosing of the latter is evident. Furthermore lead is known to be harmful to the human body<sup>14</sup>. Lead pipes, are understood to be reserved for applications where great tensile strength was required or areas where would not be convenient by being inaccessible for frequent repairs<sup>15</sup>. In regards of choosing between different water conveyances, Romans are known to have preferred to terracotta pipes, being second only to masonry conduits<sup>16</sup>.

<sup>7</sup> Vitruvius, VIII.6.8.

<sup>8</sup> Plinius, XXXI.31.

<sup>9</sup> Palladius, IX.11.1-2.

<sup>10</sup> Hodge 2002, 113-115, fn. 43, 47.

<sup>11</sup> Forchheimer 1923, 253-254; Özağaçlı 1995, 5, fn. 15-16.

<sup>12</sup> Landels 2000, 44; Hodge 2002, 113.

<sup>13</sup> Vitruvius, VIII.6.10.

<sup>14</sup> Landels 2000, 42; Hodge 1981, 487; Hodge 2002, 308.

<sup>15</sup> Hodge 2002, 311-315.

<sup>16</sup> Hodge 2002, 113.

Lead poisoning<sup>17</sup>, mentioned by ancient sources should be noted as not for lead (*plumbum*) but for white-lead (*cerussa*) which is yielded during the welding of lead and the noxious fumes which diffuse to the human body<sup>18</sup>. Therefore the people who were poisoned through lead would be the *plumbarii*, or the pipe welders<sup>19</sup>. The major reason for the choosing of terracotta over lead should be seen as ease of application and production, rather than the taste factor mentioned by Vitruvius<sup>20</sup>.

## Terracotta Pipes as a Commercial Commodity

Considering the essential requirements for the production of terracotta pipes support the reputed notion of local production<sup>21</sup>. Nevertheless, judging the presence of a workshop, craftsman and resources the production errand can be thought as an industry, overseeing to supply the demand and doing so any surplus would be stock having a commercial potential. In settlements where large scale construction works (e.g. aqueducts)<sup>22</sup> are conducted, the settlements industry might not be sufficient to supply the demand, effecting the execution of the project in time. Such event would mean that, settlements and cities would rely on the industry of others by the means of trading.

Terracotta pipes, are usually not regarded among primary archaeological materials, mostly secondary. This condition of pipes and other “secondary materials”, results in their existence to be overlooked or even ignored. Terracotta water pipes, terracotta roof tiles, etc. “secondary materials” should be evaluated within the context of their beholding structure as well as the city’s certain industrial and commercial contexts. Settlements lacking the industry or having an insufficient production quantity to supply a great construction project would have to resort to import from other cities as they would with “primary materials”.

Some archaeological examples reveal terracotta pipes to not be locally produced. First of these examples is among the pipes of Ephesos and Miletos, where the two cities were using a common or shared workshop<sup>23</sup>. Second would be the shipwreck of *Yalıkavak III* “Pipe Wreck” from the Bodrum Peninsula. *Yalıkavak III wreck* is stated to have a cargo which is scatter to an area of 20 m<sup>2</sup> composed of a terracotta water pipes in majority with amphorae dating to 2<sup>nd</sup>-5<sup>th</sup> centuries AD<sup>24</sup>.

The final example for terracotta water pipes being transported between cities as a result of trade was found close by to Parion. This example being a find group was found on land not being *in-situ* had clearly come from the deep sea due to the sea growth over it. The find was a slightly damaged bundle of terracotta water pipes composed as 4 x 3 revealing the bundle to have accommodated at least 12 pipes. The sea growth combining the bundle together as a whole has preserved the bundle until it was damaged by the nets of fishing vessels. The bundle of pipes was most likely the cargo of a trade vessel during antiquity, and the bundle is related to the emplacement of the cargo to the vessel. Although there has been some technical problems during the documentation of the terracotta pipes which later vanished, discovery of another find group forming another bundle is of uttermost importance.

This second bundle consists of superimposed 7 roof tiles<sup>25</sup> which were combined by sea growth (Fig. 1-2). The convex roof tiles measure 70 x 35 x 2 cm, and similar examples from the Southern (Tavşandere) Necropolis of Parion are dated to the 1<sup>st</sup>-2<sup>nd</sup> centuries AD<sup>26</sup>. Judging that both finds were located side by side they

<sup>17</sup> Most of lead poisoning is stated to be caused by lead based glazes on pottery used to consume drink especially wine which lead diffuses into with great ease (Hodge 1981, 486-481, fn. 9,29; Hodge 2002, 308 fn. 12; Vitruvius, VIII.6.11).

Another interesting fact would be the analyses conducted in the sediments of the sewers of ancient Rome itself, where lead amounts measured would be unharmed to the human body (Delile et al. 2014, 6594-6598).

<sup>18</sup> Hodge 1981, 486; Vitruvius, VIII.3.18, VIII.6.10-11.

<sup>19</sup> Vitruvius, VIII.6.11.

<sup>20</sup> Vitruvius, VIII.6.9-11.

<sup>21</sup> Özağaçlı 1995, 121.

<sup>22</sup> The aqueduct of Pergamon is known to have used 200.000 terracotta pipes (Hodge 2002, 114, fn. 45).

<sup>23</sup> Özağaçlı 1995, 120-121.

<sup>24</sup> Köybaşıoğlu 2009, 140; Brennan et al. 2011, Fig. 1; Brennan et al. 2012, 60, Tab. 1.

<sup>25</sup> Roof tiles are known to be traded during the Archaic Period (Greaves 2010, 135).

<sup>26</sup> Kasapoğlu 2015, 127-131, Pic. 164-165, 169.



were most likely fetched by the same fishing vessel and net, which could hint to them belonging to the same shipwreck.

Significantly the Parion find, although damaged reveal their bundle features. The depredation caused to both shipwrecks (Yalıkavak and Parion) is due to bottom trawling which is the greatest cause of damages caused to ancient shipwrecks<sup>27</sup>.

## Conclusion

With evidences of shipwreck finds terracotta water pipes and terracotta roof tiles can be stated to be commercial commodities in the Propontis Region as well as other regions and seas. Additionally, clay features and forms of some Parion pipes<sup>28</sup> have similarities with Pergamon<sup>29</sup> and Ephesos<sup>30</sup>. These similarities might be hinting to a wide spread trade of terracotta pipes. Regarding the similarities of Parion pipes to Pergamon pipes it should be noted that Parion was under the rule of the Attalid Kings of Pergamon during the late 3<sup>rd</sup>-late 2<sup>nd</sup> centuries BC and the city was favoured by the Pergamonese<sup>31</sup>. This outcome of this relation can be supported by the building of the monumental Hermokreon Altar in Parion during the reign of II. Eumenes<sup>32</sup>, and some of the lands of Priapos being given to Parion<sup>33</sup>. In the scope of Parion-Pergamon relations, they are observed to have continued during the Roman Age; Parion's Roman Imperial Age coins are known to have been found in Allianoi<sup>34</sup> and Pergamon's Roman Imperial Age coins are known to have been in Parion<sup>35</sup>.

Primary or secondary; all materials, needs of human kind were supplied on demand either by the local industry or other industries by trade. And trade would be in various forms; for antiquity being in land and sea. Transporting these items can easily be identified in sea routes of trade via shipwrecks. Though the transport on land would be impossible to be identified by archaeological finds, the only possibility would be epigraphical records of such transport for trade. Therefore, one can think the overlooking as "secondary material" might be a concept from antiquity.

<sup>27</sup> Brennan et al. 2012, 55-57, 60-61, 66-69.

<sup>28</sup> Due to the catalogue of Parion terracotta water pipes being a ongoing work, in order to not cause confusion, the provisional type names will not be mentioned. Once the ongoing work is finished the terracotta water pipes of Parion will be introduced.

<sup>29</sup> Özağaçlı 1995, 88, Çiz. 85.

<sup>30</sup> Özağaçlı 1995, 27-28, Çiz. 23-25, Lev. 17-18.

<sup>31</sup> Strabo, X.5.7, XIII.1.13-14.

<sup>32</sup> Farnel 1890, 201-202; Leaf, 1923: 83-85; Rose, 2014: 193, fn. 158; Keleş 2018, 180-184; Strabo, X.5.7, XIII.1.13.

<sup>33</sup> Strabo, XIII.1.14.

<sup>34</sup> Keleş 2014, 341.

<sup>35</sup> Keleş 2016, 455, Fig. 1, K. 5.

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Fig. 1 (Parion Excavation Archive)



Fig. 2 (Parion Excavation Archive)