

Grade and Composition of the First Money in Anatolia

Anadolu'da İlk Paranın Ayar ve Alaşımı

Süleyman YÜKÇÜ

Prof.Dr., Dokuz Eylül Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, (suleyman.yukcu@deu.edu.tr)

Seçkin GÖNEN

Doç.Dr., Dokuz Eylül Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, (seckin.gonen@deu.edu.tr)

ABSTRACT

Most important contribution of Lydian Kingdom in history is known as the invention of money. First money is coined during Lydian King Kroisos' age from a mixture of gold and silver mine which is called as electrum. In front faces of coins there is an image of top of a lion and a bull placed back to back. According to a view, lion was symbolizing Lydian Kingdom and bull was symbolizing neighbor Phrygian Kingdom. There were strong evidence supporting lion was the sign of Lydian Kingdom. There were also some traces that bull has a relation with Phrygian Kingdom. According to a legend, Phrygian Kingdom Midas ended his life by drinking bull blood. Another view related with the argument opposes that depiction of these two animals back to back implies the superiority of lion to bull thus Lydian Kingdom to Phrygian Kingdom.

Keywords:

Coin, Lydian Coin,
The First Money
Decision Analysis

Jel Codes:

M40, M10

The aim of this study is to detect grades of gold and silver composite of Lydian coins which are called electrums by pertinent electronic devices. In the research, latest technology product Thermo Scientific Xrf Tester which is developed for precious mine testing and Gemoro Auracle Agt1 that is developed for gold testing are used, amount of mines (gold, silver, iron, copper) are determined by percentage for production of each coin. Eventually, as a result of the study, gold is detected in very few amounts in Lydian coins. It is revealed that coins are formed mostly from silver, copper, iron, lead and similar materials. Therefore it becomes possible to analyze precious historical ruins in detail and precision by electronic devices developed specifically for this purpose.

ÖZET

Lydia Krallığının tarihe yaptıkları en önemli katkı paranın icadı olarak bilinmektedir. İlk para Lidya kralı Kroisos zamanında elektron adı verilen altın ve gümüş karışımı madenden bakla şeklinde basılmıştır. Sikkelerin ön yüzlerinde sırt sıra vermiş, sadece üst bölümleri olan boğa ile aslan bulunmaktadır. Bir görüşe göre, aslan Lydia Krallığı'nı, boğa ise komşu Phrygia Krallığı'nı temsil ediyordu. Aslanın Lydia Krallığının arması olduğuna ilişkin kanıtlar güçlüdür. Boğa'nın da Phryg Krallığı ile ilişkisine dair bazı ipuçları vardır. Efsaneye göre, Phryg Kralı Midas, boğa kanı içerek hayatına son vermişti. Bir görüşe göre ise, iki hayvanın karşılıklı resmedilmesi, aslanın boğaya olan üstünlüğünü, diğer bir deyişle Lydia Kralının Phryg kralına üstünlüğünü ima ediyor olabilirdi.

Anahtar Kelimeler:

Sikke, Lidya Parası,
İlk Para

Jel Kodları:

M40, M10

Bu çalışmanın amacı, elektron adı verilen altın ve gümüş alaşımı Lidya paralarının ayarlarını geliştirilen elektronik araçlarla tespit etmektir. Araştırmada değerli maden testi konusunda son teknoloji ürünü olan Thermo Scientific Xrf Tester ve Gemoro Auracle Agt1 altın test cihazları kullanılmış ve her sikkenin üretimindeki metal miktarı (altın, gümüş, demir, bakır vb.) yüzde olarak ayrıntısıyla belirlenmiştir. Araştırma sonucunda Lidya Paralarında altın çok az miktarda saptanmıştır. Daha çok gümüş, bakır, demir, kurşun ve benzeri metallerden yapıldığı ortaya çıkmıştır. Böylece, geliştirilen elektronik araçlar ile çok değerli tarihi kalıntıların analizini garantili olarak yapabilmek olanaklı hale gelmiştir.

1. INTRODUCTION

The concept of Value is the relationship between function and cost. Value is comprised of different components life benefit value, preciousness value and cost value. Amongst these, preciousness value means feature of desirability exchange value means virtual value according to acquirer benefit value means meeting to needs and quality. (Sato and Kaufman, 2005: 23, Yükçü, 2007: 426-427) Thus it can be observed that value concept is shaped by people's needs, cultures, tendencies, ages, genders and characteristics of society they live in.

When more than one object is rendered up to preference, it is necessary to generate the concept of value in the mind of a decision maker so as to have one reach an appropriate order associated with that choice.

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There are various mathematical calculations to express an obtained value in monetary terms. These calculations can be limited by only four basic operations of math. Total or unit cost of an available economic asset could be attained as a result of such computations. The answer for the question of “Are these calculations can be acknowledged as accounting applications considering their practice is limited within mentioned scope” should be sought (Yükçü ve Atağan 2012:52)

In general, it is thought that a product or service has a good value provided that it has a fair performance and cost. On the contrary, for products or services those have not a convenient performance and cost it is said that they do not possess a good value. On this basis, value can be defined as the relationship between function and cost.

The composition of value concept in human brain calls for a process. As a consequence of this process, mankind may start perceiving wheat more precious than apple or meat more valuable than pear. Clarification of these preferences assists formation of money concept along with value concept in individual’s brain. They became able to choose to buy more valuable goods with more money or less valuable goods with less money.

Many scientist consider such calculations as the first footsteps of accounting history in basic means. We feel excitement on behalf of accounting science when we notice similar calculations in our studies on accounting history.

2. BIRTH OF COIN

Mentioned coins are called as “Coin” and have certain pictures, texts placed by the state responsible for minting. Coins are accepted as communication tools as well, they represent signs of state and sovereign. For instance, in the times when there were no newspapers or other communication means, it was learned from coins which emperor is governing, who is the king, which hairstyle does the queen has. Moreover, building of new structures, bridges, temples was indicated to society by coins (Tekin, 2006:1).

The coin emblazons a figure which represents the ruler of the relevant region where it was coined. To fulfill this purpose, the figure should be a recurring symbol i.e. a coat of arms. Coats of arms are found not only on the coins of the relevant city, but also on other findings such as inscriptions, terracotta, weights and even on bodies of slaves. Coats of arms were chosen from the plants or fauna within and around the city. Yet occasionally a local god was also chosen as coat of arms of the city. Several represented at the same time the name of the city. For instance, pomegranate for Side, Goat for Aigai, celery for Selinoni, etc. These sorts of coats of arms are referred as talking coat of arms. Later, when the figure on one side or both sides of the coin was recurrently being changed, coat of arms remained nearby these figures as a symbol, like the tuna fish found on the coins of Cyzikos. In this era, inscription is very rarely seen on the coins and if any it represents the name of the city as one or three letters, such as on the coins of Phocaea, Corinth, and Athens. Indigenous inscriptions are widely observed especially in the coins of Lydia, Lycia, Cyprus, Side, and Pamphylia. The most ancient Greek inscription is found on an electrum stater coined in Ephesus in this era, which reads “Phaenos emi Sema= (I am the sign of Phanes)” (Atlan, 1993:18).

The earliest coin-like objects dated back to 8th century BCE were discovered in Southeastern region of Turkey, during archaeological excavations in Zincirli, in the Islahiye district of Gaziantep in Turkey. This area was being ruled by the Neo-Assyrian Empire at that era. A few number of these small coins bear inscriptions in Aramaic of the name of King Barrekub (or Barrakab). Being deemed as the first implication of the idea of coinage, coins were supposedly a means of payment that incur in order to reimburse military and public expenses such as the making of weapons, the construction of roads, bridges, and buildings, and to collect taxes and to pay wages. It is also said that primary reason for the invention of coinage was the need for using a standardized means of payment in the purchase of daily necessities. Prior to usage of coinage, currency came in the form of goods, metal nuggets of various shapes, and cattle. Coins, however, are small pieces of metal emblazoning the identity of the minter and produced at a certain weight or in a certain size so as to indicate their purchasing value. The kingdom of Lydia is the first civilization who transformed its wealth of mineral resources into actual coinage (Tekin, 2011:12-13).

As it can be observed, coins have lots of important duties. With its information transmitting duty by the texts, pictures and depictions on them coins had important contribution to the formation of historical terminology.

3. LYDIAN KINGDOM

In ancient history of Western Anatolia, Lydia corresponds to the region surrounded by Caria in the south, Phrygia in the east, Aeolia and Ionia in the west, and by the mounts Temnos (Demirci) and Dindymos (Murat) in the north. The central part of the region was formed by basins of the rivers Hermos (Gediz) and Meander (Menderes). These regions are very rich in natural sources. While mountains are covered with forests, which form the basic raw material for construction of the dwellings, abundant clay sources provide the essential material for terracotta and constructions. Besides, the region has marble mine supplies (Otman and Aksakal, 2004: 4).

It is acknowledged that the borders of Lydia lays towards to Kutahya Cavdarhisar at east when the Lydian inscriptions and the distribution of tumulus are analyzed. During the period of King Alyattes, the borders of the state has laid

through Kizilirmak (Halys). During the period of the last king of Lydia, King Karun (Croesus), Lydia has control over the Aegean coastline from Marmara Sea (Propertis) at west to Antalya (Lycia) area at south. (Yükçü and Yükçü, 2010:1862).

Kingdom of Lydia, prospered suddenly, is still one of the most eccentric cultures of Asia Minor. Kingdom of Lydia, resembles neither eastern nor western states and cultures; it was a new Anatolian kingdom formed by political and cultural influences of both blocks. The first information on Lydia is traced back to the ancient Greek myths. According to Herodotus, three dynasties ruled in Lydia: Atyades, Heraclides (Tylonides), Mermnadae (Herodotus, 1996: 5-6).

Ancient written records and archaeological discoveries shed light on the primary minters. The first written information comes from Herodotus of Halicarnassus (Bodrum), who lived in 5th century BCE. According to Herodotus, Lydians were the first civilization who minted and used gold and silver coins. Archaeological findings also supported this claim: The lion's head, then emblem of the kingdom of Lydia, was seen on the coins unearthed in 1904-1905 excavations at the Temple of Artemis in Ephesus. Accompanied with this discovery, Lydian coins were found as well during another excavation in Gordium, the capital of the kingdom of Phrygia. (Tekin, 2011:12-13).

Lydian Kingdom was neither totally eastern nor totally western. Our knowledge on Lydia is based on old Greek legends. During the reign of Croesus, units of golden coins were fixed. As a result of these regulations made in field of coin unit, a more precise way of payment emerged. First Lydian coins which were made of an alloy of gold and silver, called "white gold", were in elliptic form. Frontal sides of coins first had plain surfaces, then distinguished with lines, and then relief figures. Other side had one, two or three deeply engraved hollows of rectangular, oblong or triangular shape. Frontal sides also had frontal part, head, or paw of a lion or upper parts of two lions facing to each other, representing the coat of arms of the kingdom. On the frontal sides of the coins coined by Croesus, upper parts of a bull and a lion standing back to back are seen. (Yükçü et. all. 2008: 197).

Even though it is believed that Lydians invented the coin first, it was the cities of Ionia in Western Anatolia who really began to make use of coins. The kingdom of Lydia was wiped off from the history no sooner had they minted the coin; however, it would be truer to attribute its prevalent usage to Ionia states. Following the collapse of Greece's Mycenaean civilization at the end of the 12th century BCE, survivors migrated to West Anatolia and settled in Ionia and the cities. Persians also continue to mint coinage in the capital of Lydia. Consequently, Ionia and West Anatolia plays a big role in the usage of coinage along with Lydia. It is also disputable whether these coins belonged to Lydia or Lydian merchants. (Tekin 2011:18).

As mentioned previously, the most important contribution of Lydians to history is the invention of money. After its first invention in Lydia coins which were formed from a mixture of gold and silver mines called as electrum became rapidly widespread by going beyond Little Asia borders in other countries around Mediterranean. Furthermore, it is important to highlight Ionian city-states' coins on the point that we cite coin money is an invention of Lydian Kingdom based on archeological digs.

4. CITY OF SARDEIS

The city of Sardes is the magnificent capital city of Lydian Kingdom. The city was founded on the skirts of the majestic Mount Tmolus (Bozdağ). The Pactolus River (Sart Çayı) flows down from Tmolus through the center of Sardis bringing in alluvia granules of the gold and silver alloy known as electrum. The Lydians would dip sheepskins in the river and then pull the soaked skins back out in order to collect the granules of electrum left there. They would take the granules to refineries for processing. Sardis' refinery workshops, which date to the middle of the 6th century BCE-during the reign of Croesus-and are situated in the excavations site known as the Northern Pactulus". This manifests how the coins of the kingdom of Lydia were refined from raw electrum. In the workshops, electrum would be broken down so as to obtain pure gold and pure silver, with the gold component being further separated from base metals like copper by the heating process called "cupellation" analysis. The gold content of electrum was diminished and that the coins were minted with added silver, which means the first Lydian coins-long thought to have been made from naturally occurring electrum were in fact minted from an artificially prepared gold and silver alloy. (Tekin, 2011:14).

The minting of electrum coins was abandoned for the first time, and separate coins of gold and of silver began to be produced in the reign of Croesus and it was a turning point. On the obverse are the protoms, or head and shoulders, of a lion and bull standing face to face; while on the reverse is a square incuse punch. The lion represents the kingdom of Lydia, whereas the bull represents the neighboring kingdom Phrygia. This fact serves as a good proof that the lion was the emblem of the Lydian kingdom. Furthermore, certain clues suggest that there is a relationship between the figure of the bull and the Phrygian kingdom. According to legend, the Phrygian king Midas died after drinking the blood of a bull. The depiction of the two animals as standing face to face may symbolize of the lion to the bull; that is, the superiority of the king of Lydia to the king of Phrygia. (Tekin, 2011:16).

Being adept jewelers, Lydians had also deep knowledge of geology particularly in the field of gemstones. According to the Roman writer Plinius, a type of dark red quartz used in making seals was firstly discovered in Sardis. Abundant

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amounts of gemstone chips found in excavations manifests that various types of opal and agate were cut and carved in Sardis (Türe, 2002:82-83).

According to a study by Yükcü and Yükcü (2010) the fact about finding first coin in Sardes are enumerated like that:

- Fertile Soil
- Easiness of Cultivation
- Easiness of Irrigation
- Increasing Product Diversity
- Increasing Product Amount
- Easy Acquisition of Gold
- Increasing Richness
- Increasing Economical Requirements of People
- Existence of the Thermal Water Spring of Sardes
- Increasing Human Life
- Good use of Information, Science and Technology
- Experiencing a Legendary Famine
- Strong and a Rich Political Authority

Besides that, technical procedures about producing the first money are explained in “Collecting ore from nature”, “Cementation (resolving gold with alluvium from composition)”, “Melting and Cupellation”, “Electrum Production”, “Minting Money” and “Adjusting the weight of money” headings.

Sardes kept its importance after Lydian Kingdom is collapsed by Persians became capital of satrapy during Persian governance period and capital of state during Romans time. Sardes lost its importance after alterations of commercial routes in Byzantine Empire’s last terms. In 1075 after Seljuks conquered the city, this settlement became known as Sart. With the help of Crusades Sart were retaken by Byzantine Empire in 1098. Afterwards in 1313 Aydin Bey from Germiyanids take Sart entirely to Turkish governance (Akış ve Başkan, 2009:35).

The capital city of Lydian Empire, Sardeis, constitutes huge importance for the history of coin. With its regarding of Golden City, it places in Sart town in province of Manisa. Its importance turns out more and more important for archeological excavations.

5. TECHNIQUES USED FOR GRADING OF GOLD and ORGANIZATIONS DETECTING GRADES OF GOLD

Grade detection in Gold could be performed by two methods either in “grading by touchstones” or “grading with chemical techniques”. Grading by touchstones mostly applies in finished goods or junks. Grading with chemical techniques can be applied to finished or semi finished goods, junks or alloys. The explanations regarding techniques used for grading of gold are as follows: (MEGEP Projesi, 2011: 18-21)

Grading by Touchstones and Flavoring

This technique is applied to detect precious metals with different grades, to determine jewels that are coated or not, to find out values of jewels’ parts and to grade valuable metal waste before melting that are scrapped to junk. The operations to be followed through this technique are sequenced below.

- After touchstone is greased, the part that is to be graded is rubbed to touchstone (Stripes obtain on the surface of experimented stone)
- The length of the stripes should be 20-30 mm long and the width should be 3-5 mm.
- Calibration needles is pressed and rubbed on the surface of the stone
- Detecting grade of silver is measured by eye view. Light and white colors indicate that the grade is high.
- Obtained stripes are moisturized with testing acid solution. If test stripes and standards react similarly it means purity turns out the same level.

To measure the grade of gold solution of tin and chloride is used. Nitric acid and hydrochloric acid solution namely Aqua Regia is dropped to current stripes. After metal stripes are fully melted, solution is cleaned up with drying paper. Subsequently, a drop of tin chloride solution is applied to the stain on drying paper. Measuring of grades is performed via appearance of a ring shaped like a crown and transformation of that ring’s color from red to purple.

As it may be seen in this technique resting on personal experiences and judgments metals are determined as 24, 22, 18, 14 grade. For a coin or historical monument it is required to be rubbed on a touchstone before its grade is determined. In this technique historical monument is damaged. Moreover, grading is determined according to the metal that is rubbed to touchstone when a monument’s one is a metal and the other side is another metal. This situation may be misleading.

Grading with Chemical Techniques

Detecting grades by melting method is the most precise method to determine gold amounts in gold alloy parts. By melting in a pot, gold and silver amounts in the alloy are identified. In this technique since metals like gold, silver and platinum do not oxidate in higher temperatures; samples taken from them are melted with lead. Lead and other metals in the alloy combine with oxygen in the air and form oxides.

These formed oxides are absorbed by the pores of graphite pot. Remaining precious metals stay at the bottom of the pot. As the last operation silver is separated from gold with dissolving with nitric acid. Later, artillery mil of gold is computed.

As it can be noticed, in this technique since coins or jewelries are fully melted for grading, to detect its grade may lead to loss of that coin.

Gold graders are examined in three groups “Grading Houses”, “Milis”, “Mubayaacılar and İfrazcılar” Those three groups are discussed in detail in subsequent headings. (www.jewelrtyturk.com, MEGEP Projesi, 2011: 23-25):

Grading Houses

Generally involving in jewelry business grading houses are commercial organizations analyzing metals. These organizations detect purity of precious metals and rare metals according to a predetermined list. For gold mine, it's necessary to test purity from production phases to selling phases as junk. Manufacturer workshops, wholesalers and stores frequently consult to grading houses to ask for purity tests in order to assure reliability of products. Certain chemical methods are applied in grading houses not only measuring grades of gold but also measuring of silver, platinum and soil. Different analysis techniques are available for different metals. Very sensitive weighers are used. In order not to lose scales of that weighers they are preserved in heat insulated rooms. Apart from numerous grading houses mili's and stamp printery management's own grading houses are also available. Istanbul Jewelers' Chamber's grading house is also available. There is a statement prepared for these grading houses and these organizations are obliged to abide by that statement.

In jewelry sector amount of metals in alloys is determined in these grading houses. During melting process a homogeneous disperse should be existent in these alloys. If compositions formed for products or artillery mils are not clear ingots are sent to grading houses. Grading houses take samples from products determine artillery mils and report them. These reports proofs grades for ingots and products, constitutes guarantee for buying or selling.

Milis

It has started its operations after Fatih Sultan Mehmet's conquest of İstanbul at a place in Beyazıt district called Simkeşhane. Afterwards, for security reasons it need to be settled in nearby palace and new mili buildings constructed garden of the palace in Sultanahmet by Sultan III. Ahmet Mili becomes an organization affiliated to Ministry of Finance, Treasury and Faoreign Trade Counsellorship.

Stockbrokers (Mubayaacılar) and Purifiers (İfrazcılar)

In jewelry business traders of people's or firms' economically valued ingots for a certain fee was called stockbrokers and this job was called stockbroking. In jewelry business mines with wrong grading or alloys containing undesirable wastes were brought to stockbrokers. In there they were exchanged with pure metals. stockbrokers on the other side bring these metals for purification to purifiers for a cost. Purifiers pay back the amount of purified metal to stockbrokers. Apart from gold other precious metals were left to purifiers.

6. METHOD, IMPORTANCE and LIMITATIONS of the STUDY

In our study to measure grades of Lydian coins, an implementation is conducted in Manisa Museum. While determining the method of research, literature review is performed firstly by taking other academic works as samples. Based on that idea, conversation, observation and document review methods are chosen among qualitative research methods.

In the first phase of our implementation, business visit are initiated via taking an appointment from manager of Manisa Museum. Information about research is given at first, then aim and method of the research are explained in detail. In order to get efficiency from conversations and to obtain information about interested topic, conversations are conducted within the scope of prearranged questions.

During the research 33 Lydian coins are noticed and got consent to analyze 25 amongst them. In the research, latest technology product Thermo Scientific Xrf Tester which is developed for precious mine testing and Gemoro Auracle Agt1 that is developed for gold testing are used, amount of mines (gold, silver, iron, copper) are determined by percentage for production of each coin.

AGT-1 model which is a test device of Electrumic Gold & Platinumium can conduct measurement by using electricity power and it can be admitted as the most user friendly electrumic gold testing device with highest performance and unique precision. It makes possible to signify fake gold, gold coating and milled gold. It can test various colors of gold

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from 6K to 24K. It provides instant test results and indicates specifications of carat, platinum or not gold with its LED screen by touching pen seeker to the gold. When pen seeker is used appropriately and preserved it enables making approximately 5000 tests. On the other hand, XRF device can measure radioactive rays and the components of of a gold product.

In this research the reason of usage of mentioned devices is not to physically or chemically harm historical monuments that are of interest to this study. Although mentioned devices are very expensive in order not to harm the monuments devices with latest technology are being used.

7. FINDINGS OF THE STUDY

Findings reached as a consequence of grading of 25 coins are represented in the table below elaborately.

Table 1. Analysis of 25 coins

Inventory Nu:	Inventory Info	Weight	Product Info	AGTI Grade	Thermo Composition	Photo
2569	Silver	5,288 g	Lion-Bull	Not Available	Gold 0.391 Silver 97.48 Copper 0.396 Iron 1.43 Lead 0.299	
8710	Is not allowed to be analyzed					
10195	Silver	0,390 g	Lion-Bull	Not Available	Gold 0.297 Silver 98.47 Iron 0.181 Copper 0.130 Selenium 0.028 Iron 0.897	
10568	Silver	3,405 g	Lion-Bull	Not Available	Silver 94.16 Copper 4.33 Zinc 1.13 Iron 0.388	
10569	Silver	2,372 g	Lion-Bull	Not Available	Silver 93.80 Copper 4.67 Zinc 1.31	
10570	Silver	3,317 g	Lion-Bull	Not Available	Silver 90.65 Copper 4.15 Zinc 1.61 Iron 3.53 Lead 0.056	

10571	Silver	2,093 g	Lion-Bull	Not Available	Silver 90.22 Copper 6.86 Zinc 1.60 Iron 1.18 Lead 0.142	
10572	Silver	1,776 g	Lion-Bull	Not Available	Silver 92.42 Copper 7.45 Lead 0.126	
10573	Silver	1,996 g	Lion-Bull	Not Available	Silver 93.19 Copper 6.67 Lead 0.134	
10574	Silver	3,183 g	Lion-Bull	Not Available	Silver 98.72 Copper 0.069 Zinc 0.760 Iron 0.455	
10575	Is not allowed to be analyzed					
10576	Silver	5,581 g	Lion-Bull	Not Available	Silver 93.46 Copper 6.43 Lead 0.106	
16896	Silver	0,421 g	Lion-Bull	Not Available	Gold 0.530 Silver 98.22 Copper 0.718 Iron 0.340 Lead 0.197	
18364	Silver	0,832 g	Lion-Bull	Not Available	Gold 0.588 Silver 97.28 Iridium 0.309 Copper 1.07 Iron 0.751	

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18365	Silver	0,402 g	Lion-Bull	Not Available	Gold 0.645 Silver 98.19 Copper 0.830	
19212	Electrum	0,715 g	Lion-Bull	Grade 14	Gold 56.92 Silver 42.86 Copper 0.221	
19267	Is not allowed to be analyzed					
19273	Is not allowed to be analyzed					
19500	Is not allowed to be analyzed					
19553	Silver	4,884 g	Lion-Bull	Not Available	Gold 1.93 Silver 96.56 Copper 0.418 Iron 0.953 Lead 0.137	
19998	Silver	1,291 g	Lion-Bull	Not Available	Silver 82.70 Copper 14.63 Iron 1.69 Lead 0.976	
22296	Is not allowed to be analyzed					
22523	Silver	1,659 g	Lion-Bull	Not Available	Gold 0.562 Silver 99.18 Copper 0.263	
22524	Silver	0,782 g	Lion-Bull	Not Available	Gold 0.914 Silver 95.91 Copper 1.39 Iron 1.52 Lead 0.270	

22697	Silver	5,125 g	Lion-Bull	Not Available	Gold 0.563 Silver 98.68 Iridium 0.240 Copper 0.138 Lead 0.165	
22764	Silver	4,443 g	Lion-Bull	Not Available	Gold 1.10 Silver 96.54 Copper 1.37 Iron 0.755 Lead 0.188	
23346	Silver	5,371 g	Lion-Bull	Not Available	Gold 0.325 Silver 81.00 Palladium 0.120 Rhodium 0.085 Iridium 1.98 Copper 6.26 Selenium 0.204 Iron 2.17 Lead 7.85	
23460	Silver	4,600 g	Lion-Bull	Not Available	Gold 0.722 Silver 86.84 Copper 10.09 Iron 2.29 Lead 0.068	
23545	Silver	4,242 g	Lion-Bull	Not Available	Gold 0.412 Silver 41.24 Copper 54.92 Iron 1.40 Lead 1.91	
23728	Silver	10,402 g	Lion-Bull	Not Available	Silver 90.87 Copper 8.34 Iron 0.727 Lead 0.60	
23997	Silver	3,222 g	Lion-Bull	Not Available	Gold 1.50 Silver 96.83 Copper 0.834 Iron 0.713 Lead 0.124	
24098	Is not allowed to be analyzed					
24300	Is not allowed to be analyzed					

After getting these finding related with Lydian coins; in order to make a comparison with them compositions of coins from Hellenistic Period, Persian Period and Early Byzantine Period that are registered in Manisa Museum with inventory numbers respectively 870, 7262 and 3396 are detected. Mentioned compositions of are represented in the table below.

Table 2. Analysis of Hellenistic, Persian and Byzantine Coins

Inventory Nu:	Inventory Info	Weight	Product Info	AGTI Grade	Thermo Composition	Photo
870	Hellenistic	8,549 g	Filip Bozbaşı Combat Car	Grade 23	Gold 96,98 Silver 0,451 Copper 0,309 Lead 1,86 Iron 0,395	
7267	Persian	5,654 g	King Darius with arrow and bow in his hand	Not Available	Gold 0,358 Silver 88,49 Copper 8,69 Zinc 1,77 Iron 0,698	
3996	Byzantine (Gold)	1,434 g	Portrait	Grade 24	Gold 98.33 Silver 1.42 Copper 0.245	

Noticing above Hellenistic, Persian and Byzantine coins, it can be observed that gold comprise an important amount of their composition. Lydian coins on the contrary made up of silver significantly.

8. CONCLUSION

Observing results of the analysis, it has been revealed that Lydian coins are not made up of an alloy called electrum which is mixture of gold and silver as its far known in the world literature but mostly of silver along with a few amounts of copper and iron. There are some other metals like lead, silisium, copper and iron etc. observed in the composition of these coins. It's worth remarkable that some coins do not contain any amount of gold.

In the records of museum indicate that coin that is registered with 19212 inventory number is made up of electrum. During the analysis very interesting findings reached about this coin. This coin is mostly produced of gold and silver. However, during production process these tow sort of metals used separately. Top half of that coin that carries a lion and bull figure is comprised of gold and the bottom half is totally of silver. In other words, top of coin is gold and bottom is silver. There is

no amount of silver observed in top and no gold observed in bottom. This finding reveals that coin is minted by melting and spilling of two metals. This evidence is a revolutionary detection about Lydian coins. When Hellenistic, Persian and Byzantine periods' coins are examined, a considerable amount of gold noticed in their composition.

On this basis of explanations, the hundred year old statement asserting that Lydian coins are produced from mixture of gold and silver turned out at least entirely not true through this research. Lydian coins are mostly made up of silver and mixtures of various metals. Some of them contain no amount of gold or only a few.

REFERENCES

- AKIŞ Ayhan and BAŞKAN Hasan Ozan. (2009) "Salihli'nin (Manisa) Yerleşme Özellikleri, Selçuk Üniversitesi Ahmet Keleşoğlu Eğitim Fakültesi Dergisi", Vol.27: 31-50.
- ATLAN Sabahat (1993) "Grek Coinleri, Arkeoloji ve Sanat Yayınları, Antik Nüvizmatik Dizisi:2", İstanbul
- HEREDOTUS. (1996) "Histories", Wordsworth.
- MEGEP Projesi (2011), "Kuyumculuk Teknolojisi, Alaşım Metal Oranları" T.C.Milli Eğitim Bakanlığı, Ankara.
- SATO, YOSHİKİKO and KAUFMAN, J. Jerry. (2005). "Value Analysis Tear Down: A New Process For Product Development And Innovation." Industrial Pres, First Edition, New York.
- OTMAN Ahmet and AKSAKAL Ali (2004), Antik Çağdan Günümüze, Salihli.
- TEKİN Oğuz, (2006) "Coinler, Devletler, Hükümdarlar: Eskiçağda Anadolu'da Paranın Siyasal, Kültürel ve Ekonomik Rolü", http://www.obarsiv.com/pdf/vct_oguz_tekin.pdf, (Retrieval Date:10/12/2012).
- TEKİN Oğuz (2011), "Konuşan Paralar (Talking Coins)", Türkiye İş Bankası Kültür Yayınları,Promat Basım Yayıncılık, İstanbul.
- TÜRE Altan, (2002) "Anadolu Antik Takıları", Goldaş Kültür Yayınları-2, İstanbul.
- YÜKÇÜ Süleyman, "Yöneticiler İçin Muhasebe: Yönetim Muhasebesi" Birleşik Matbaacılık, İzmir, 2007.
- YÜKÇÜ Süleyman and ATAĞAN Gülşah, (2012) "20. Yüzyılın İlk Yarısında Maliyet Muhasebesinin Gelişimi (Development of Cost Accounting in the First Half of 20'th Century)", Accounting and Financial History Research Journal, Year:1, Issue.2 :39-67.
- YÜKÇÜ, Süleyman and YÜKÇÜ Onur "Birth of The First Money", 2nd Balkans and Middle East Countries Conference on Auditing and Accounting History, Conference Proceedings, Vol:3, 1861-1872.
- YÜKÇÜ Süleyman, UGURLUEL Gülşah and IRIER Sadık (2008) "The First Money in Anatolia", 12th World Congress of Accounting Historians, July 20-24, İstanbul, Conference Proceedings Vol.1. 197-209.
- <http://www.jewelrtyturk.com/ayar-evleri-nedir/> (Erişim Tarihi:22/12/2012)