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191

IMPERIAL SHIPYARD (TERSANE-I AMIRE) IN THE OTTOMAN EMPIRE IN 17TH CENTURY: MANAGEMENT AND ACCOUNTING

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RESUMEN

Las instituciones del Imperio Otomano se encontraban bajo control estatal. El astillero Imperial (Tersane-i Amire) estaba entre ellas. El astillero Imperial se estableció a finales del siglo 15 en el Cuerno de Oro (Halic), Estambul, y todavía hoy sigue funcionando. Este estudio examina la gestión y la infraestructura contable de los astilleros con el fin de comprender las razones de la interacción mutua entre la dirección y las prácticas contables del Imperio Otomano. Así, este estudio proporciona un marco para las prácticas de contabilidad en el Imperio Otomano al examinar un documento contable en relación con el Astillero Imperial en el año 1661 d.C. (Hegira 1071-1072). La evaluación de los documentos indica que la contabilidad tenía capacidad para satisfacer las necesidades del sector al que da servicio, aunque el concepto de costo no se desarrolla en la época estudiada.

ABSTRACT

The institutions of the Ottoman Empire were under state control. The Imperial Shipyard (Tersane-i Amire) was amongst them. The Imperial Shipyard was established at the end of the 15th century in the Golden Horn (Haliç) – Istanbul and today it continues to operate. This study examines the management and the accounting infrastructure of the shipyard in order to understand the reasons for the mutual interaction between the management and accounting practices of the Ottoman Empire. Thus, this study provides a framework for the state accounting practices of the Ottoman Empire by examining an accounting document regarding the Imperial Shipyard in the year 1661 A.D. (Hegira 1071-1072). Evaluation of the documents indicates that accounting has the ability to meet the needs of the sector which it services. But the concept of cost is not developed within the regarding era.

PALABRAS CLAVE:

Imperio Otomano, Siglo 17, Administración del Astillero, Historia de la Contabilidad.

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KEYWORDS:

Ottoman Empire, 17th Century, Shipyard Administration, Accounting History.

1. Introduction

The term *tersane* has entered the Turkish language after many usages of Arabic word *dar al Sina'a* by various Mediterranean countries. It was used by Spanish as *atarazana*, *arsenal*, *dársena*, by Portuguese *darsenale*, *drasena*, by the Italians *arsenale*, *darsena* and by the Maltase *tarzna*, *tarznar*. The Ottomans were using the word “port” instead of maritime arsenal, but from the beginning of the 16th Century onwards, they started to use the term *tershane* or *tersane* which was similar to the Italian usage of the word (Bostan, 2007: 2).

Within the concept of etatism in the Ottoman State, there were private shipyards where small boats for fishing were built, but it is known that the real ship building was done, and their maintenance was carried out in shipyards owned by the state. These shipyards were located in the various territories of the empire. Capital accumulation of private initiative was not sufficient to build large shipyards. It is known that the state brought several masters, whom were raised in small boat workbenches, to Istanbul from time to time and employed them in the Imperial Shipyard (Tersane-i Amire). Sultan Mehmet the Conqueror benefited from these masters especially for the establishment of the first shipyard at the end of 15th Century.

In the conquest of Istanbul (1453) by Sultan Mehmet the Conqueror, there were many small boat building places remaining from Byzantine times. Most of these places were in the place called Kadirga which is in the south of the peninsula. The first shipyard was built at the place where Golden Horn¹ expands into land in Aynalikavak location on Golden Horn, since none of these places were of sufficient size. This shipyard which met the need of the Ottoman Empire for centuries was initially called Galata Shipyard, then Imperial Shipyard (Tersane-i Amire) when its function within the Empire expanded. Expansion of the function of the shipyard resulted in this shipyard being used solely for ship building and other shipyards being distributed to the coasts of the Empire seas, serving as a place for central administration. For this reason, modes of administration and accounting records are not in the property to indicate the organizational power of the maritime Empire.

This shipyard is currently operating with the title of Golden Horn (Halic) Shipyard as a state shipyard of the Republic of Turkey.

Ottoman Navy lost an important battle to the united navy of European states in Lepanto in 1571 A.D. After this defeat, a great importance was attached to ship building in the Imperial Shipyard. For this reason, expansion of the Imperial Shipyard came to agenda

¹ The Golden Horn is an inlet of the Bosphorus divides the city of Istanbul and forms a natural harbor.

towards the end of 16th century and both the organization structure and the capacity of the shipyard was expanded with new investments.

This paper first examines the management structure of the Imperial Shipyard by explaining its expanded departments in details and then concludes by analyzing the accounting records regarding the ship construction and repair activities within the Imperial Shipyard during the year 1661 A.D.

2. Management Structure of the Imperial Shipyard

2.1. Foundation and Development of the Imperial Shipyard

It is seen that the establishment of the Imperial Shipyard in its current place took place towards the end of the 15th Century. Initial knowledge of the production date goes back to the beginning of the 16th Century. It is understood that this production was 17 (9 of which were galley (kadirga)²) in 1527 raised to 27 in 1530, to 22 ships in 1585 (12 of which was bastard³) (Prime Ministry Ottoman Archives: MAD 852).

In the 17th Century, the Imperial Shipyard was not only shipyard of the Empire. New shipyards were built in various parts of the Empire and current shipyards were renewed. These include Gallipoli shipyard located on present-day Dardanelles Strait, Sinop shipyard on the Black Sea, Izmit shipyard located on the eastern end of Marmara sea (it is currently a military shipyard), Suez shipyard where Suez Canal is connected to Red Sea, Basra shipyard on Basra Gulf, Ruscuk shipyard for building of boats used on the River Danube, Kefken and Samsun shipyards on the Black Sea. Technical administration of all these shipyards was made from Imperial Shipyard (Bostan, 1992: 14-25).

Certainly the largest of these shipyards was the Imperial Shipyard in Istanbul. The ships produced and repaired in the Imperial Shipyard in various years of the 16th Century were as follows.

² Galley: War and trade ship with two posts, moving with sailing sheet and shore, made from wood. It used to be in a length of 47 metres and in a width of 6 metres. Galleys were being built not only in state shipyards but also in private shipyards for trade purposes. These special galleys were called chief (bey) galleys. These ships were produced until XVIII. Century. Kadirga is today the name of a district in Istanbul. (Ana Britannica, Volume: 12, 1988, Istanbul)

³ Bastard: A type of ship used in the Ottoman navy. Ship with oars, in a length of 50 metres; they were used mostly as war ships. In the navy, admiral ships would be in bastard type (Ana Britannica, Volume: 3, 1986, Istanbul)

Table 1. Types of Ships Constructed and Repaired (Bostan, 1992: 99)
(Prime Ministry Ottoman Archives MAD: 7458, 5787, 5024, 979, 5932, 996, KK.5657)

Year	Galleon		Bastard		Galley		Lighter		Galiata		Stoneship		Horseship		Caique	
	C	R	C	R	C	R	C	R	C	R	C	R	C	R	C	R
1610	-	-	12	11	1	36	-	5	-	5	-	2	-	9	1	4
1615	-	-	6	13	8	36	1	1	3	13	-	-	-	2	-	4
1620	-	-	7	13	3	17	-	-	6	4	-	-	-	2	-	1
1631	-	-	2	7	7	13	-	-	5	19	-	13	-	-	15	-
1649	-	-	1	3	4	64	6	2	-	2	-	1	-	-	-	-
1661	-	6	3	1	1	56	2	-	-	-	-	1	-	-	2	-
1668	-	34	-	1	-	-	-	-	1	16	16	-	-	-	15	8

In abbreviations on the table, (C) refers to construction, (R) to repair. Types of ships on the table are explained below (Bostan, 1992: 83-93.)

Galleon : Transport ship with three posts, it is seen to have been built also partly as War ship in 17th Century.

Galley – Bastard: It was explained before. (See footnote 1 and 2)

Lighter : Ship larger than bastard, with two stores, wide, with two or three posts, generally a war ship.

Galiata : A ship used in cargo transport services, in a length of 35-40 meters.

Stoneship : Ship produced for transporting wood and stone.

Horseship : Special ships produced for transport of horses and other animals.

Caique : Small boat, with oars and for short distance. Horse caique is for live animal transport, Fire caique for fire extinguishing, Distance caique for communication.

Numbers of ship construction and repairs included in above table indicate construction and repair with more emphasis on galleys, bastard and galiata. These numbers also indicate that the Imperial Shipyard reached a certain size in the 17th Century.

In parallel with this growth and development, the administration structure of the Imperial Shipyard had changed significantly. In the next section, the administration structure of Imperial Shipyard is explained in details.

2.2. Administration Structure of the Imperial Shipyard

2.2.1. Imperial Shipyard Director and Subordinate Departments

Captain Pasha was at the top of maritime power in the Ottoman Empire. He was both the head of fleet and also the person to whom the Shipyard Director reported. Captain Pasha actively administered the navy at military expeditions. However, he was administering the Imperial Shipyard through the Shipyard Director while the navy was at the port. It is important to mention that Captain Pasha had the title of Vizier (Minister).

Captain Pasha did not administer the shipyard solely through Shipyard Director. There were two more persons under Captain Pasha in the Shipyard. The first one of them was Shipyard Kethuda (Officer or colonel) in charge of legal works, second one was Shipyard Master (Agha) working in representation of Captain Pasha during times when he was on military expeditions.

As it will be understood from these explanations, the head and high level authority of Imperial Shipyard on administrative, financial and technical matters was Shipyard Director. Imperial Shipyard directors generally worked for two years. Ibrahim Efendi was the person to work as an Imperial Shipyard Director for the longest period (1658-1662). Shipyard Director was one of the state officers earning the highest wage (5,000 Akcha⁴). At the last section of this study we will examine the accounting report at the end of office term of Ibrahim Efendi.

In the Imperial Shipyard, equipment fitting, construction and repair works of ships were being done. These equipment fittings comprised things like sails, awning, and oars besides preparation of places for sleeping, illumination tools, eating and drinking containers. It did not comprise arms and ammunition required for use at arms. Armament of ships was being fulfilled by other departments of state. The departments which perform within the shipyard are listed below. These departments constitute the administration structure of the Imperial Shipyard.

a. Accounting Department: Accountants operating in this department are indicated below.

- *Secretary of Imperial Shipyard:* He was the head of accounting department, and worked under Chief Financier (Defterdar) the central accounting organization of state. In this case, it follows that Imperial Shipyard accountant is the bureaucrat who comes after Director (Güvemli, 2000: 836)⁵. This indicates the importance attached to accounting by the Ottomans.

- *Daily Ledger Officer (ruznamçeci):* *Ruznamçe* means daily ledger. Daily Ledger Officer is the person working under Imperial Shipyard secretary and keeping daily accounting records of the shipyard. However, it is known that not one single person but a few people performed this duty (Uzunçarsili, 1948).

⁴ *Akcha* or *Akche* was the chief monetary unit of the Ottoman Empire.

⁵ Director: In its general sense, a state officer working for a certain wage. Here, a high ranking state officer.

- *Execution secretary*: He is the person who prepares and pays wage payrolls of employees in shipyard accounting. It is seen that he has a few deputies in the 17th Century.

- *Safe box secretary and deputy*: It is the department which keeps records of storage where equipment materials of ships were saved. It is a sort of inventory monitoring record. When the Shipyard Director changes, the director who is leaving office gets the counting done and the goods in the storage are delivered to the officers of the new director⁶.

- *Port Secretary*: He is the accountant who keeps accounting books of wood incoming for ship construction and distributes wood to constructed ships. The importance of wood in ship construction indicates that the control of wood stocks became a separate section within accounting. It is seen that this section assumed administration of wood stocks and made the inventory.

- *Jail Secretary*: Ships would generally move with oars and the oarsmen would be from slaves working in ships, and convicts. It is known that those who were sentenced for various offenses worked in ships as oarsmen. Some of the slaves and convicts would also work for ship construction works in the shipyard. They would stay in shipyard buildings. Records of these persons would be kept. Their clothing and accommodation were met by the accounting department in the shipyard (Güvemli, 2000).

- *Cashier*: They are the persons who perform cash administration of the shipyard and keep incoming money and their records of expenditure⁷.

These explanations indicate that there are six departments under accounting department head, within accounting department in the Imperial Shipyard.

b. Documents Department: Those working in this department are explained below.

- *Book director*: It is known that some places of revenue of state from among revenue items of the Imperial Shipyard are allocated to the shipyard. Not much emphasis will be put on Shipyard connection of these items of revenue which are kept outside the scope of this paper. However, revenues of these places allocated to *Iltizam*⁸ (tax-farming) (Güvemli *et al*,

⁶ In the Ottoman bureaucracy, there are titles of Director, Secretary, Deputy from top to bottom. These titles means director, chief and officer.

⁷ The revenues of the shipyard were constituted from monies coming from state treasury, special taxes (avariz) collected for the shipyard. Avariz is the name given to extra-ordinary taxes collected at times of war.

⁸ In the Ottoman Empire, taxation system carried out by farming the public revenue. The state auctioned taxation rights to the highest bidder (*nültazim*, plural *mültezim* or *mültazims*), who then collected the state taxes and made payments in fixed installments, keeping a part of the tax revenue for his own use. The *iltizam* system included the farming of land taxes, the farming of urban taxes, the production of certain goods (such as wine, salt, or senna), and the provision of certain services. It began during the reign of Sultan Mehmed II (1444–46, 1451–81) and was officially abolished in 1856.

2008: 1827) came directly to Shipyard. Protection of documents of these revenue items and follow-up of revenues are seen to be in this section.

- *Port Head*: They are the people who assume the work of maintaining protection of ships drawn to land in the Imperial Shipyard. They work with various assistants depending on needs.

2.2.2. Imperial Shipyard Chief

Imperial Shipyard Chief is the manager responsible for ship construction and repair works of the Imperial Shipyard. He is the second highest level manager responsible for legal works. His duties include: Provision of security and discipline in Shipyard, punishment of offenses committed in the shipyard, control of prices of materials purchased regarding Naval Works. He is seen to be basically responsible for legal works, and also engaged with administrative works as much as required by legal works (Karamürsel, 1940).

2.2.3. Imperial Shipyard Master

The Imperial Shipyard Master is the representative of Captain Pasha. Shipyard Director and Shipyard Chief, which are the upper positions, have executive characteristics; however, Imperial Shipyard Master has a representative character. Shipyard Master is seen to have a more active office since he represents Captain Pasha while he is on military expeditions. He prepares reports for Captain Pasha (Uzunçarsili, 1948: 428). Another executive duty is known to be the control of materials to be loaded in ships setting off on military expeditions. The reason for this duty is the need to perform the preparations of Captain Pasha commanding the navy that set off on military expeditions, by his deputy in the shipyard.

2.2.4. Officers Related To Ships

The work for the realization of any equipment of ships which are constructed and repaired and making them ready for military expedition were done in the Imperial Shipyard. It

Various forms of iltizam, however, continued until the end of the empire in the early 20th century, when the system was replaced by methods of taxation that were supervised by public officials. (Source: Encyclopedia Britannica)

is seen that there are three sections which execute the works to make the ship ready for service. These three sections are mentioned below.

- *Minister of Galleons*: He is the high level manager, responsible for equipment fitting of ships. It is seen that this title is not a separate person, but Imperial Shipyard Director assumed this job (Bostan, 1992: 47). Shipyard Director is the head of teams which construct and repair ships. The reason Shipyard Director also assumes the duty of Minister of Galleons, should be that those working under the same person should also deal with equipment fitting of ships.

- *Galleon Financier*: He is the person keeping records of any ship which is being constructed or repaired. Because it was necessary to keep records of food, drink, sleeping places, clothing of crew and similar materials for each ship, the Galleon financier and deputies would work in buildings of Imperial Shipyard. They would monitor the completion the equipment fitting of each ship launched to sea and deliver the ship's captain to the ship.

- *Galleons Secretary*: This duty was comprised of accounting works related with keeping accounts of wages of those working in constructed and repaired ships. The person to perform this task would be called Galleons Secretary. This accountant had deputies, too. Another task of Galleons Secretary was purchase of food to be loaded in the ship. It was frequently seen that an accountant would help in these purchasing works. The underlying reason could be that the accountant knows the price of material to be purchased.

2.2.5. Religious Officers and Other Officers in the Imperial Shipyard

- *Mosque in the Imperial Shipyard*: It is seen that there is a mosque in the Imperial Shipyard and fifteen religious officers. Wages of these religious officers are known to be covered from Shipyard budget.

- *Other Officers*: It is known that there are a large number of professional groups working in the shipyard. They include masters and workers like carpenter, ironmonger, caulker (person to apply pitch against decay), roller, sailing sheet assigned in ship building, besides persons fulfilling auxiliary services like water carriers and kitchen officers. They are generally members of sections working under the Shipyard Director (Ünver, No. XXXIII: 129).

The number of Imperial Shipyard employees throughout the 17th century is given below.

Table 2. Number of People Working In the Imperial Shipyard in the 17th Century.
(Bostan, 1992: 50)

<i>Year</i>	<i>Employees</i>	<i>Year</i>	<i>Employees</i>
1601	3,524	1670	1,003
1608	2,761	1685	1,003
1635	2,337	1695	821
1648	1,952	1700	726
1654	1,932		
1665	1,005		

Expansion of the Imperial Shipyard came to agenda towards the end of 16th century because of the Ottoman Navy's defeat in Lepanto in 1571. Both the organizational structure and the capacity of the shipyard were expanded with new investments. In parallel with these developments, there was a significant increase in the number of employees within the Shipyard. Starting from the beginning of 17th Century, the number of employees started to decrease and this continued for a hundred years.

In which type of employees did this numeric fall emerges? It is easy to see that there was a fall in all types of employees. Numerically, the highest human power is comprised of military personnel working in constructed and repaired ships. These soldiers are called *Azab*. About half of personnel working in the shipyard are comprised of *Azab* soldiers. While the number of *Azab* was 1,588 in 1604 A.D, this number fell to 602 in 1648 A.D, 330 in 1665 A.D, 239 in 1695 A.D. A rapid fall is seen also in the number of artisan masters like carpenter, caulker (pitch applicator), sailing sheet, shore manufacturer, roller. While the number of masters was 838 in 1604, this figure fell to 368 in 1648, 145 in 1665, 144 in 1685, 118 in 1694. These figures indicate that the Imperial Shipyard developing after Leponto Naval War shrank for the following century and the number of employees, which was 3,500 at the beginning of century, fell below 750 persons towards the end of the century.

Another reason for the fall in the number of employees in the Imperial Shipyard is the development of shipyards in places like Izmit, Samsun, Sinop, Gallipoli, Basra over centuries and that ship construction and repair activities moved to these shipyards to some extent.

2.3 Materials Obtained to be used in Ship Construction and Repairs

2.3.1 Those Obtained In the Form of Raw Materials

From the moment of its establishment the Imperial Shipyard brought under its orbit a vast stretch of imperial lands in order to supply its numerous shipbuilding materials (Özveren and Yildirim, 2006: 6). Imperial Shipyard administrators had separated the materials used in ship construction and repairs, and then entered them into records. The first group was the initial materials. They were called “materials”. The second group was the materials bought in the form of semi-manufactured product and used in ship construction. They were called “equipments”.

The names of the materials bought in the form of raw materials are as follows:

Wood, columns (used in construction of ship posts) and boom (used in building wooden beams positioned horizontally to vertical posts), heath (bushes, etc. used by burning for drying trunks of boats recently constructed), iron, nail, lead (for closing gaps and making weight on main backbone in ships), tar (material applied to prevent decay of part of ships left under water), pitch (material used to protect the boat against humidity and to be applied on additional parts of wooden parts), grease (material bought to be used in illumination works in the boat), paint (to be applied on wooden parts and iron parts to protect ships from effects of weather), resin (material used to make pitch utilizable), wax (material used in illumination of ship), hemp (rope, material used in making strings), rope (used in steering sails and binding to shores), string (used in stitching sides of sail clothes), tow (material used by inserting into wood to prevent water leakage from wooden parts of ship).

A large part of all these raw materials were obtained from Anatolia. As for materials obtained from outside Anatolia, we observe from accounting records that iron and nails were obtained from Bulgaria, materials like pitch from Thrace, resin from Aegean islands and string from Egypt. We need to mention that all required materials and equipments for ship construction were obtained from within the territories of the Empire.

Raw materials had diminished particularly in the second half of century in accordance with the activity decrease within the Imperial Shipyard.

For example, while the amount of wood obtained in the mid century was 300,000 *akcha*, it is observed this amount fell below 290,000 *akcha* towards the end of the 17th century (Prime Ministry Ottoman Archives KK 2623, KK 5655).

The same situation is observed also in the amount of paint acquired. For example, the amount of paint which was 1,380 *kiyye* in 1622 A.D. fell to 1,153 *kiyye* in 1653 A.D, to 298 *kiyye* in 1698-9 A.D. (Develioglu, 1998)⁹.

2.3.2 Those Obtained as Semi-Manufactured Product and Manufactured Product (Equipments)

⁹ *Kiyye*: One *kiyye* equals to 1282 grams.

The goods considered as equipments in accounting records can be listed as oars, anchors (used for anchoring ships), compass, lantern (good in glass protecting the fire of lamps used in the ship from wind), linen cloth (cloth used in making sail), awning (cloth laid on deck to protect the ship deck from sun and wind), twill (cloth used in making flags and signal flags), taffeta (cloth used in making ship flags), embroidery canvas (cloth used in making clothes of shipmen), broadcloth (cloth used in making clothing of shipmen), roller (round materials used to enable sails to move easily).

The amount of procurement of these goods is also known to have diminished throughout the century. For example, while sailing sheet fabrics were obtained in the amount of 6,400 arshin (ell)¹⁰ in 1650 A.D, the amount of sailing sheet fabric bought in 1692 A.D. was around 2,000 arshin. (Prime Ministry Ottoman Archives MAD 2787 and MD CIII.)

2.4. Evaluation of the Management Structure of the Imperial Shipyard

So far, we gave specific details on the management structure of the Imperial Shipyard. Now, we will make an evaluation of the management structure in order to understand the findings more clearly.

- The naval force of the state is headed by Captain Pasha. There are two groups subordinate to him. The first one is the navy at sea. It is headed by Captain Pasha. The second group is shipyards. All shipyards are subordinate to Captain Pasha. However, shipyards are headed by Shipyard Director. In this research, the Imperial Shipyard, the largest one of all shipyards, is examined. Imperial Shipyard is headed by Imperial Shipyard Director. Other shipyards too are subordinate to this Director particularly in technical respect (ship construction and repair). There are two other high level managers in the Imperial Shipyard. One of them is the Shipyard Chief who performs legal duties. The second one is the Shipyard Master who is the representative of Captain Pasha. This organizational scheme displays a characteristic not seen in any other institution of the Ottomans.

- Imperial Shipyard Director is the head of the Shipyard. He is responsible for technical affairs, administrative affairs, and financial affairs. In other words, the entire organization is under his authority. The departments subordinate to him are: Accounting Department, Documentation Department, Technical Personnel, and Religious Officers. The most developed of these departments is the accounting. It is conceived also from the high number of departments subordinate to it that the accounting department is the most developed department of shipyard organization. The following sections and their duties constitute the inner organization of accounting responsibilities: Cash book officer's section - keeping daily records of accounting department; Execution Secretary's section - computing and distributing

¹⁰ *Arshin* is a unit of length ranging between 60 and 70 cm..

wages; Safe box section - keeping records of materials storage; Port Secretary's section - keeping records of wood storage; Jail Secretary's section - meeting the needs of oarsmen comprised of slaves and convicts; Cashier's section - recording cash affairs. It is known that the Ottomans attached importance to a central accounting organization as well as to a devolved accounting organization for the accounting of private institutions such as shipyard accounting. Documentation of the importance attached to accounting department by the state is available in the Ottoman Archives today. About half of nearly hundred million documents available in the Prime Ministry Ottoman Archives being from accounting documents and nearly four hundred accounting books being among these documents indicate this importance.

- Equipment records of ships operating in the navy and the work to determine wages in ships are seen to be performed by persons subordinate to the Shipyard Director. There is a manager (minister) responsible for the equipments of each ship submitted by order of the navy being lunched to sea, an accountant keeping records of ship equipments and an another accountant (secretary) who computes and distributes wages and these people operate under Imperial Shipyard as required by their duties.

- The characteristic of 17th Century is that the state attached importance to shipyards, mainly the Imperial Shipyard in Istanbul as a result of the Ottoman Empire's defeat against the naval forces of the Holy League¹¹ in 1571 Leponta naval war. As a consequence of these developments, shipyards developed and became widespread at the beginning of the century. All shipyards of the state were technically made subordinate to central shipyard and to some extent for this reason, the shipyard in the centre, in other words the organization of Imperial Shipyard was developed and strengthened.

- Imperial Shipyard was brought to a position to construct big ships. It is noticed that all materials required for ships constructed in the shipyard were obtained from provinces of the Empire. Constructed and repaired ships are made entirely from domestic materials and workmanship. Three types of personnel had been employed in the Imperial Shipyard. The first group of them is the managing cadres. It is seen that managers were assigned to the Imperial Shipyard after having been selected from among those raised in the central administration of the state. Technical personnel comprised of masters working in ship construction constitute the second group. It is seen that when shipyards expanded suddenly, masters initially working in small shipyards (boat construction loots) of private sector on sea shores of various regions of the Empire were drafted to state shipyards. However it is understood that these masters were later raised within master apprentice relations in these shipyards. Personnel working in accounting and other departments, constituting the third group had been obtained from the central organization of the state in Istanbul. Particularly the

¹¹ Fleet of the Holy League: A coalition of Spain, the Republic of Venice, the Papacy, the Republic of Genoa, the Duchy of Savoy, the Knights Hospitaller and others.

personnel of accounting department are known to have been covered from those raised in the central accounting organization¹².

It is understood that the Imperial Shipyard in the Ottoman Empire had an intrinsic form of management and this organizational scheme was not like those in other institutions of state. It is noticed that accounting had a special place within this organizational scheme.

3. Accounting Records of the Imperial Shipyard

3.1. Ship Construction and Repair Activities in the Imperial Shipyard in 1661 A.D.

The number of ships constructed and repaired in 1661 A.D. is stated below.

Table 3. Types of Ships

Year	Galleon		Bastard		Galley		Lighter		Galiata		Stoneship		Caique	
	C	R	C	R	C	R	C	R	C	R	C	R	C	R
1661	-	6	3	1	56	2	-	1	-	-	-	1	1	2

According to the data in this table, it is seen that 60 new ships were built in 1661 A.D, the number of repaired ships were 8, and 6 of them were large ships.

It was mentioned in the previous sections that Ibrahim Efendi had served as the Shipyard Director for the longest term in 17th century and he performed this duty between 1658 A.D. and 1662 A.D.

Accounting records regarding the latest period (1661-1662) of Ibrahim Effendi are kept in summary books of yearly accounting records which can be found in the Prime Ministry Ottoman Archives Number MAD 966.

3.2. Evaluation of the Accounting Records of the Imperial Shipyard in the Years 1661 A.D. and 1662 A.D.

Four pages of yearly summary accounting books including revenues and expenditures of the final year when Ibrahim Effendi departed from his office as Shipyard Director are included in Annex 1.

Summary accounting records of the period mentioned in the first two pages of four-page accounting books are included in Annex 1. On the last two pages, there are notes for

¹² For further details see Güvemli and Toraman (2004).

control of records and the summary made by Ibrahim Effendi in writing on the revenues and expenditures for the final period. Below, first the dates including information in the accounting books will be mentioned and then the information in books will be focused for examination.

Ibrahim Efendi released accounts of his final year as Shipyard Director and presented them to the Prime Ministry. These accounts comprise a period of 13 months 8 days. It is because records start from the month *Rebiülevvel*¹³ of Hegira¹⁴ 1071 (Gregorian 1660-1661) and end on the 8th of month *Cemaziyelevvel*¹⁵ of Hegira 1072 (Gregorian 1661-1662). Accounts are kept on a yearly basis in the accounting department. The reason why Ibrahim Efendi took up such a time interval is not exactly known. However, we can make estimation. The date of account submitted previously to the Prime Ministry could be at the end of the 2nd month of Hegira 1071. In that case, the account to be submitted anew should start from the beginning of 3rd month of Hegira 1071. 8th Day of month *Cemaziyelevvel* of Hegira 1072 is the date of Ibrahim Effendi leaving Directorship, Ibrahim Effendi gives an account of the last 13 months, 8 days which is the period for which he had not previously given an account.

Within this period, Ibrahim Effendi issued the incoming money to Shipyard and the places of expenditure of these monies from accounting records, then presented to Prime Ministry. In other words, it is an accounting report comprising revenues and expenditures for a period.

The date of this accounting report prepared by Ibrahim Efendi is 12 *Cemaziyelahir*¹⁶. In other words, the accounting report is prepared one month four days after 8 *Cemaziyelevvel* which is the date for the latest kept record. Two matters are noticed within the long explanations included at the end of accounting records. The first one of them is the short explanation. In this explanation, it is stated that *the report is prepared on 12 Cemaziyelahir 1072 from accounting records pursuant to submitted order*. The Imperial Shipyard Secretary made this explanation. He was the highest level responsible of the shipyard. He put the date at the end of the report and signed it. On this explanation of the accountant, there is a signature in the form of *Sah*. This indicates that this report prepared by the accountant who confirms with accounting record, and that it was controlled by a few people, auditors.

Following a brief explanation included at the beginning of a long explanation at the end of report, there is a long explanation. This explanation is the article where Shipyard Director Ibrahim Efendi presents his accounting summary. In this article, numeric summary of accounting report is included in writing. Revenues and expenditures are written not in figures but in writing. Therefore, Ibrahim Efendi gives the written form of amounts included

¹³ *Rebiülevvel* is the third month of the year according to the Muslim calendar.

¹⁴ *Hegira* is an Arabic word meaning migration or flight. It is the emigration of Muhammad and his followers to the city of Medina in 622 CE making the first year of the Islamic calendar.

¹⁵ *Cemaziyelevvel* is the fifth month of the year according to the Muslim calendar.

¹⁶ *Cemaziyelahir* is the sixth month of the year according to the Muslim calendar.

in the accounting report once again in summary. In other words, Ibrahim Efendi wanted to express that he read and accepted that the information in this report was prepared on the basis of the accounting records. These expressions indicate that Ibrahim Effendi accepted the information in the accounting report. Ibrahim Effendi stated: *Yes these revenues and expenditures are made under my responsibility and I assume the responsibility for these amounts.* The report ends with the following expressions: *Revenues and expenditures fully conform to their documents and records, this report is prepared by benefiting from accounting records upon orders of my great Sultan (My Emperor) and submitted to his order.*

Under these expressions, Ibrahim Efendi sets forth that the report is accepted by him and it is presented to the order of the Sultan.

The explanations for the summary accounting records are examined below.

- Accounting records in the report are made using the *Merdiban* Method. This method is the accounting record method employed by the Ottomans for five centuries in state accounting (Güvemli *et al*, 2008). Ottomans quit this method from 1879 A.D. and passed into a double-entry recording method. Ottoman language was not used in accounting records; *Siyakat* characters were used instead (Güvemli and Güvemli, 2007). *Siyakat* characters are characters written in Arabic letters without points, it is like Ottoman stenography. Ottomans used this type of calligraphy in accounting and also in communication related with foreign affairs¹⁷.

- Original accounting records shown in this paper were transcribed and then translated into English. This translation is included in Annex 2. Underneath the translation, three notes are inserted by us. The first two of these notes are related to the correction of two figure errors confronted in the originals of records. The third one is related to the difference between total revenues and total expenditures. Expenses are in excess by 9,683 *Akcha* and it is accepted by us that this difference is covered by borrowing.

- After corrections, first the daily book records, then the great book records of these accounting records are made pursuant to the double-entry recording method. Then a trial balance is prepared. From the prepared trial balance, it is concluded that an expenditure of 35,956,068 *Akcha* is made in the said period and a portion of 35,801,385 *Akcha* of these expenditures are met from the Treasury, a portion of 145,000 *Akcha* is covered from sales of scrap materials and a portion of 9,683 *Akcha* is covered by borrowing. When the portion covered through borrowing is deducted, the amount of revenue allocated to the Imperial Shipyard is seen to be 35,946,385 *Akcha*. These amounts are taken from records made through the *Merdiban* Method, they are original information. In Annex 2, the form of accounting records kept in *Merdiban* method is included, and in Annex 3, the form of the same records made with the double-entry recording method is included. A comparison of

¹⁷ For further details, see Güvemli and Gücenme (2002).

Annex 2 and Annex 3 also enables comparison of the *Merdiban* Method with the Double-entry Recording Method.

- There is also a possibility of showing the yearly expenses of the Imperial Shipyard by benefiting from these records. In the trial balance included in Annex 3, six expenditure items are seen on the debt section of remaining columns. The first four of these expenditures are related to the Imperial Shipyard. The last two are related to the navy at sea. It is noticed that arms and ammunition are not included in accounts. This is because neither artillery nor rifles nor weapons like swords are produced in the Imperial Shipyard. Materials used by fired arms like gunpowder and bullets are not being produced either. Therefore, armed equipments of ships are not included in these accounts. They are included in accounts of other institutions producing these arms and ammunition. The task of the Imperial Shipyard is to make ships ready for use under maritime conditions. Imperial Shipyard had the responsibility to ready different type of ships with the same equipment.

- On these bases, expenses of the Imperial Shipyard covering a period of 13 months and 8 days from 1 *Rebiulevvel* 1071 to 8 *Cemaziyelevvel* 1072 are as below. These expenses are obtained from the trial balance included in Annex 3.

Table 4. Ship construction and repair expenses of the Imperial Shipyard

	<i>Akcha</i>
Materials	15,072,760
Wages	9,345,314
Salaries	366,994
Food expenses	<u>190,000</u>
Total	24,975,068
Equipment expenses:	
Wages	10,201,000
Food expenses	<u>780,000</u>
Total	<u>10,981,000</u>
Grand Total	35,956,068

It would be appropriate to state that expenses -excluding salaries- are in variable characteristics. On the other hand the salaries are in unchangeable characteristics because they belong to officers and high level managers.

- There is the possibility of transforming these expenses into yearly status with an approximate calculation. Accordingly, yearly expenses of the Imperial Shipyard would approximately become:

$24,975,068 \div 13 = 1,921,160 \times 12 = 23,054,000$ *Akcha*. A cost calculation can be made under the assumption that all of these amounts are used in ship construction and repairs. The coefficient of ships produced and repaired in the year 1661 A.D. is clear. However, their costs are not included in calculations. The aim of these specific accounting records is not cost calculation. However, it is not possible to come across cost accounting records of the Ottomans before the 19th Century. It cannot be said that unit production costs of ships produced by the state in the Imperial Shipyard are much needed in this period; it is because there is no need to make a comparison. All materials used in the production of ships and the entire workmanship are domestic. There was no need to calculate the unit cost of ship types. This is because a decision is made on ship types not on the direction of cost of ships but on the requirement of navy. Despite that, it seems plausible to make cost calculation since almost all of the ships produced in 1661 A.D. are in large sizes.

In 1661 A.D, a total of 60 ships, 59 of which were large, were produced and 8 ships, of which 6 were large, were repaired in the Imperial Shipyard. If we consider that the repairs are not great repairs and 10% of yearly expenses could be allocated to ship production and repairs, then the unit cost of 59 big ships can be calculated as follows:

<i>Yearly expenses</i>	<i>23,054,000 Akcha</i>
<i>Big ship production expenses</i>	<i>20,054,000 Akcha</i>
<i>(23,054,000 x 90% = 20,748,600)</i>	
<i>Big ship unit cost</i>	<i>351,670 Akcha</i>
<i>(20,748,000 ÷ 59)</i>	

It is known that 3 bastards and 56 galleys were produced as big ships. These ships are generally in a length of 50-60 meters, they have double masts and sailing sheets. From these detailed characteristics, it is conceived that the Ottomans could make a ship of 50-60 meters for around 350,000 *akcha*, in the 17th Century.

4. Conclusion

It can be seen that the state attached importance to ship construction and repairs, thus improved the Imperial Shipyard which was established on the Golden Horn in Istanbul at the end of the 15th century. The Ottoman Empire also set up new shipyards in other parts of the Empire when the Ottoman State navy faced an important defeat in Lepanto in 1571 A.D.

The Imperial Shipyard is seen to have an organizational structure subordinate to Captain Pasha, who was the commander of naval forces of the state. There were three persons subordinate to Captain Pasha in the shipyard. They were the Shipyard Director, the Shipyard Chief and the Shipyard Master. The Shipyard Director was the person with the widest authority in the shipyard. He had responsibilities for financial, administrative and technical issues. The Shipyard chief was responsible for legal affairs. The Shipyard Master was the representative of Captain Pasha in the shipyard. He was in the position of being the person to act during times when Captain Pasha was on maritime military expeditions. This organizational structure is a structure not seen in other institutions of the Ottoman and was formed according to the special characteristics of the shipyard.

One of the strongest positions within the organizational structure of the Imperial Shipyard was the accounting department, which was comprised of six sections. Besides the classical accounting organization, it had additional sections depending on the characteristics of the shipyard. For example, inventory records of the equipment of each ship on the sea were under record and controlled by three operating personnel. It can be conceived that equipments like sailing sheets, shores, compasses, maps, illumination, food storage and water barrels of ships constructed in the Imperial Shipyard were made by the shipyard administration. Shipyards could not be involved with arms and ammunition required for the armament of ships. With respect to this situation, it is understood that ships made ready to transport humans, cargo and animals were constructed in shipyards and then launched to the sea. The armament of ships was fulfilled by other institutions of the state.

It is seen that the shipyard accounting department prepared a report related to revenues and expenses at the end of each financial year and this report went through auditing and was then sent to the Prime Ministry. This report had two aims. The first aim was to audit revenues and expenses. The second aim was to determine the amount of resources to be allocated from the state budget in the following year. In the Ottoman period, accrual accounting was implemented in state accounting practices. The need for accrual accounting practices results from the need of the state to know how much tax will be paid by the tax payer in the New Year. In other words, the state notifies tax payers how much they will pay at the beginning of the year, registers it in accounting and then deducts from the debt of the tax payer as collection is made within the year. Accrual accounting also includes expenses of the state. The state had to announce how much expenditure it will make in the Imperial Shipyard at the beginning of the New Year.

There is a second issuance time for financial reports. It is the time the Shipyard Director is taken from office. The Shipyard Director then presents the revenue and expenses of the shipyard to the state for the period under his own responsibility. Before leaving office, The Shipyard Director issues his report for two purposes. The first one of them is to give an account of his own time and the second purpose is to hand over the accounts for the person succeeding him. It is necessary to mention that the *Merdiban* Method was used in state

accounting by the Ottomans and specific characters were used in records, such as *Siyakat* Scripts¹⁸. It is seen that revenue and expenditure accounting was dominant in shipyard accounting; inventory and cost accounting was not developed. It is understood that inventory works are made in two sections under accounting. One of them was the material storage, while the other was the wood storage. On the other hand, it is noticeable that there exists an internal control order in Ottoman accounting practices.

We wanted to understand whether the accounting practices of the related time period was meeting the requirement of the sector which it serves within the period examined. It is observed that the accounting practice within the shipyard had met the needs with respect to revenue and expenditure accounting. It is conceived that information regarding both revenues and expenses could be obtained from the accounting department. It is seen that accounting records could be turned into a financial report; also, the information on the financial report could be audited. Since accounting towards revenue-expenditure records is dominant, this recording and auditing order could be said to meet the requirement. It is hard to say inventory accounting is much developed. Inventory works were made with the purpose of controlling materials and wood storages. It is because there are separate personnel in the accounting department working on controls of these storages. On the other hand, it is hard to say the cost accounting concept is yet included among the accounting concepts and implementations.

¹⁸ For further details see Toraman, *et al* (2005).

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Prime Ministry Ottoman Archive Number MAD 966

Prime Ministry Ottoman Archives KK 2623, KK 5655.

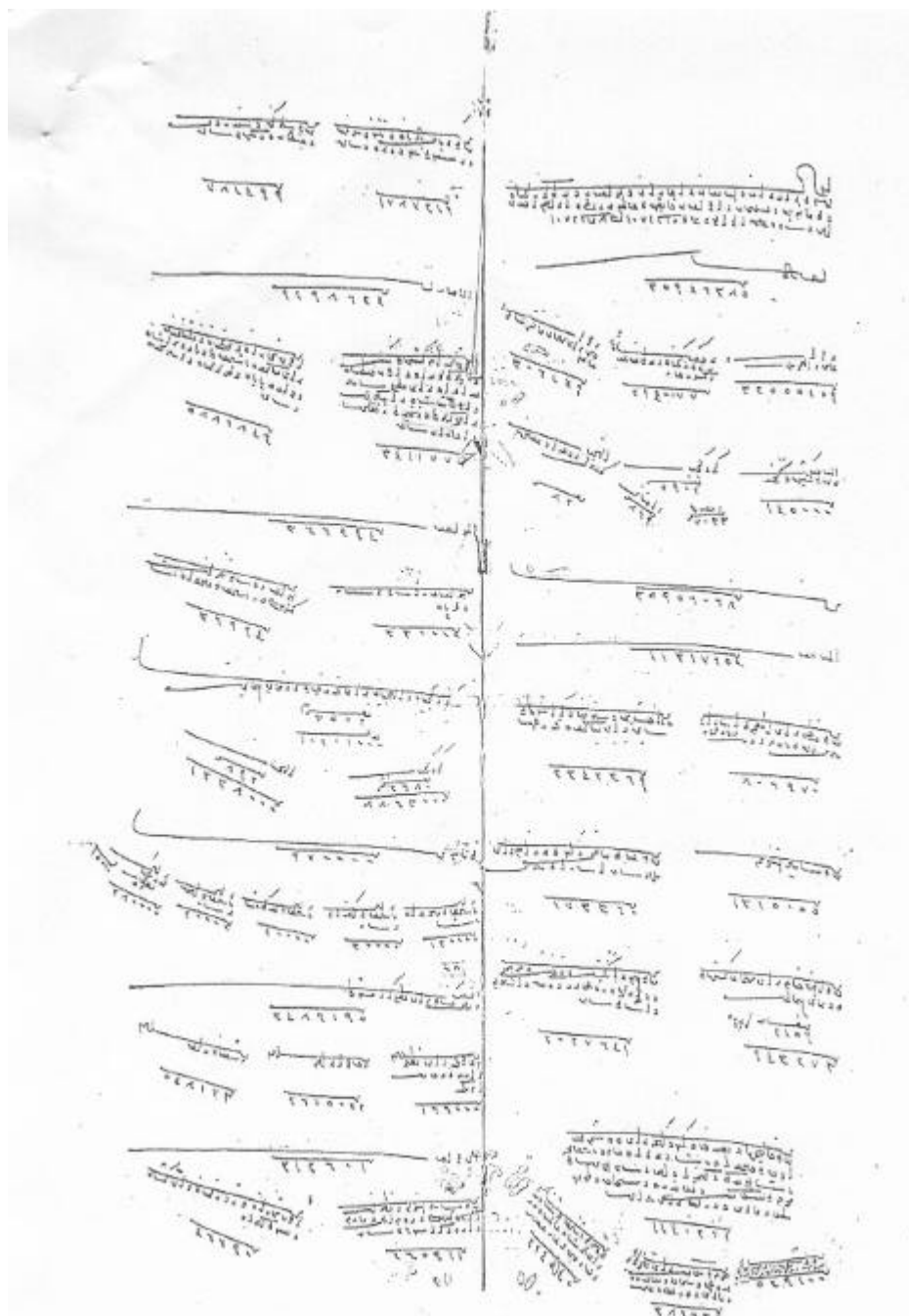
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Annex. 1

Accounting Brief Report for 1661-1662 A.D. (Hegira 1071-1072)



Source: The Directorate of Ottoman Archives of the Prime Ministry, MAD 966

Annex. 2

Transcription of Accounting Records

All of the Bookkeeping Registers_____

At the time of the Imperial Shipyard's Administrator Ibrahim Efendi, from the beginning of the Rebiul-evvel in 1071 to the 8th of Cemaziyel-evvel in 1072, purchases, revenues wages, salaries, payments to the rowers, food payments and expenditures for the Imperial Fleet.

Total revenue _____

Akcha

35,946,385

Amount coming from Treasure_____

Collected Taxes_____

From Treasure

(for rowers and pensioners)

(on demand of the shipyard administration)

Akcha

Akcha

Akcha

32,555,159

2,940,077

306,149

From Sales_____

(old materials)

Akcha

145,000

Deducted from these_____

Akcha

35,956,068

Purchases _____

Akcha
11,317,654

Wheat and bread payments for rowers

Akcha
806,970

Lumber, masts and etc. payments

Akcha
2,342,369

Nails (different sorts of) _____

Akcha
1,315,055

clothes suitable for making clothes for rowers _____

Akcha
173,360

Iron as materials for the fleet _____

Cantar
2,159

Akcha
940,273

Trunks, coal, pitch, olive oil, tar _____

Akcha
2,027,641

Decoration for Captain Pasha's _____
room and his admiralship in the fleet
and decoration for Shipyard Administrator
and Shipyard's Colonel

Akcha

1,140,271

Payments for Admiralship's
decoration

Akcha

529,100

Broadcloths for Galleys
and cloths for flags and pennants

Akcha

386,630

Payments for Flag Ship
Saban Beg's decoration

Akcha

224,541

Payments for cloths, rope
and awning for sails

Akcha

1,787,216

Payments for red lead,
glue, blue vitriol

Akcha

781,499

Wages

Akcha

9,298,624

Workers
wages of the stone workers,
iron workers and others,

Akcha

3,411,778

Masters
wages of carpenters, firemen
caulkers and such skilled masters

Akcha

5,886,846

Salaries

Akcha
366,994

Salaries of the Chiefs _____
Imperial Shipyard

Salaries of workers in Gallipoli in the _____
shipyard and Admiralty

Akcha
330,000

Akcha
36,994

Wages of those on boards _____
Rowers and repairmen employed on the galleys of the fleet

Person
3,572

Akcha
10,201,000

wages of the rowers

wages of the repairmen

Person
2,680

Person
892

Akcha
8,363,000

Akcha
1,338,000

Payments for Foods _____

Akcha
970,000

Payments for _____ Admiralship	Payments for _____ ship of Colonel of the shipyard	Payments for _____ Pasha's Reserve Ship	Payments for _____ Shipyard Administrator's Ship	Payments for ships of the Fleet
Akcha	Akcha	Akcha	Akcha	Akcha
120,000	30,000	20,000	20,000	780,000

Lumber purchases _____

Akcha
3,489,195

Payments for _____ Lumber purchasing to Mehmet	Payments for _____ Lumber purchasing to Hadji Ibrahim	Payments for _____ Lumber purchasing to Hadji Sabanoglu
<u>Akcha</u> 166.000	<u>Akcha</u> 2.775.022	<u>Akcha</u> 548.173

Miscellaneous Purchases _____

Akcha
312,601

Payments for _____
Nail, cloth, tar, cutter instruments etc.

Akcha

Payments for _____
wages of carpenters and boatmen

Akcha

Notice: Corrections on the registries:

1. Total purchases are written as 11,317,650 akches. It should be 11,317,654.
2. Elements consist of the total amount as follows:
 - 970,000 for the food payments;
 - The purchasing cost of the 52 ships is recorded as 280,000 but it is to be corrected as 780,000 akcha.
3. Total revenue is 35,946,385 akcha and total expenditure is 35,956,068 akches. The difference is not explained in the original recordings. The difference amount is 9,683 akches and it is probably debt.
 - Errors written in numbers 1 and 2 have been corrected on the transcripts.
 - The correction for number 3 was done in the double-entry bookkeeping system.

Annex. 3

Records with the double-entry bookkeeping system

Records on the General Journal

1) _____

Cash	35,946,385
from Treasury	32,555,385
from Treasury	2,940,077
from Treasury	396,149
from the sales of scrap-iron	145,000

From the month of Rabiul-evvel in 1071 to 8th of Cemaziyel-evvel in 1072 (Hegira)

2) _____

Materials	11,317,654
-----------	------------

Bread, wheat for rowers	806,000
Timbers, masts for galleys	2,342,369
Cost of nails	1,315,055
Clothing for rowers	173,360
Cost of iron	943,273
Various (logs, tar, coal, oakum)	2,027,641
For the ships of Captain Pasha	1,140,271
For equipping ships	529,100
Broadcloth for galleys	386,630
For small war-galley	224,541
Cloth, fabric for sails	1,787,216
Paint materials	781,499

Cash	11,317,654
------	------------

3) _____

Wages	9,298,624
-------	-----------

Workmen	3,411,778	
Skilled workers /masters	5,886,846	
Salaries	366,994	
Workers at the Tersane-i Amire	333,000	
Workers at the Gallipoli Shipyard	36,994	
Wages of the ship workers	10,201,000	
Rowers	8,863,000	
Repairmen	1,338,000	
		Cash
		19,866,618
4) _____		_____
Foods	970,000	
for the Admiral's Ship.....	120,000	
for the ship of Shipyard's Colonel	30,000	
for the reserve ship of Admiral	28,000	
for the ship of the shipyard's manager	20,000	
for 52 ships in the fleet	780,000	
		Cash
		970,000

5) _____

Timber purchases	3,489,195
to Hadji Mehmet	166,000
to Hadji Ibrahim	2,775,022
to Sabanoglu	<u>548,173</u>
 Miscellaneous payments	 312,601
Miscellaneous materials	265,911
Miscellaneous wages	<u>46,690</u>
 Cash	 3,792,113
 Trade Payables	 9,683

Sub. Ledgers

Cash	Treasury
(1) 35.496.385	32,855,159 (1)
11,317,654 (2)	2,940,077 (1)
19,866,618 (3)	<u>306,149 (1)</u>
971,103 (4)	35,801,385
<u>3,792,113 (5)</u>	
35,946,385	

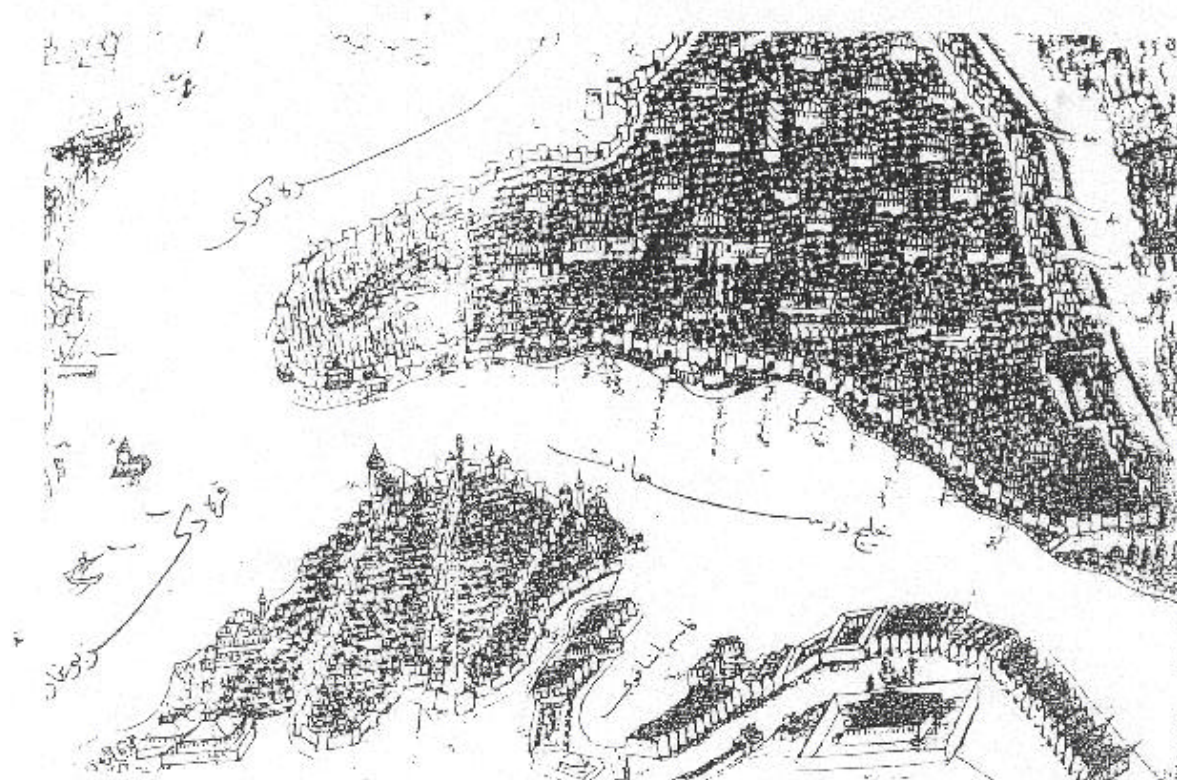
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; border-bottom: 1px solid black;">Scrap-iron Sales</td> <td style="width: 50%;"></td> </tr> <tr> <td style="border-left: 1px solid black; border-right: 1px solid black; padding: 5px;">145,000 (3)</td> <td></td> </tr> </table>	Scrap-iron Sales		145,000 (3)		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; border-bottom: 1px solid black;">Material</td> <td style="width: 50%;"></td> </tr> <tr> <td style="border-left: 1px solid black; border-right: 1px solid black; padding: 5px;">(2) 11,317,654</td> <td></td> </tr> <tr> <td style="border-left: 1px solid black; border-right: 1px solid black; padding: 5px;">(5) 3,489,195</td> <td></td> </tr> <tr> <td style="border-left: 1px solid black; border-right: 1px solid black; padding: 5px;">(5) <u>265,911</u></td> <td></td> </tr> <tr> <td style="border-left: 1px solid black; border-right: 1px solid black; padding: 5px;">15,072,760</td> <td></td> </tr> </table>	Material		(2) 11,317,654		(5) 3,489,195		(5) <u>265,911</u>		15,072,760	
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Foods (Fleet)															
(4) 780,000															
Traders															
	9,683 (5)														

Trial Balance

Account Titles	AMOUNT		BALANCE	
	Debit	Credit	Debit	Credit
Cash	35,496,385	35,946,385	-	-
Treasury	-	35,801,385	-	35,801,385
Scrap- iron Sales	-	145,000	-	145,000

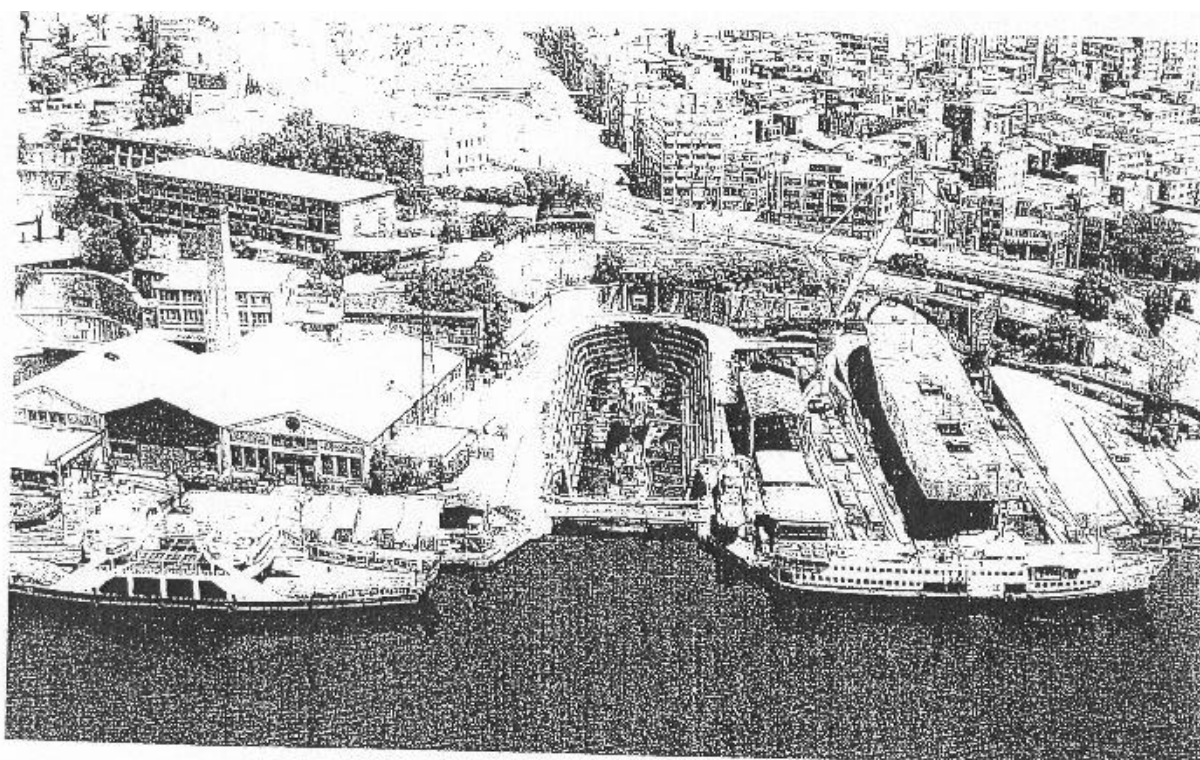
Materials	15,072,760	-	15,072,760	-
Wages (Shipyard)	9,345,314	-	345,314	-
Salaries (Shipyard)	366,994	-	366,994	-
Foods (Shipyard)	190,000	-	190,000	-
Wages (Fleet)	10,201,000	-	10,201,000	-
Foods (Fleet)	780,000	-	780,000	-
Traders	-	9,683	-	9,683
TOTALS	71,902,453	71,902,453	35,956,068	35,956,068

Annex. 4



The projection of the Tersane-i Amire on the Bosphorus and in view of the Golden Horn at the 17th Century.

Annex.5



The current condition of Tersane-i Amire.