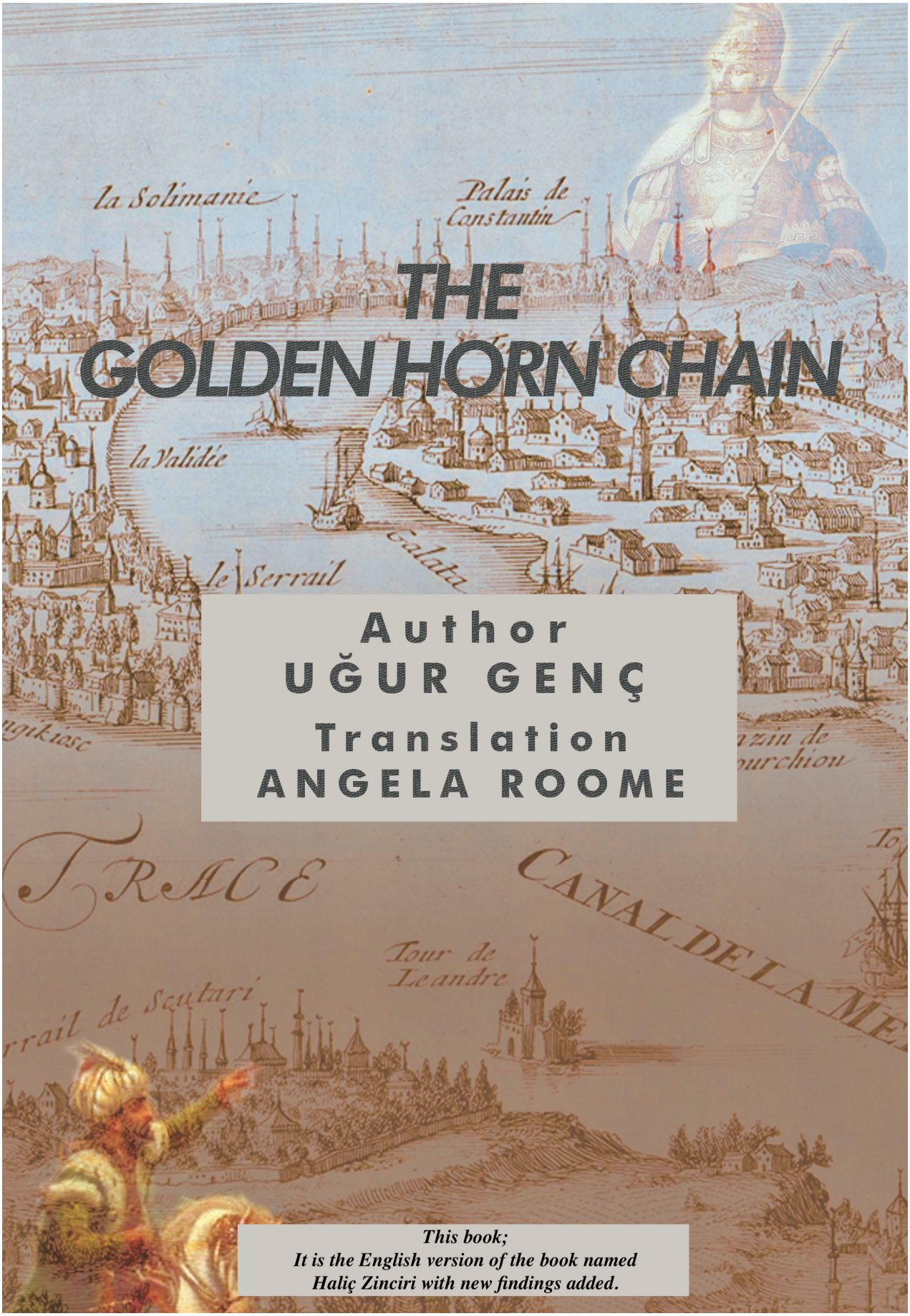


THE GOLDEN HORN CHAIN

Author
UĞUR GENÇ

Translation
ANGELA ROOME

This book;
It is the English version of the book named
Haliç Zinciri with new findings added.

ISBN: 978-605-06741-0-1

Publisher: Uğur Genç

Year: 2023, September

Electronic Book

This book; It is the English translation of the Turkish book published by the Military Museum and Cultural Site Command in 2010, made by Angela Roome in 2011. Moreover, it is an improved version that is studies after the book's first publication

THE GOLDEN HORN CHAIN

UĞUR GENÇ

Translation

ANGELA ROOME

Explanation About This Final Version

At this last stop of the adventure that started in 2007, I feel complete thanks to the chain pieces. Thanks to this research, I have shown to large masses that every object has a story and that conservators can not only see the objects they work with as materials, but also take part in revealing their original identities. As a result of this perspective, which deeply affected my professional activities, I completed my doctoral thesis focused on the development of methodologies to be followed in the authenticity research of cultural assets. I am grateful to everyone who helped me research the chain parts and walked with me on this long road.

Research on chains has shown that parts of the same type are complemented by each other. The hypotheses carried out about the closing moment of the port confirmed this identity, since they were of the size that could be a port chain and that it was named The Chain Closing the Golden Horn. Published in 2010 which after the end of my master's thesis, this book dealt with the mechanism of use of the chain in terms of how it could have happened during the siege of Constantinople in 1453. With the new researches carried out over time, strong findings have been obtained that these chain pieces may actually be the chain broken during the 4th Crusade in 1203, which is much older. As a result of the research we completed with the Italian academician Pier Gabriele Molari, it was understood that the port entrance of the Golden Horn was closed with a much more difficult engineering barricade during the preparations for the siege of Constantinople in 1452. Information about this research is given in Annex-3.

In the light of recent research, we understand that the great chains on display in museums belong to the Golden Horn Chain, built by Manuel Komnenos, broken by Enrico Dandolo and broken into pieces by Bonifacio I degli Aleramici.

Thank you very much for your interest in the mystery of the Golden Horn Chain.

Genç, U. and Molari, P. G. (2022). “The Chain Parts Must Be Holder: A New Interpretation of the Authenticity of the Golden Horn Chain”, *IX Convegno Nazionale di Storia dell’Ingegneria-5th International Conference*, 573-586.

CONTENTS

Page No


1846
Askeri Müze ve Kültür Sitesi Komutanlığı

Preface

The Conquest of Istanbul, one of the most important events to have changed the course of world history, has been the subject of much examination and research. However, the chain which at times throughout history served as a barrier across the Golden Horn had not been sufficiently investigated.

An examination by Uğur GENÇ of the chain in the Military Museum, where the greater portion of it is to be found, and in the other locations, has eliminated this deficiency and found the answer to every kind of question concerning the chain.

We are proud to have been of use in this kind of research and in publishing the results of such an examination.

I would like to thank the researcher, Uğur GENÇ, and wish him every success in his future work.

Military Museum & Cultural Foundation

Ahmet TEKİN
Infantry Colonel

Foreword

This book entitled "*The Golden Horn Chain*", an expanded version of the research and investigations I carried out at the Turkic Research Institute of Marmara University for my doctoral thesis, "*The Problem of the Golden Horn Chain*", has been prepared in order to share my findings with readers interested in history and historical research. This work, which was published under the auspices of the Military Museum, is the first in a contemplated series of books focusing on historical objects. In order to convey to our readers the excitement we, as a team, experienced in every satge of our investigation, we have refrained from academic terminology and speculation, in particular. So I would advise readers not to proceed immediately towards the next section but to wait and if possible do their own research.

The Golden Horn Chain, a subject which has been neglected for many years, in fact, an object which has been seen by some as simply a "heap of old iron" is of priceless historical value. In fact, historical objects, which reflect the technical and scientific knowledge of the time in which they were made and corroborate one or more of the events which happened during their existence, have, quite apart from all this, the same value as a piece of documentary evidence. Historical objects are, indeed, valuable but the concept of what each is worth is relative. An emperor's sword with a scabbard adorned with precious stones, a picture which symbolizes the social norms of its time, or objects belonging to a religious leader are valuable both materially and aesthetically and are, therefore, protected in accordance with their value. Moreover to a researcher working on a sunken wooden ship, there is no historical object in the world more precious than the wooden peg he finds which contains valuable evidence of the way the ship was made. In just the same way the Golden Horn Chain answers questions in the debate over the Conquest.

A tattered history journal which came into my hands when I first started on this research showed that the first person to take up this subject was Ibrahim KONYALI (Atis) in 1951. In his article "*The Chains which closed the Golden Horn*", KONYALI laments the fact that the techniques of the day had not been used to examine the chains and requested experts to estimate their actual measurements. Honour is due to the memory of this man who obtained the permission whereby this work was carried out.

As is well-known, a chain is only as strong as its weakest link. I bear witness to the importance of regulations and discipline in the process of linking the chains, where one person is not seen by the other, and how important teamwork is in order to complete a job faultlessly. The chain used as a barrier to close the Golden Horn was undertaken as a joint enterprise. I would like to thank all the people and organisations who combined to plan the framework of this research into the origins of this mighty chain.

I would like to express my regard for and gratitude to my esteemed teacher, Prof. Dr. Selcuk MULYIM, who helped to bring this research to life, and of whose extensive knowledge I am always in need; to my language teacher, Assistant Professor Dr, Ahmet GÜLEÇ, who laid the foundations for my approach to this historical object: to Colonel Ahmet TEKIN, Director of the Military Museum and Cultural Foundation: to Colonel Bülent TÜTÜNCÜOĞLU, Group Director for the Military Museum, to my family for their understanding and support and to Deniz VARMAZ. In the hope that this work will be of use to researchers on the Conquest.

Uğur GENÇ
February 2010, İstanbul

Introduction

At the begiining of the Fourth Geological Era, the world's most beautiful strait came into being when the sea invaded a deep valley. Until recently it had been accepted that the first settlement here was at Fikirtepe in the Kadıkoy area in the Vth century B.C.E. During the Marmaray excavations, findings from the Neolithic period show that the history of this city goes back to 8 thousand years before the present day. According to myth, it was the Megara tribes which first discovered the beauties of the 27 km strait Westerners call the Bosphorus. In the VIIth century B.C.E. on leaving their homeland the Megarians asked an oracle where they should found their new settlement. "Oppsite the City of the Blind" was the answer. When under their leader Bizans they came to where Tokapı palace is today, they saw that the Phoenicians had established themselves on the opposite shore in Chalcedon. Cosidering that those settlıng there and leavıng such a beautiful place behind them must indeed be blind, the Megarians decided that this must be the place the oracle meant and establıshed themselves on the peninsula there. The small city established where Topkapı Palace is to be found nowadays and surrounded by walls starting from Sarayburnu, passing by Sultanahmet Mosque and reaching the sea again at Ahırkapı, was given the name of Byzantium after their leader.[1]

After its founding, the city underwent many sieges. In 340 B.C.E. it was besiged but not taken by King Philip of Macedonia. However, the city could not withstand the siege made by the Roaman Emperor, Septimius Severus, in 194 B.C.E. and surrendered to him. Thus Istanbul became a part of the Roman Empire.[2]

In 325 A.C.E. the Emperor Constantine undertook to build a new city and in 330 this became the capital of the empire in place of Rome. When the empire was divided in 395, Istanbul became the capital of the Eastern Roman Empire. Subsequently the city underwent many further sieges, notably by the Huns under the leadership of Atilla, and later by the Avars and the Arabs, but it was never taken.[3]

In 1452 Sultan Mehmet II made up his mind to conquer Constantinople which had withstood for centuries some of the most powerful armies in the world. When he came to the throne his plans were ready. He would be the one to conquer Istanbul or Istanbul would conquer him. In fact had the slightest mistake been made, the fate of the Ottoman Empire might have been worse than that of the Interregnum. On 23rd March, 1453, the Ottoman Army set out from Edirne, arriving at Constantinople on 2nd April. Theır first attack on the city walls began on 6th April. However, on the Golden Horn a formidable obstacle was waiting for the navy - the chain across its entrance.

[1] İlhan Akşit, **İstanbul**, Sandoz Publications, Istanbul 1981, p.7.
[2] **Fatih ve Fetih Albümü**, Tarih ve Tabiat Vakfı Yayınları, İstanbul 2003, p.IX.
[3] A.Özcan Ünlü, **İstanbul Aşkı**, Parıltı Yayıncılık, İstanbul 2005, p.12.

THE START

When the Golden Horn Chain is mentioned, everyone, whatever their education, social position or age may be, has some idea about it. From our history lessons in primary school and throughout our life the chain has become embedded in our minds. It is connected with the story of how the ships were dragged across land, to some people a seeming miracle, to others a symbolic witness to the Conqueror's genius and the power of the Ottoman State.

Pieces of chain alleged to belong to the Golden Horn Chain can be encountered in many of İstanbul's museums. I wonder if all of them really belong to the Golden Horm Chain?

Is the Golden Horn Chain Merely a Legend?

History Professor Refik Turan in his preface to "Myths about the Conquest of Istanbul" draws attention to this subject. According to Turan:

"After the conquest no certain information concerning how the chain was streteched across the Golden Horn was discovered. Relying on speculation, İsmail Hami Danişmend gives the date of its being placed at the mouth of the Golden Horn as 2 April, 1453. The chain known to have been there during the conquest, but which could not, however, be broken, was placed there on the orders of Emperor Constantine Paleologus XI by the Venetian Bartholomeo Soligo. This chain, which prevented the Turkish fleet from entering the Golden Horn, stretched from Sarayburnu at one end to the Galata quay at the other. It is said that the floats which kept the chain above water were round in shape. It is possible that the great chain exhibited in the Istanbul Military Museum is part of this historic chain. However, it is also said that this is part of the chain stretched across the harbour at Rhodes by the knights during the Rhodes campaign of Suleiman the Magnificent. In either case the true facts and historical role of the chain in question are uncertain."[4]

It is possible to come across many different reservations and doubts about the Golden Horn chain. The long discussion lasting for many years on the way in which the ships were dragged in one night up the slopes of Galata and landed on the Golden Horn has been overtaken by that about the existence of the chain which closed the Golden Horn. Howeve we see that the two historic events -the transportation of the ships and closure of the Golden Horn by a chain- support and bear witness to the truth of each.

The existence of a chain barring access to the Golden Horn is proved by the fact of the ships being transported overland. Meanwhile research on this transportation shows that the reason for it was the existence of the chain.

[4] Refik Turan, "Efsanelerle İstanbul'un Fethi", **7th Eyüp Sultan Symposium**, İstanbul 2003, p.70.

Seemingly Impossible

Many examples of the myths surrounding the Golden Horn chain can be seen in discussions on each of these events, both on-going and stretching way back into the past.

"...once more the municipality proposed "Let ships be launched into the Golden Horn." Bearing mobile phones in place of axes, the fleshy mariners took up the ropes with enthusiasm. With sweat and tears they dragged the galleons over the hill at Taksim; pushing and shoving they brought the ships down to Kasımpaşa, all two of them. According to legend, however, it was seventy-two ships which were brought from Dolmabahce down to the Golden Horn in a single night. What does it matter- counterfeit Byzantium is now the norm. In any case, it has been Turkish for 549 years. Even two galleons stopped the tongues of the enemy, but when the sound of Turkish oars echoed around Europe, who listened, I wonder? For example, I have a very knowledgeable friend, Ömer Genç. Not even he listens any longer. He is very interested in history, See, this is what he writes: "Tursun Bey unloosed the sails of the Muslim ships decorated with flags on the day of that historic conquest. They carried them through the air around the Galata Tower. Perhaps they made them fly," he said. But why would Mehmet the Conqueror, who had the brains to commission guns said to be at the cutting edge of the technology of the age, attempt such an illogical enterprise? Thıs answer comes from both Tursun Bey, Âşık Paşazade, İdris-i Bitlis, in fact, even from Namık Kemal: 'Your honour, the Byzantine infidels removed the chain from the mouth of the horn, that's the explanation!' What kind of a chain was this which could be neither broken, cut nor crossed? But if the chain, which those who wish may see today in the Military Museum, was so strong how did the infidel ships which managed to flee from the siege retreat from the Golden Horn? Did rackıng one's brains over cutting down thousands of trees, making tracks, filling in holes and levelling hummocks, goading on oxen, greasing planks, placing each ship one by one on them and balancing them with ropes, seem an easier task? Free the chain; mass the ships on the Horn? No, never that! The ships must have been taken overland and in one night, at that!"[5]

"*...In this situation, the question comes to mind as to whether our ancestors, clever enough to undertake the arduous task of dragging the ships over a mountain, had no axes with which to simply cut a chain?*[6] *When two stout janissaries might have been ordered to go and file off the chain, it is impossible to understand why our Ottoman forefathers chose to stir up so many complaisant minds, burden so many men and oxen with such heavy loads, and despoil so many forests for the sake of such an extraordinarily complicated task.*[7] *It was like a mock battle-of-wits. As if saying: "Oh, so you'll release the chain, will you? Well, just see how we transport our ships over a mountain!" The chain was not impassable, just an obstacle to be tested and overcome. In fact, it had been breached previously by the Venetian fleet in 1203..."*[8]

Examples of other answers to the questions concerning this subject that these two esteemed authors concentrate on can be found on the internet. On examining the discussions given on these information sharing websites, those trying to find answers to the questions of

[5] Mine G. Kırıkkanat, "Salla Salla Salla", **Radikal Newspaper**, DatePublished: 29.05.2002.
[6] Erdoğan Aydın, "Fetihte Gemiler Nerden Geldi?", **Cumhuriyet Newspaper**, 02.06.2007.
[7] Erdoğan Aydın, **Fatih ve Fetih: Mitler ve Gerçekler**, (**Conqueror and Conquest: Myth and Reality**) Cumhuriyet Books, Istanbul 2000, p.145.
[8] Erdoğan Aydın, **Fatih ve Fetih: Mitler ve Gerçekler**, Doruk Publications, Ankara 1997, p.101.

how the Conqueror transported the ships overland and on the subject of the Golden Horn chain come across many debatable points. Some of the chief ones are these:

"Since primary school something has been puzzling me. What kind of a chain was this, actually? And how was it guarded? It had to be guarded. Didn't it break or couldn't it be broken? I have always been curious as to what kind of a chain could be such an obstacle to the taking of Istanbul that ships had to be dragged over the hill."

"Regarding the chain, it isn't certain that the one in the museum is actually a part of it. It doesn't look to me like a chain which couldn't be cut. It looks as if a barrel of gunpowder would do the trick."

"Part of the chain across the Horn can be seen in the Military Museum. Something that has always puzzled me is whether or not the part of the chain fixed on the Galata side could have been captured in a surprise attack."[9]

"Some parts said to be from the Golden Horn chain are to be seen in the Naval Museum. How was the Horn closed by this chain? Probably the chain was supported by floats or barges. If the chain broke or the supports removed this would have been enough to sink it. Was this so difficult? The Byzantines could slacken the chain in order for allied ships to enter before swiftly pulling it up again, but the Ottoman ships couldn't get in? This doesn't seem likely to me."[10]

"Was it so easy to stretch a chain of so many metres in length? Wouldn't it have been possible for ships ramming it at speed to have broken the shore moorings?"[11]

The conclusion from observations I made in the museums where the chains are exhibited and the general opinion of visitors is as follows:

First of all, in the opinion of visitors who have seen the links, it is doubtful that such a chain could have lasted until the present day. Moreover, considering that it would be 558 years old, that the chain would still be strong and in good shape after having been used even on the surface of the sea weakens one's belief in it. Both native and foreign visitors consider it a possibility that if, after the Conquest, there had been any parts left of the chain blocking the Bosphorus, the Ottomans would have either melted them down or used them for something else. Those in charge of the chain suggest that the Ottoman State kept the chain in case, one day, they, too, might have reason to close the Golden Horn. Visitors from abroad, in particular, voice their opinion that the chain might be a replica.

What Should Be Done?

During this research, the prime purpose was to take into consideration all points of view in order to use the facts to throw light on the question of whether such a legend might be true or not. So it is very important to be impartial on this subject: the fact that ports were closed by chains. Is this method described only in connection with the Golden Horn? In order to find the answer to this, it was necessary to be able to compare the chains and to consider whether these chains might belong to different dates. It was also necessary to do research on

[9] http://forum.divxplanet.com/index.php?showtopic=86490.
[10] http://groups.yahoo.com/group/YelkencilerLokali/message/719.
[11] http://forum.donanimhaber.com/m_26810411/printable.htm.

other chains mentioned in the sources. Having obtained this information, all of the chains used on the Golden Horn had to be put in chronological order.

Parts Said to Belong to the Golden Horn Chain

The chains exhibited in the Military Museum, the Naval Museum and the Archaeological Museum in Istanbul are presented as "**parts of the chain used by the Emperors of Byzantium to close the mouth of the Golden Horn**." The small chain exhibited in another museum in Istanbul, that of Rumeli Hisar (Fortress), is described in the brochure as "*part of a chain said to have been used to close the mouth of the Golden Horn."*[12] It is therefore necessary to examine the parts of the chain found in each of these four museums and research into whether they come from the same chain or not. This brings up the question of whether these links were ever part of the chain across the Golden Horn or not. In order to answer these questions, one has to consult history to understand the relationship between the chains and these museums.

Information from the Inventory

A catalogue must be produced which includes information about the chains contained in the inventory. Included in this should be the number and kind of links in each part, the measurements- their length, weight and thickness- supported by photographs of the chains from every angle. The type of chain, the technology used, when and from where each came, and how each was brought to its respective museum should all be assessed.

How Might the Chains Have been Used?

The principles under which the chain was used should be evaluated. To know the mechanism of the chain is important in any discussion of the Conquest. Art History Professor Selçuk Mülayim stresses this point, saying:

"Those who oppose the idea of a chain across the Golden Horn put forward the idea that the chain across the Golden Horn did not go all the way across the mouth but was used to connect old ships in order to prevent entrance to the Golden Horn. This suggestions puts paid to the idea of the ships being transported overland and supports the idea that the Ottoman ships entered the Golden Horn by sinking such ships. Those who deny the existence of a chain across the Golden Horn put forward as evidence the fact that the parts of the chain, now exhibited in three different places, as a whole are scarcely 100 metres long which would not have been sufficient to close off the Golden Horn. Meanwhile, the museums in which the chains, said by everyone to be those from the Golden Horn, are kept do not give information about what they were used for. İt must first be established whether or not there was a chain across the Golden Horn. If there was indeed a chain stretching across the whole of the entracne to the Golen Horn this points out clearly that ships were transported overland. However, if the chains were used to connect ships to each other, then it seems this discussion is doomed to continue."[13]

Having shown our aims and what must be done to achievet them, let us now proceed to the research itself.

---

[12] **Turkish Museums,** T.C. Ministry of Monuments and Museums General Headquarters Publications, Ankara 2002, p.85.

[13] Haşim Söylemez,**"**..Ve Zincir Gemileri Karadan Yürüttü", (And the Chain Drove the Ships Overland) **Aksiyon Journal**, Series.390, 27.05.2002, p.24.

HISTORIC CHAINS

According to the information given in our sources, chains were of great importance in the history of war and in the economy. Not only were they used in fortresses to keep out the enemy and in ports to stop merchant and warships from entering harbour but also on campaigns to make temporary bridges during attacks. Chains were used to bind ships to each other in sea battles and to bind cannon together in battles on land. First let us see how chains were used in ports.

Chains Mainly Used to Block Entrances to Ports and Straits

Vetruvius, an architect and engineer of ancient times, writes that, in his opinion, harbours were of the utmost importance and should be constructed so that a chain could close the entrance. He goes on:

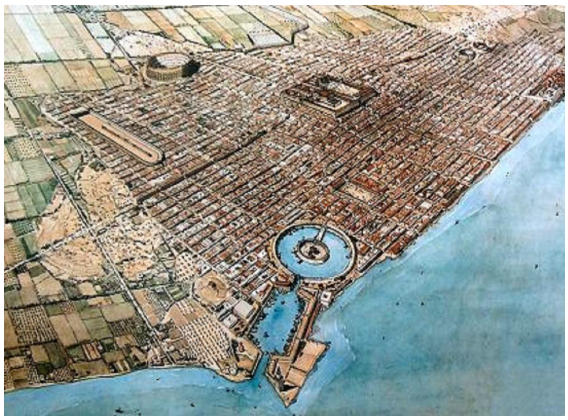


Plate 1: *The Ancient Port of Carthage*

"*As the benefit of a harbour is not a subject to be overlooked, it is necesaary to explain how to protect ships from being taken by storm. Of course, if there is the advantage of a natural geographic feature such as a bend or a dogleg, the harbours there are very handy. Colonnades or boatyards should be built around this or a colonnaded passage made to the business centre. On each side towers should be constructed from which chains can be stretched with the use of machines.*"[14]

Realizing the importance of this, the Carthaginians built towers in order to close off the entrance to their city harbour. These towers were at the entrance to the harbour and from them an iron chain could be stretched across the harbour entrance. It was on account of this that the Carthaginians could easily form a battle front.[15]

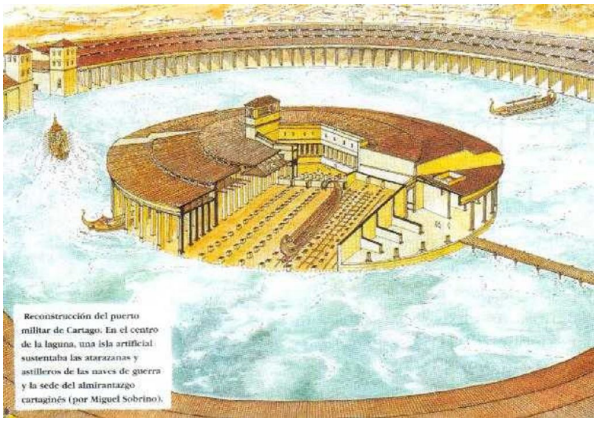
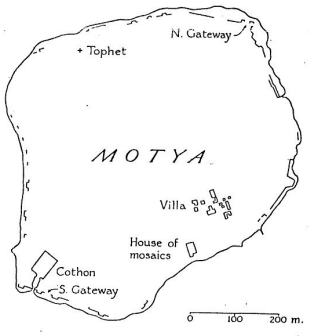


Plate 2: *The Entrance Towers and Chain: Carthage Harbour*

[14] Vitruvius, Ten Books on Architecture(**Mimarlık Üzerine On Kitap**,)Yem Publications, İstanbul 1998, p.121.
[15] Coşkun Bilgi, **Antik Kartaca Limanı**, (The Antique Port of Carthage) Selçuk University, Social Studies Institute, Konya 2006, p.38.

In his research for his doctoral thesis, Underwater Archaeologist Coşkun Bilgi gave Carthage and other harbours as examples of where chains were used.



Map 1: *Motya Island*

The Harbours of Mahdia-Motya-Monastır

The harbour of Mahdia, to the south of Carthage, and that of Monastir in Sicily close to that of Motya are good examples of antique harbours. These three, together with Carthage, were the best-known ones of that time. They were protected by walls on the seaward side and the entrance could be closed by a chain. This points out the importance given to port battles in ancient times.[16]

Another important harbour in ancient times was Phaleron, before the constructıon of Piraeus the closest place to the city for the Athenian ships to beach their ships. However, in 493 B.C.E, the peninsula of Pireaus began to be fortified and in the fifty years following three harbour basins were built there. These harbours were each protected by fortified towers and breakwaters topped with stone walls. Moreover, the Athenians bound the blocks of stone together with iron hoops. Be means of these, or by closing the basins with chains, the defendants were able to prevent attackers from the sea from entering the harbour.[17]

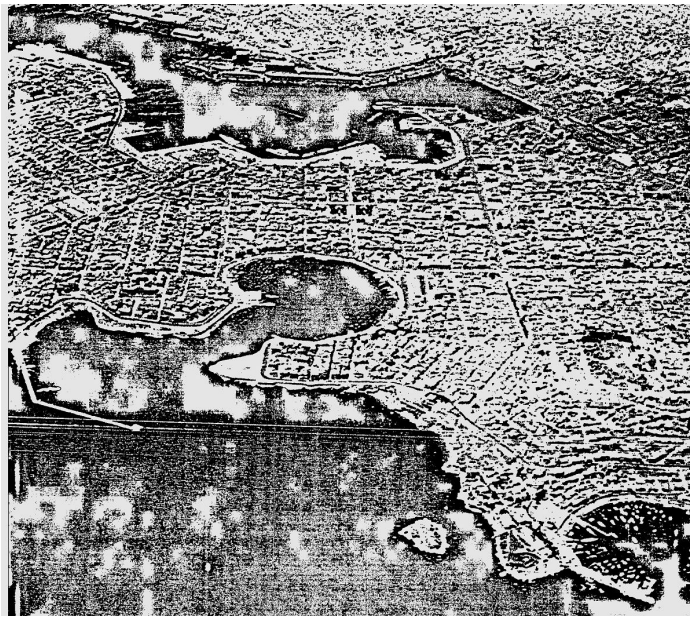


Plate 3: *Ancient Port of Piraeus*

[16] Coşkun Bilgi, ibid., p.5.
[17] Coşkun Bilgi, ibid., p.34.

In ancient ports the part used by trading vessels was larger than that used by warships and was therefore more difficult to defend. So a defence strategy arose of building these as separate entities. The ancient port of Knidos can be given as an a exmaple of this type of port. Open-ended breakwaters built in deep water to the south show that this port was used by trading vessels. The northern port was square in shape and better protected. It was used as a naval port where the entrance could be blocked by chains.[18]

Another ancient city which had a safe natural harbour was Miletus. İts geographical position allowed it to be reached from every corner of the Mediterranean Basin as well as being open to maritime trade with the Black Sea. Although it has been established that there were altogether four harbours at Miletus- the Lion Harbour, the Theatre Harbour, the Fever Harbour on the left, and one other- the exact positions of these has not yet been determined.[19] Access to the Lion Harbour, so named from the fine Hellenic statues of lions at the harbour entrance, could be blocked by a chain and the coming and going of ships monitored. A chain is said to have been used at the port for the city of Ephesus, another place in Anatolia inhabited in ancient times. The southern entrance to the port of another ancient city, Iassos, was built on a small island and could be protected by a chain slung between two protective breakwaters. Excavations at the ancient city of Kaunos, at Köyceğiz, uncovered tablets giving information about customs dues. According to this information, the city harbour was closed by a chain and there was a dockyard there. It is thought that in times of danger the trading port could be closed off by a chain strung between Küçük Kale (Little Castle) and Çömlekçi Tepe (Potters Hill).[20]

An Example in Myra

Myra, an important Lycian city, was first built on the side of a hill and later extended to the plain below to become one of the six largest Lycian cities. The Myra River passes through the present day town and flows into the Mediterranean at Andriake where there was a settlement and harbour. Ships were able to sail up-river to the city of Myra. The city, which developed greatly due to maritime trade, suffered many invasions at different times. Therefore, in times of danger, a thick chain was stretched across the mouth of Andriake Harbour in order to prevent the entrance of enemy ships. The Roman historian, Appius, mentions that, in 42 B.C.E. after invanding Xanthos and taking Patara, Brutus, one of Caesar's murderers, sent one of his captains, Lentulus Spinther, to Myra to collect money. Myra resisted him but Spinther succeeded in breaking the thick chain blocking the city harbour at Andriake and captured the city. So the hapless citizens of Myra had to bow their heads and pay the large sum of money demanded by the Roman captain as war indemnity.[21]

[18] Coşkun Bilgi, ibid., p.35.
[19] Alan M. Greaves, **Miletos Bir Tarih**, (A History of Miletus)Homer Publications, İstanbul 2003, p.24.
[20] Mustafa Büyükkolancı, Denizli, Kişisel Görüşme (A Personal View).
[21] Serhat Kunar, **Myra,** Net Turistik Yayınlar, İstanbul 1995, p.6.

The Chain Blocking Passage between Kız Kulesi (Maiden's Tower) and Sarayburnu

In 310B.C.E. one of the Athenian generals, Alcibiades, wishing to impose a 10% customs tax on cargoes coming by ship from the Black Sea, established a customs post on the island where the Maiden's Tower stands today. In order to prevent boats sailing into the Marmara without paying tax, it is said that a chain was strung between this island and Sarayburnu.[22]

However, reliable records of a building on this rocky islet only go back to the XIIth century.[23]

According to İbrahim Hakkı Konyalı's researches, the Byzantine historian, Nicetas Honiates, writes that the Emperor Manuel Comnenos (1143-1180) had a chain fixed between Sarayburnu and Kızkulesi[24] where he built a tower to which the chain was attached. Moreover Comnenos blocked the passage between the tower and Üsküdar by a stout wall. The other end of the chain was attached to the Alat-i Harbiyye Mangana Tower, the old name of which was Aya Dimitri, at Sarayburnu. This was to be found between the area of the Değirmen Gate and the pavilion of Sinan Paşa.[25]

Details of this are given by Çelik Gülersoy in the materials on the Maiden's Tower used for his encyclopaedia.

Photograph No: 1: *Kız Kulesi*

"When the Emperor Manuel Comnenos I built his summer palace where Topkapi now stands, he built a protective tower on the Sarayburnu shore where the Mangana Monastery was situated. Seeing that approaching Ottoman and trade ships might threaten the city, he surrounded the tower with a bastion wall. Later barges ranged in the harbour near it were then linked together by a chain in order to prevent enemy ships from entering Istanbul. Moreover, a watch office was set up to collect the way-tax and customs dues from merchant ships. Having paid the dues, merchant ships were allowed to pass through an opening in the chain strung between the tower and the Salacak shore It is said that the weight of the chain caused the collapse of the Damalis tower on the Sarayburnu shore."[26]

---

[22] İbrahim Atis, "The Chain Blocking the Golden Horn", **Tarih Hazinesi**, Ülkü Kitap Yurdu Publications, İstanbul 1951, vol.8, pp.375-376**.**

[23] Emrah Aksin, "İstanbul'un Üç Kulesi" (Three Towers in Istanbul), **TMMOB Chamber of Construction Engineers, Izmir Branch News Bulletin** p 48.

[24] Built for defence, the Maiden's Tower functioned as such until Ottoman times. However expansion of the city walls reduced its importance and the tower began to be used as a lighthouse.

[25] İbrahim Atis, see above., p.377.

[26] Çelik Gülersoy, "Kız Kulesi", (The Maiden's Tower) **Dünden Bugüne İstanbul Ansiklopedisi,** (Encyclopedia of Istanbul Past and Present) Tarih Vakfı Publications, İstanbul 1994, vol.5, p.11.

Why Would Such a Chain Have Been Used?

One of the main reasons why such a chain might have been used in XIIth century is that when Manuel Comnenos I was on the throne the Byzantine Empire was under threat from the enemy in many places. In fact, in 1144, Prince Raymond of Antioch captured many Byzantine fortresses and cities in Anatolia. However, the fleet under the command of Demetrius Brannasse, and the army under Bursuk, a commander of Turkish origin, brought this area back under Byzantine control. This situation, of which people in the west were well aware, aroused thoughts of a new crusade, following the success of the First Crusade. In 1146, the French King, Louis VII, wrote a letter to Manuel Comnenos I apprising him of this The first to set out on this new crusade in May, 1147, was the Germanic ruler, Conrad III, with a force of twenty thousand men. The Germanic troops were difficult to discipline and consisted in part of a rabble of escaped prisoners. This group began to loot and pillage from their very first entry into Byzantine lands. Moreover, Conrad III's nephew, Frederick Barbarossa, confirmed the Emperor's worst fears when he massacred all the inhabitants of a monastery near Edirne, including the monks. The Byzantine force which had been sent to accompany them, on observing the situation, engaged in combat during which a certain number of the rabble were killed.[27] Apart from this, the inclusion of the Byzantine King Roger of Sicily on the side of Conrad III in order to rein in his ambition left the Byzantines without a trusted ally. Moreover, preparations should have been made for rapid arming of units against the dangers of open invasion and looting. So Manuel Comnenos then speeded up arrangements to defend the city.[28]

Illustration 4: *Manuel Comnenos*

Illustration 5: *The Second Crusade: Siege of Constantinople*

[27] Radi Dikici, **Şu Bizim Bizans**,(Our Byzantium) Remzi Bookstore, İstanbul 2008, pp.336-337.
[28] Auguste Bailly, **Bizans İmparatorluğu Tarihi,** (History of the Byzantine Empire)Nokta Books Publications, İstanbul 2006, p.238.

The Chain Blocking Passage between Yoros Castle and Rumeli Kavak

The Castle at Rumeli Kavak had been built by Manuel Comnenos I in the XIIth century with the aim of keeping customs under control. A similar castle was built on the other side. The reason for building these two opposite each other was to draw a chain from one side of the strait to the other in order to prevent merchant ships from passing without paying customs dues. In former times this castle was called Polichion, Asomaton or Imros Castle while in Ottoman times it was known as the Genoese or the Old Castle.[29]

Illustration 6: *Evliya Çelebi*

Evliya Çelebi also informs us that he had seen a chain blocking the strait between Yoros Castle and Rumeli Kavak. He writes:

"In the time of Yorko, three layers of chain drawn across the Black Sea at the foot of Yoroz Castle prevented the passage of enemy ships. Parts of this chain are to be found in the Dockyard depot. I myself have seen them. Each link is as thick as a man's waist."[30]

Illustration 7: Ruy Gonzales de Clavijo

The Spanish Ambassador, Ruy Gonzales de Clavijo, who passed through the strait in a sailing ship on his way to join Timur, writes in his travel notes that the castle was in very good repair and housed a military garrison. Clavijo mentions that the castle was surrounded by walls and had a ruined tower from which he supposed a chain could be strung across to the other side:[31]

"The castle of the Rum at the entrance to the Bosphorus is a deserted ruin. But that of the Turks is full of soldiers. There is another fortress here apart from the two opposite each other. The Turks had built another castle on a rock near the shore and surrounded the two castles with a wall. According to what we were told, in former times a chain was strung between the two opposite castles to protect the entrance to the Bosphorus. Ships could not enter the Black Sea without paying the official tax."[32]

---

[29] Yeliz Erkoç, "Boğaz'ın Son Durağı Rumeli Kavağı", (Last Stop on the Bosphorus, Rumel Kavak)**The Gate Journal, TAV** publications Issue.4 April, 2007, pp.22-23.

[30] Yüksel Yoldaş Demircan **İstanbul Mimarisi İçin Kaynak Olarak Evliya Çelebi Seyahatnamesi**, Evliya's Travelogue as a Source for Istanbul Architecture, Vakıflar Genel Müdürlük Publications İstanbul 1989, p547.

[31] Semavi Eyice, "Yoros Kalesi", **Dünden Bugüne İstanbul Ansiklopedisi, (Encyclopedia of Istanbul From Past to Present_** vol.7, Tarih Vakfı Publications, İstanbul 1994, p.534.

[32] Ruy Gonzales De Clavijo, **Timur Devrinde Kadis'ten Semerkand'a Seyahat**, (A journey from Kadis to Samarkand in the Time of Timur) Kesit Publications, İstanbul 2007, pp.53-54.

Research Begins

In 2007, Referans Newspaper published the news that Asnu Bilban Yalçın, a lecturer in the Byzantine Art Faculty of the Bosphorus University, in drawing attention to the existence of a chain between these two castles blocking ships from passing, had suggested that this chain resembled the one across the Golden Horn. Having trawled through many sources, Asnu Bilban Yalçın, when touching on the subject of this castle, asserts that it could have been built during the time of Manuel Comnenos I. Remarking that this emperor gave great importance to Byzantine defence systems, Yalçın declares that it is very possible that it was built for defence purposes. In the 10th century, before the castle was built, the Vikings, pressing hard on the boundaries of the Empire, had come up the Black Sea and into the Golden Horn by way of the Bosphorus.[33] Taking a lesson from this unexpected attack, Manuel I also had a chain fixed from one side of the Bosphorus to the other for purposes of defence. Cursory research in ancient sources shows the existence of VIth century buildings there. Moreover, the foundations of an antique castle have been uncovered in a wooded place on the other side of the Bosphorus exactly opposite Yoros castle. It appears to have been built at the same time as Yoros Castle and has the same kind of wall and foundations. According to ancient sources, this place at the point where the Marmara meets the Black Sea and where the only Byzantine Castle built in Istanbul in the Xth century stands at the highest point of Anadolu Kavak, was known as Hieron Oros, or Holy Mountain and there was a temple there before the advent of Christianity. With the decline of Byzantium, this castle, and the one at Şile, fell into Turkish hands in 1305. Later it was taken by the Genoese, and then in 1391, before the conquest of Istanbul, was brought under Ottoman rule by Beyazit the Thunderbolt. On being taken by the Turks, it got the name of Yoros Castle."[34]

Was there a Chain across the Bosphorus?

According to the latest research, control of the strait was ensured by the building of a fortress on each side of it with a chain stretched betwen the two. However, just as no chain has been found either in Yoros castle or the surrounding area, so no parts of any chain, such as the one mentioned in exhibitions about the Bosphorus Chain in museums at home or abroad, is to be found in the depots.

Photograph No: 2: *Yoros Castle*

Photpgraph 3: *View from Yoros castle*

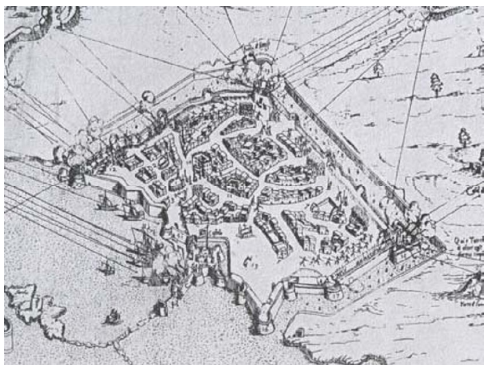
[33] See The Chain Said to Have Been Breached by Prince Oleg

[34] Vercihan Ziflioğlu, "İstanbul'un Tek Bizans Kalesi.." (The Only Byzantine Castle in Istanbul), **Referans Newspaper**, 28 August 2007.

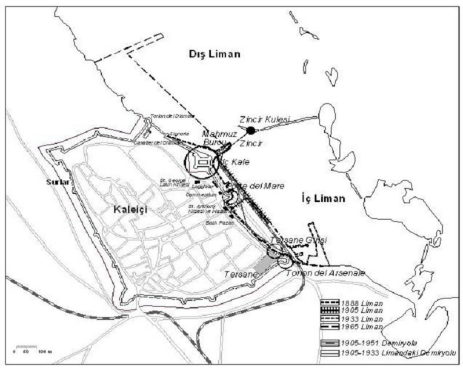
A Chain Blocking Famagusta Harbour

Due to its natural defences, the harbour of Famagusta, situated on the eastern shores of Cyprus, has throughout history provided the best anchorage on the island. The harbour consists of an inner and an outer harbour. In the XIIIth century, when the Lusitanian kings began to rule in Cyprus, Famagusta became the main harbour. The reason for this choice was its geographical proximity to the Holy Land and Lesser Armenia. Data concerning construction in the city and its harbour go back to 1232 and a castle is mentioned as having been used in its defence. A dockyard and a castle were built before the year 1300 to meet the city's needs. In 1308, construction was in progress on a wall between the inner Fortress and the Torion del Arsenale, and on the Sea-Gate. At the beginning of the 14th century a chain was put at the entrance to the harbour. This, if different from the original, still exists, as do the Dockyard, Torion del Arsenale (Canbulat Tabya) and the Sea-Gate.

According to Ege Uluca Tümer, a lecturer in the Architectural Faculty of Kültür University, the defence tower at the entrance to the harbour had occupied the place of today's Inner Fortress and then possibly became a fortress on the seaward side of the Inner Fortress. The fact that the Lusitanian king, Henry I, in 1232 had to besiege and take the defence tower in order to establish his rule there proves the existence of a fortress there at that time. It seems that the Inner Fortress at that time consisted of several small towers, but in 1310 work went on to turn these into a single tower. The first record of a chain, strung between the Inner Fortress and the breakwater at the entrance to the harbour and separating the inner and outer harbours, dates back to 1296. Another extant record states that between 1442-1443 the building of the Chain Tower by the Genoese, the first stage toward stringing a chain between it and the rocky shore, was completed during the time of Venetian rule.



Engraving No: 1: *Famagusta*



Map 3: *Famagusta Harbour*

During the Venetian period, important changes were made in the relationship between the Inner Fortress and the harbour when the north-eastern tower was razed and in its place a walled wharf was constructed, at the very end of which the Mahmuz Bastion, to which the chain from the opposite tower could be attached, was built. In this way, the road to the Inner Harbour was brought nearer to the natural rock opposite, and entrance to the harbour could be better monitored.[35]

[35] Ege Uluca, **Gazimağusa Kaleiçi'nin Tarihsel Süreç İçindeki Kentsel Gelişimi ve Değişimi, (City Development and Changes in the Inner castle of Famagusta during its History _** İTÜ Journal/a Mimarlık Planlama Tasarım (Arhcitectural Plan and Design), İstanbul 2008, vol.7, issue.1, pp.62-67.

Chains Continued to be Used in the Harbour

During the Latin Occupation, the use of the Dockyard and the Dockyard Gate, which had been important in earlier times, was discontinued. However, the Inner Fortess at the mouth of the Golden Horn and the chain between this and the Sea Gate continued to be used, both then and during the Ottoman period. After the Inner Fortess had been taken by the Ottomans it was used to monitor the harbour and for various military purposes. The chain at the entrance to the inner harbour stayed in place until the end of the Ottoman period.[36] It can be seen there in Guiseppo Rosaccio's sketch of Famgusta done in 1597.

Illustration 8: *Famagusta*

Some Notes on Othello's Tower

Photograph 4: *The Winged Lion Relief*

Over the entrance to the tower can be seen a relief of the winged lion of Saint Mark, the symbol of Venice, under which is inscribed the name of Nicolo Foscarini, the commander who renovated the tower. Leonardo da Vinci is said to have advised the Venetians on the system to use for the defence of the city when he was in Cyprus in 1481. A part of Shakespeare's famous tragedy takes place in "a port in Cyprus" and introduces the hero, Othello, as a Moor. It is thought that the writer had heard the name of the Venetian governor of the time, Cristoforo Moro, and had wrongly assumed from his surname that he was of Moorish origin. The tomb of Canbulat Bey, who fell in battle in this area, is to be found under the battery here, the original name of which was the Arsenal Battery. Timeworn and ruined, this building was restored in 1968 and the front section turned into a museum where today ethnographic and archeological objects are displayed.[37]

[36] Ege Uluca, ibid., pp.62-67.
[37] http://www.magusa.org/kentrehberi/gmtarihiyerler.htm.

Canbulat Bey and Chainbreaker Mehmet Bey

Under the Ottomans, the Arsenal belonging to Venetian times on the seaward side of Othello's tower was given the name of Canbulat Tower. Canbulat Bey, the governor of Kilis, had been included in the force preparing to go to conquer Famagusta. Iskender Paşa and Deniz Paşa, who had been of great service in the Ottoman conquest of Nicosia, were newly assigned to take part in the siege of Famagusta. According to reports, at the time of the siege, Canbulat Bey lost his life when riding on horseback to attack and render useless a spiked wheel at the entrance there.[38]

Photograph 5: *The Sea Gate*

Photograph 6: *Canbulat Bey's Tomb*

Photograph 8: *Gate with Hoop reliefs*

Mehmet Bey, who drove the Cypriots out of Antalya in 1573 and brought the city under Ottoman rule once more, was given the title of Chainbreaker. After his death, a chain, his battle symbol, was hung over the entrance to his six-sided tomb in the Grooved Minaret Mosque Complex.[39]

Photograph 7*: Place where the chain was hung*

The stone hook from which the chain, now lost, which gave Mehmet Bey his title was suspended remains as a symbol at the entrance.[40]

[38] http://www.kibristkd.org.tr/kktc_magosa.php.

[39] Hüseyin Çimrin, **Bir Zamanlar Antalya**, (Once Upon a Time in Antalya) Sanayi ve Ticaret Odası (Antalya Chamber of Industry and Trade) Publications, Antalya 2007, vol.1, p.57.

[40] http://www.kenthaber.com/akdeniz/antalya/merkez/Rehber/turbeler/zicirkiran-mehmet-bey-turbesi.

Finally, an Example of a Harbour Chain

After conferring, through the help of Ege Uluca Hanım, with the director of the Famagusta Museum of Antiquities, Hasan Tekel Bey, about details of this chain, a photograph of the links was obtained. 11 links are extant from this chain, known as Othello's Chain. 9 of these are round in shape while two of them are "S"-shaped with open ends. The ends of these links are twisted so that one lies at the side and the other around a link.

Photograph 9: *Pieces from the Chain across Antalya Harbour*

Photograph 10: *Pieces from the Antalya Chain (detail)*

Chain Closing the Antalya Harbor

In 1423 Antalya fell into the hands of the Ottoman State, and the Turks kept access to the harbour under control by means of a chain stretched between two towers there.[41]

Engraving No: 2: *Antalya Harbour (C.De Bruyn 1700)*

A Chain in the Vatican

The Christian world was plunged in despair when Istanbul was conquered by Sultan Mehmet II in 1453. The prestige of Christianity was shaken. Consequently Pope Sixtus IV made ready a scenario for the Christians to regain this city, first spurring on Uzun Hasan against the Conqueror. While Sultan Mehmet was engaged in the struggle with Uzun Hasan, a strong Crusader fleet consisting of 82 galleons from Naples, Venice and Rhodes under the command of Cardinal Carafa was sent to the Eastern Mediterranean. In 1472 the Crusader fleet approached the harbour of Antalya, but a chain, which had long ago been placed between two towers there, prevented it from entering. When the fleet came abreast of the city, 10 selected galleys went ahead and broke the chain by cannon-fire. Then the ships entered the harbour and anchored in front of the walls. The crusading army looted the markets and filled the ships with their spoils. They even cut down trees from the root. They loaded the broken chain on to their ships as a symbol of their victory. However, they could not enter the castle which was protected by two moats and surrounded by walls. Unable to breach the city walls after breaking the chain, the Crusaders plundered and burned the area outside, and took 25 Turkish prisoners away with them as well as 12 camels, the timber they had cut, and the broken harbour chain.[42]

The Crusader fleet, greeted as "Conquering Heroes" in Rome, distributed among the people links of the chain they had brought back as a memory of their triumph. A large part of this captured chain was hung above the Ravenna entrance to the old basilica of St Peter's as a token of victory and a marble tablet was inscribed. In 1925 the chain was removed from the Ravenna Gate and exhibited in the Petri Museum, now no longer in existence. When this museum was closed, the chain was hung in a corridor of the St. Peter's Workshop and Storerooms near the Sala Rotonda of the Pio-Clementina Gallery.[43]

---

[41] Hüseyin Çimrin, ibid., p.58.
[42] Mustafa Kozak, "Ganimet Zincirin Beş Asırlık Sırrı Çözüldü", (The Five Centuries' Mystery of the Looted Chain Resolved) **Akşam Newspaper**, 11.03.2006.
[43] Hüseyin Çimrin, ibid., p.59.

Photograph 11: *Saint Peter's Basilica*

The Chain as a Symbol of Victory

I obtained detailed information on the Antalya Harbour Chain from the director of AKMED Institute, Kayhan Dörtlük, who carried out research connected with this subject. In answer to a letter written to the Vatican asking for information, a church official, Dr. Pietro Zander, wrote the following:

"In answer to your request which has come to Photograph Bureau of the Saint Peter's Workshops, Cardinal Oliviero Carafa informs us that the Antalya Harbour Chain brought to Rome in 1472 and hung over the Ravenna Gate of the Old Basilica is today in the depot of Saint Peter's Workshops, to be more exact, stored in the corridor going to the first octagon opening on to the Pio/Clementino Gallery. Before it was placed there, it was exhibited in 1925 in a salon at the Petri Museum."

In Search of the Chain

According to Kayhan Bey's researches, the marble tablet for the chain commissioned by Duke Ricardo Carafa had a Latin inscription which read as follows: **"Cardinal Oliverius Carafa, for the sixth time admiral- in- chief of the Vatican fleet of Sixtus IV, besieged the port city of Satalia (Antalya)from where he removed this iron chain and had it placed above the door- knocker of this basilica.**[44]

The Institute provided a slide of this chain in 2004. It is from this that information about the type and size of chain, such as the Othello Chain, used in harbours was obtained.

[44] Kayhan Dörtlük, Antalya, Kişisel Görüşme. (A Personal View of Antalya)

Photograph 12: *The Chain taken to Rome from Antalya in 1472*

The Chain in Antalya Museum May be a Part of This!

Under the heading "Mighty Chain Seen in Rome," the Cumhuriyet Newspaper stated that Feridun Baloğlu had mentioned that this subject had been raised in the Turkish Grand National Assembly and went on to write, *"Perhaps it is is not so important that this chain be brought back to Turkey. However, we should recognize and be aware that this is a part of the city's identity*."[45]

In answer to questions, a letter presented to the National Assembly by the Minister of Culture drew attention to an important event:

"In order for a thorough examination to be carried out on the pieces of chain found in the course of improving and cleaning the harbour at Antalya(yacht marina,) these have been brought to the Antalya Museum for safe-keeping."[46]

A statement from the Ministry declared that the various pieces of chain recovered during the cleaning and improvements done at the Antalya Yacht Marina had been delivered to the Antalya Museum. It seemed that these might be parts of the historical chain taken from there to Italy. Therefore a visual examination of them was made and it was concluded that the chains in the depot of St Peter's Basilica looted from Antalya Harbour were not of the same type. The chains in Antalya Museum were of the same type and size as anchor chains.

[45] "Dev Zincir Roma'da Görüldü", (Mighty Chain Seen in Rome) **Cumhuriyet Newspaper**, 01.05.2006.
[46] TBMM Başkanlığı Kanunlar ve Kararlar Dairesi Başkanlığı (Grand National Assembly Ministry Rules and Regulations) dated 10.05.2006 and A.Ol.O.GNS.0.10.00.02- Document Number 20724

Photograph 13: *Antalya Archaeological Museum*

Photograph 14: *Chains in the Antalya Archaeological Museum*

Chained Harbours Noted on Maritime Chart (Kitab-ı Bahriye)

Kitab-ı Bahriye, or maritime chart, is a pilot chart prepared by the Ottoman Admiral, Piri Reis, giving details of the Mediterranean coast. This gives the coastal configuration of the Mediterreanean, the islands, passages, straits, gulfs and safe anchorages in a storm, as well as information on how to approach the harbours and the best routes to take between the various ports. Piri Reis drew his first map of the world between 1511 and 1513 and began to organize his ship's log into a book. This book, written in the form of advice to sailors including, in particular, information on the history and geography of the various places, was completed in 1521. It also gives information on how to use chains and examples obtained from many ports. Piri Reis describes the harbours of Famagusta and Antalya. It can be understood that a chain continued to be used across the harbour at Antalya after Crusader attacks.

Illustration 9: *Piri Reis*

Photograph 15: *The Book of Navigation*

Famagusta and Antalya Harbours

"There is a splendid fortress facing southeast of Famagusta in front of which is a double harbour, an inner and an outer. There is nowhere bigger than Famagusta on the island of Cyprus."[47]

"There is a harbour in front of the castle at Antalya. Here ships lying in this small port are tied fast fore and aft. There is a bastion on each side of the mouth of the harbour. A chain stretches between the two. Foreign ships cannot enter."[48]

Map 4: *The island of Cyprus*

Map 5: *Antalya Harbour*

[47] Piri Reis, **Kitab-ı Bahriye**, Denizcilik Müsteşarlığı Araştırma, Planlama ve Koordinasyon Dairesi Başkanlığı,(Department Headquarters for Naval Research, Planning and Co-ordination)Ankara 2002, p.576.
[48] Piri Reis, ibid., p.570.

Map 6: *The island of Sicily*

The Island of Sicily in the Catalan Chain

"Messina situated on a flat plain on the island has a castle in front of which there is a natural harbour. The harbour covers four miles and its depth ranges from thirty to forty fathoms. At the mouth of the harbour a chain is stretched between towers on each side."[49]

The Island of Majorca

"This island, under Spanish rule, is 250 miles in area. Water is plentiful in the mountains and the island is well-kept.In front of the city is a breakwater known as Portobin. Larger barques anchor outside the harbour while smaller ships lie in the harbour itself. The distance of the anchorage from the city is three miles. There are two towers at the entrance to the harbour and a chain stretches between them As there is anchorage on both sides of this, ships may anchor either side."[50]

Map 7: *Majorca*

Map 8: *Brindisi Castle*

The Famous Harbour of Brindisi near Naples

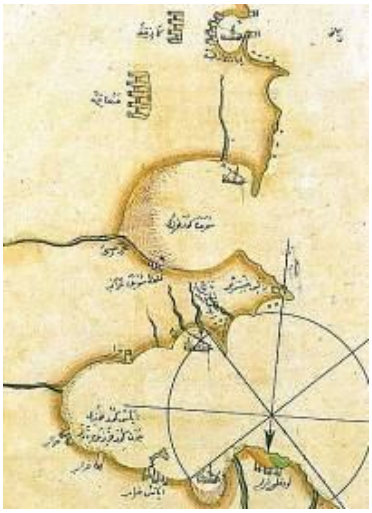
"It should be known that, as I have explained, there is no harbour more famous than that of Brindisi, not even on the Neapolitan coast. This is because there is a very beautiful natural harbour in front of the city. There is a rocky island at the harbour mouth on which stands a fortress strengthened by cannons. Foreign ships cannot enter there. Moreover the mouth is closed by a chain at both ends of which there is a castle containing guards and watchmen."[51]

[49] Piri Reis, see above, p.377.
[50] Piri Reis, see above, p.406.
[51] Piri Reis, see above, p.358.

The City of Marseilles, France

"Marseilles is the chief trading port of France. If it is necessary to send troops anywhere they assemble and sail from there. It has long been in the hands of France and was built in the centre of its territories. There is a harbour in front of the town, A chain is said to be stretched across the harbour mouth."[52]

Map 9: *Marseilles*



Lazkia City

"Thre are rocks at the mouth of the harbour which can cut an iron hawser. It has to be inspected every day. In each side of the mouth of the inner harbour stands a fortress, between which a chain is stretched. There are guards on the starboard side."[53]

Map 10: *Lazkia*

The Castle of Zara on the Gulf of Venice

" This has two castles, one called the Old Castle and the other the New. Some people call this place Zare. The New Castle is a splendid castle surrounded by sea. Chains stretch to the left along the seacoast and within these there is a good harbour..."[54]

Map 11: *Zara Harbour*

Mora Anabolu

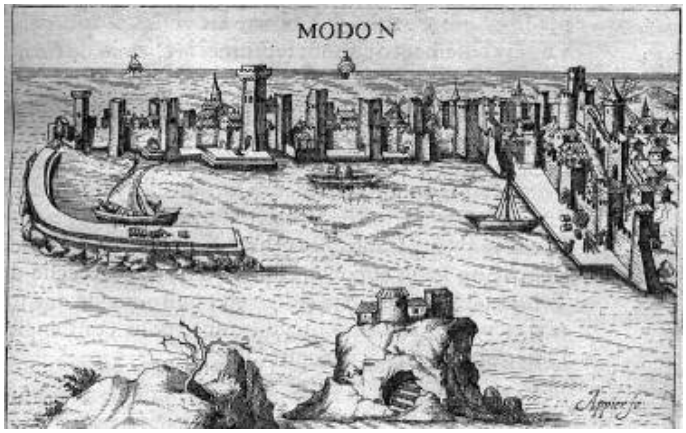
"In front of this castle there is a small island on which before the Inebahtı campaign there stood a castle. Many cannons were ranged on each side. Foreign ships were not allowed near the castle. When our warships came near the castle on their return from the Moton (Modon) campaign, they brought ships and scuttled them around the fortress. So they prevented the ships from approaching or landing soldiers."[55]

[52] Piri Reis, see above, p.445.
[53] Piri Reis, see above, p.558.
[54] Piri Reis, see above, p.293.
[55] Piri Reis, see above, p.226.

Chain Closing Modon Harbour

Map 12: *Modon Castle*

In midwinter 1500, Bayazıt II set sail with the fleet under Yakup Paşa and ordered him to besiege Modon on the Morean Peninsula. As it was a very strong castle, the people did not want to surrender, putting their trust in a triple ditch constructed on the seaward side of the strongest part as a deterrent to footsoldiers. In fact, they expected the besiegers to lift the seige and sail away. The castle stayed under siege for three weeks at the end of which the Venetian Admiral, Melchior Trevisano, came to their rescue with his fleet. However, even though Admiral Melchior Trevisano outwitted the the Turkish fleet and entered the harbour with four of his galleons, he could not proceed because of the chain. When some of the guards left their posts and came to help the ships get past the chain, Sultan Bayazit ordered an attack. The force under the Beylerbey of Anatolia, Damat (son-in-law) Sinan Paşa entered through the gap and not only took the city but burned the four Venetian ships which had entered the harbour. This victory took place on 10 August, 1500.[56]



Engraving No: 3: *Modon Harbour*

Illustration No: 10: *The battle of Modon*

[56] http://www.e-tarih.org/sayfa.php?sayfa=1252797.1228026.4166127.0.0.php.

The Chain Blocking Rhodes Harbour

The island of Rhodes kept its importance throughout history and attracted attention not only on accountof its strategic position but also because of its special nature and its trading opportunities. Rhodes may be accessed via two harbours. In Ottoman times one of these was known as Tersane/Kadırga (Dockyard/Galleon) and the other as Ticaret (Trading) Port. This important island in the Aegean recognized Turkish rule in 1522 during the last days of Sultan Suleiman the Magnificent who himself took part in the campaign. Turkish rule would continue here unbroken for 390 years. In 1912 when Italy invaded the island Turkish rule, as such, came to an end and in 1947, after World War II, it was given to Greece.

Engraving 4:*The Island of Rhodes*

The first dispatch of the Turks towards Rhodes came during the time of Emir Çaka Bey, the judge for Izmir and the surrounding regions. However, he was killed in 1093 and Turkish attempts at domination in the Aegean ceased for the time being. In 1082 Rhodes came under Venetian control and in 1248 under that of the Genoese. In 1309 it was taken over by the Knights which began what is considered to be the most important period in its history. It was during this time that the island underwent great developments in architecture and military power. The Knights of Rhodes caused harm to Muslim merchant ships by attacking coastal cities in Anatolia. The disturbance these caused led to the launching of three important campaigns against the island in the time of Baybars, namely in 1424, 1425 and 1426. However, the castle of Rhodes, famous for its fortifications, was impregnable. The arrival on the scene of the Ottoman State combined with the joining of sea and land forces made the Aegean islands an inevitable target. An important campaign was launched by Mehmet the Conqueror. Two great attacks were made in 1455 and 1481 but were unsuccessful. On 14 June, 1522, 30 Turkish/Ottoman warships set sail from Istanbul and, after stopping at the island of Cos, within a short time had anchored in front of Rhodes. The Turks invited the authorities to surrender the island. The Knights of the island trusted in the impregnability of their castle, one of the best fortified of its time with its 13 towers, double row of walls intersepersed with steep rock, as well as its double moat, 17 metres wide, which at times was even wider than that. In addition to this they had strung chains across the harbours.[57]

Since 1309 Rhodes had been in the hands of the St John Hospitallers, otherwise known as the Knights of St. John of Jerusalem The Commnader in Chief, Philippe Villiers de l'Isle Adam, on receiving news of this campaign, had taken certain precautions to strengthen the castle, had stocked up on food, had had chains placed across the harbour and had sent to the Pope and to France for aid. The Ottoman fleet arrived at Rhodes on 24 June and anchored at a harbour four miles to the east of Rhodes castle. Battle began on August 1 with a salvo of cannon fire on the German Tower. Violent and persistent attacks by the Ottomans would continue for five months. During this time some successes were gained. In the end, the

[57] Şahap Kaşlıoğlu, **Rodos'ta Saklı Zamanlar**, (Past Times In Rhodes) Doğu Library, İstanbul 2007, pp. 8-21.

Knights, realising they were unable to resist futher, would be forced to inform Suleiman the Magnificent that they would surrender.[58]

Engraving 5: *The Island of Rhodes*

As a result of negotiations, the treaty of surrender was signed on 21 December, 1522 with these conditions: the city of Rhodes was to be given to the Turks; freedom of religion and language was to be afforded to any Roman Catholics or Greek Orthodox members who wished to stay on the island; goods would not be confiscated and the inhabitiants were to be exempt from income tax for five years; those who wished to depart with the Knights were allowed to take their goods with them. The Ottomans filfilled their promises to the letter. On 26 January, 1522, the Sultan received the Knights and accepted the surrender of the key to the city from their commander. At midnight on the same day, the Commander of the Knights, together with 5,000 Roman Catholics and Greek Orthodox members who did not wish to stay, left the island with their sacred objects, their treasure, and their archives.`After their victory, the Ottoman Turks preserved the fabric of the city untouched, giving special attention to the inhabitants and their dwellings.[59]

The Possibility that the Chain in the Military Museum is the One Brought from Rhodes

Photograph 16: *Rhodes: View from the Harbour 1862 (Harbour entrance on the right)*

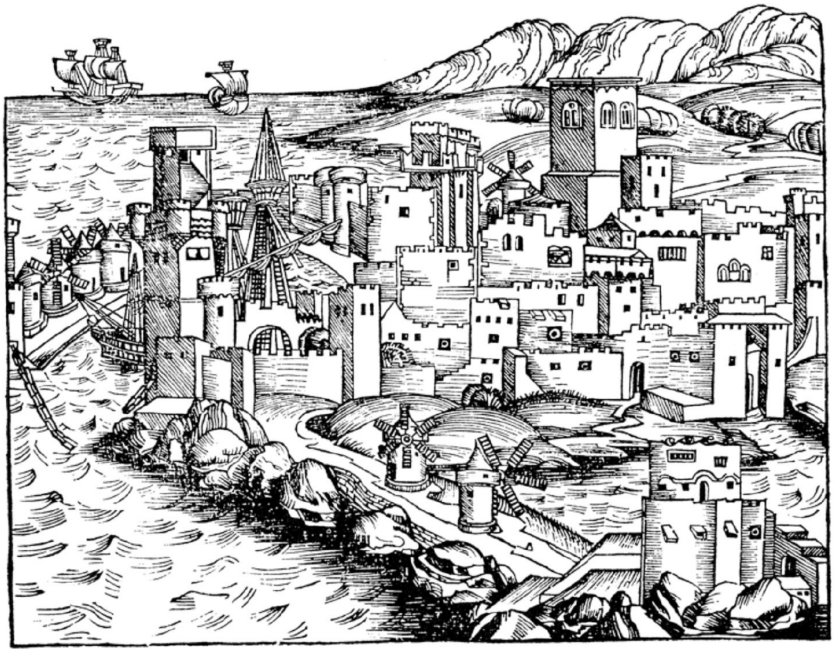
For several reasons it is unlikely that the chain the Empire could not break was taken to Istanbul as a war-trophy. First of all, the key to the city was surrendered to Suleiman the Magnificent himself, We know that this key was preserved by the Ottoman State together with other castle keys.

Photograph 17: *Rhodes Harbour today*

With the surrender of Rhodes, the Ottoman State received several benefits. At the same time the Ottoman State continued to use the chain found at Famagusta harbour. As is well-known, it was Ottoman policy to celebrate their conquests. As an example of this, the ship, the *Yeşil Melek*, captained by Mahmut Reis, in which Sultan Suleiman crossed from Marmaris to Rhodes was preserved and exhibited in the dockyard at Rhodes for several centuries.[60]

[58] http://www.e-tarih.org/sayfa.php?sfid=434.
[59] Şahap Kaşlıoğlu, see above, pp.25-26.
[60] Yılmaz Öztuna, **Kanuni Sultan Süleyman**, (Suleiman the Lawgiver) Ministry of Culture Publications, Ankara 1989, p.30.

An engraving from the time of the Knights shows the chain being used.



Engraving 6: *Rhodes Harbour under the Knights (1493)*

Engraving 7: *Rhodes Harbour under the Ottomans*

In the Ottoman engraving minarets are seen in the city and a chain across the harbour. From this engraving we understand that, just as the chain at Famagusta harbour was not taken to Istanbul but remained there, the same practice was continued at Rhodes.

Other Chains

Where there were chains between the gates of a city or a fortress these cities were known as Chained Cities or Chained Fortresses. Ankara was given the name Kalat üs Selasil, and Ankara Castle that of Beldet üs Selasil.[61]

Chains were used when making campaign bridges for purposes of attack. On the Budin campaign (1526), long, thick chains were employed when the Grand Vizier İbrahim Paşa built a bridge across the River Sava. By means of these iron chains, landings were made on both sides of the Sava, then boats were bound to each other with thick chains and thick, wide plankswere laid on top of them.[62]

The Chain Used in the War on Chios

Çaka Bey was a member of the Oğuz Çavul tribe. Following the battle of Manzikert, he had been taken prisoner in a skirmish with the Imperial Byzantine forces. Taken to Istanbul, he attracted the attention of Emperor N. Botaniates III and was sent to the Byzantine Court. There he attracted much interest and was allowed freedom of movement. In later years he was favoured on account of his success and obtained much experience and information as well as learning Greek. He kept a close watch on the Imperial Navy. He obtained his freedom in 1081 when the Emperor Alexis Comnenos came to the throne.[63]

Photograph 18: *Çaka Bey*

The founder of the beylik (fiefdom) and the first Turkish Admiral of the Fleet, Çaka Bey dominated the Aegean with his fleet of forty ships. After taking Foça and Midilli he landed troops on Chios and took the island. A year later he landed troops on the islands of Samos and Rhodes and captured those too. His conquest of the islands, one after another, led the Byzantine Emperor, Alexis Commenos (1180-1183), to send a fleet to the Mediterranean under two commanders. The fleet under Çaka Bey fought and sank many of the Byzantine ships. This was the first victory of the Turks against the Byzantines in Mediterranean naval warfare. After this victory of Çaka Bey, the Byzantine Emperor made Constantine, one of his famous captains, an admiral and sent him with a second fleet against the Turks. There were about 500 knights in these ships. This fleet approached Samos, landed troops and attacked the castle. While the castel was being besieged, Çaka Bey, who was in Izmir, set out for Samos immediately with his fleet. The ships, chained together in crescent formation, approached the enemy directly. The Byzantine commander, apparently put off by this new war stratagem, was defeated by Çaka Bey's fleet.[64]

---

[61] İbrahim Atis, see above, p.376.
[62] **Türk Silahlı Kuvvetleri Tarihi : (1451-1566), (A History of the Turkish Army: 1451-1566)** Ankara 1977, vol.3 part 2, p.252.
[63] http://www.denizce.com/cakabey2.asp.
[64] http://www.e-tarih.org/sayfa.php?sayfa=351351.600137.1713726.0.0.php.

Chains used in the Pitched Battle of Calderon

It is know that in this pitched battle between the Ottoman and the Safavi states both sides used chains. The Ottoman army reached the plain of Calderon on 22 August,1514. The Iranian army commanded by Shah Ismail were seen to have positioned themselves on a hill overlooking the plain. Sultan Selim (Yavuz) ordered his troops to get into battle formation as they descended on to the plain of Çalderon. Accordingly the Anatolian and Karaman cavalry stationed themselves on the right and the Rumelian forces on the left with the Janissary troops in the centre. The Anatolian and Rumelian irregular forces strengthened the army on both sides. The artillery was to be found to the rear of the flanking auxiliary forces and the cannon were in place in front of the units. 500 cannon were chained one to the other.[65] The right flank was commanded by Hadım Sinan Paşa, who had had the available cannon chained together so as to create a formidable barrier.[66]

Illustration 11: *Sultan Selim (Yavuz)*

Illustration 12: *Shah Ismail*

Chains Used at the Decisive Battle of Mercidabık

It is said that chains were used in the war between the Mameluke (Turkish) Empire of Egypt with Syria and the Ottoman Empire which resulted in a victory for the Ottomans on 24 August, 1516. Sultan Selim was at the centre of the army with his Kapıkulu soldiers, in front of which were 300 cannon chained one to the other. Pulled by oxen and buffalo, the guns followed the army and when positioned in a suitable place on the battle field gave great supportive fire. The three hundred or so cannon belonging to the army were placed at the front of the line behind the irregular troops as well as being positioned behind the troops on the flanks. The formation in this battle was the same as that used at Calderon. In addition cannon chained together at the front of the battle line were a formidable obstacle and a further barricade was fashioned from camels and overturned wagons.[67]

---

[65] Vehbi Tülek**, "**Selim Han'ın Dehası ve Çaldıran Zaferi", **1001 Osmanlı Hikâyesi,** Türkiye Gazetesi, 01.07.2005.

[66] **Türk Silahlı Kuvvetleri Tarihi : (1451-1566), (A History of the Turkish Army: 1451-1566)** Ankara 1977, vol.3 part 2, p.254.

[67] Vehbi Tülek, "Mercidabık Meydan Muharebesi",**1001 Osmanlı Hikâyesi**, (The Pitched Battle of Mecidabik, 1001 Ottoman Tales) Türkiye Newspaper, 01.10.2003.

Chains Used in the Battle of Mohacs

From 1524 to 1525 the situation in the east was calm. Shah İsmail had died and there seemed to be no immediate threat of attack by Iran. With the conquest of Rhodes a stop had been put to dangers from the sea. Moreover, the squabbles between France and the Hapsburgs in Western Europe and internal division in those countries created a favourable situation for war.[68]

The Battle of Mohacs was the greatest battle fought between the Ottoman army commanded by Suleiman I and the Hungarian army under King Louis II of Hungary. Suleiman the Magnificent's conquest of Belgrade, followed very shortly by the taking of Rhodes, had infuriated Charles V and outraged the Christian world. Seeing an opportunity to re-take Belgrade, Charles V hoped to include the whole of Hungary within his domain also. In this battle 70,000 Hungarian armoured cavalry had trained their horses to fight when chained together.[69] In order to break any attack by the armoured cavalry, the Ottomans had created barricades of cannon chained together, firing, and other obstacles. It is written in Bulgarian history that, during this battle, oblivious to the firing of the cannon chained together in front of Ibrahim Pasha's forces or the number of Hungarians killed or wounded by infantry fire, Tomori, the Hungarian Commander-in-Chief, continued to attack towards the centre through a gap in the line. Eventually on 29 August, 1526, the battle resulted in a resounding victory for the Ottoman Empire.[70]

Miniature 1: *Chains Used at the Battle of Mohacs*

Miniature 2: *The Battle of Mohacs*

[68] Feridun M. Emecan, "Büyük Türk'e Pannonia Düzlüklerini Açan Savaş Mohaç 1526", (The Battle of Mohacs which Opened Up the Plain of Pannonia to the Turks) **Muhteşem Süleyman, (Suleiman the Magnificent)** Kitap Publications, İstanbul 2007, p51.

[69] **Vehbi Tülek, "Mohaç Meydan Muharebesi", 1001 Osmanlı Hikâyesi, (The Pitched Battle of Mohacs, 1001 Ottoman Tales)** Türkiye Newspaper, 16.08.2003.

[70] http://www.e-tarih.org/sayfa.php?sayfa=1252797.1228026.4284315.0.0.php.

Chain in the Dome of the Mosque of Suleiman

According to Doğan Kuban, for the Turks the Mosque of Suleiman is not just a mosque but rather as an institution of collective consciousness, a symbol of assimilated history. Just as Saint Peter's Basilica symbolizes Rome, Notre Dame Paris and Saint Paul's London, so Suleiman's Mosque has come to symbolize Istanbul.

In the Suleiman Mosque Complex, Mimar Sinan and Suleiman the Magnificent, that is, art and great political strength, are commemorated together. Containing a teaching centre, a soup kitchen, and a hospital, and situated in pleasant and airy surroundings, this is the greatest complex of the Ottoman period. Together with the Aga Gate and the Old Palace, it was a lodestone in Istanbul where sultans often came to pray, and with its proximity to the market area and its outer courtyard overlooking the Golden Horn, it was, as Evliya Çelebi remarks,"an extraordinary place from which to view Istanbul."

Engraving 8: *Suleiman's Mosque*

According to one account, when in 1577 the mosque was finished, Mimar Sinan told the sultan that on the Day of Judgement, when the mountains would be scattered like cotton wool, the dome of this mosque would not fall and roll around like a hoop.

Another story concerning the Suleiman Mosque relates that Shah Tahmas was infuriated when all the jewels sent to be sold to facilitate the building of the mosque were given by Süleiman to Mimar Sinan to use in the building. These were set at random in one of the minarets being built and there they sparkled so brightly in the sun that this minaret was given the name of 'Jewel" or 'Sun" Minaret. Evliya Çelebi writes that one of these jewels, a turquoise from Nişabur, as large as a basin, set in the arch of the gate looking towards Mecca, sparkled in the sun so radiantly as to blind a man.[71]

[71] Doğan Kuban, "Süleymaniye Külliyesi", **Dünden Bugüne İstanbul Ansiklopedisi**, Encyclopedia of Istanbul Past and Present İstanbul 1994, vol.7, p.96.

The Chain in the Dome

In the main dome of the Suleiman Mosque there is a chain. It is said that this was used to reach the top of the dome.[72]

One is remınded of the chain from Antalya Harbour taken to the Vatican, the greater part of which was hung over the Ravenna Gate of the old Saint Peter's Basilica as a sıgn of victory and later removed to a corridor around the Clamantina Dome of the depots for Saint Peter's Workshops. One wonders, first of all, whether the chain in the Suleiman Mosque with its symbolic moral significance could be a part of the Golden Horn Chain and was hung there for the same reason.

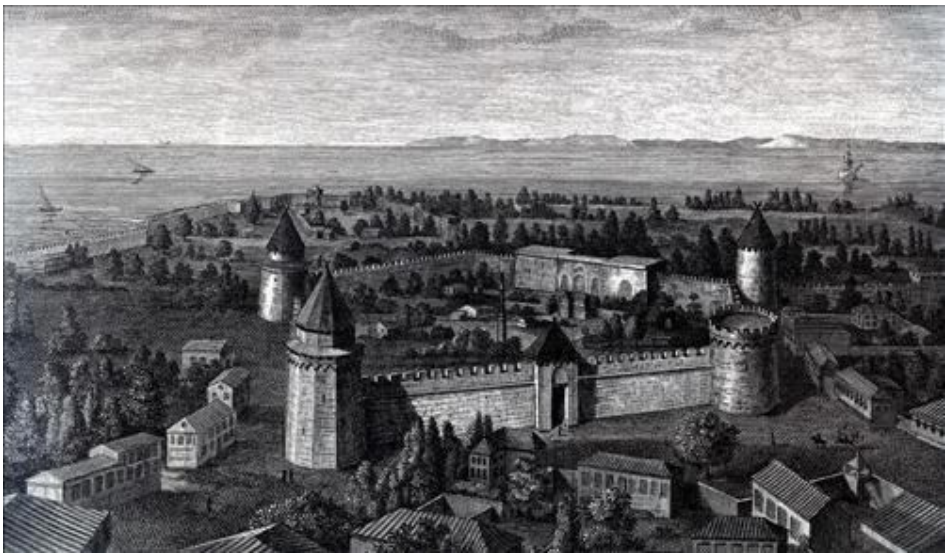
At present restoration is going on at the mosque and so measurements and visual examination of the chain found in the dome cannot be carried out. In Aras Neftçi's photograph the links are circular, pinched in the middle but without joins of any kind.

Photograph 19: *The Chains Found in the Dome of the Suleiman Mosque.*

[72] Aras Neftçi, "Kubbe ve Örtüde Dolaşım", **Bir Şaheser Süleymaniye Külliyesi,** (Around the Covering Dome, **The Wonderful Suleiman MosqueComplex**) The Ministry of Culture and Tourism Publications, Ankara 2007, p.116.

The Barrier Chain Found at Yedikule Fortress

The area near the land walls to the south of Yedikule (Seven Towers) Fortress known by this name is now attached to the Directorate of Castles and Museums. The most important gate in this wall is the Golden Gate, built between 413 and 439 by the Emperor Theodosius. This famous gate was appointed to be used as the entrance for the emperor and his victorious army. The gate, resembling a triumphal arch, had three entrances and was flanked on each side by marble towers. During the centuries the gate was bricked in and became smaller. After the conquest, Sultan Mehmet repaired the walls, which had been damaged during the siege, and built a five- sided fortress with seven towers by building a wall linking the two original towers of the gate and two Byzantine forts in line with them with three others he had added to these. These seven forts gave the name to the castle and the surrounding area.[73]



Engraving 9: *Yedikule Fortress.*

On entering Yedikule one sees on the left a chain hung near the steps by the wall of the Bayrak (Flag) Tower.

Photograph 20: *The Barrier Chain Found at Yedikule Fortress.*

[73] Hayri Fehmi Yılmaz, "Yedikule Hisarı", **Dünden Bugüne İstanbul Ansiklopedisi**, (The Castle of Seven Towers, **Encyclopedia of Istanbul Past and Present**) vol.7, p.460.

This chain was put here by Bayram Pasha of Amasya, governor of Istanbul when Murat IV left Istanbul to go on his Revan campaign. When the walls were being repaired in 1635 the chain was placed here.[74] It is thought that the chain, which has been preserved in the fortress to this very day, was put there to prevent people from falling down the steps

The barrier chain is composed of 110 pinched links and one hoop. Together with this, the chain measures 12.0 metres in length. The hoop has a diameter of 43.5- 45 cms. One of the first links is slightly bigger than the rest being 19.8 cms long. The following 109 are 13.0 cms long.

Photograph 21: *The Large Link.*

Photograph 22: *The Biggest Link.*

Photograph 23: *Links in the Barrier Chain.*

The Hoop on the Chain Attracts our Attention

On account of its wide hoop, this chain may have been used, not only as a barrier, but also to lower people during repair work or for climbing walls. This chain to be seen hanging in the dome of Suleiman Mosque sugges, is that it was used to climb up to the dome.

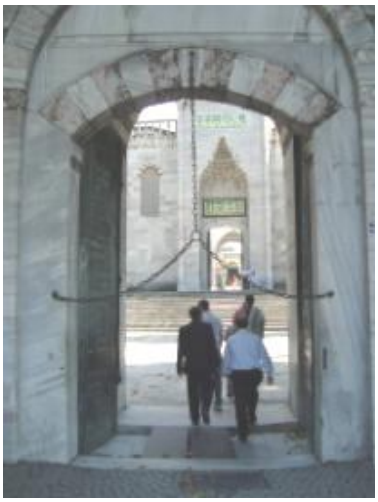
[74] http://www.yedikulezindanlari.com/tarihce.asp.

Chian at the Gate of Sultanahmet Mosque

Sultanahmet Mosque, completed in 1616 is one of the most important buildings of the Hippodrome Square. The architect, who was trained as a janissary, was Sedefkâr Mehmet Ağa; he also repaired the Kaaba. It is said that Sultan Ahmet I himself worked on the building.[75]

Engraving 10: *Sultanahmet Mosque*

A chain can be seen on the door of the Sultanahmet Mosque which opens on to the square. For this reason it is called the Chain Gate. İt is said that by means of this chain Sedefkâr Mehmet Efendi caused even the sultan to bow his head as he entered the mosque courtyard on horseback. This practice used at the gate of the Sultan's Apartments at the mosque can be seen at other mosques also.



Photograph 24: *Entrance to the outer Courtyard*

Photograph 25: *Entrance to the Sultan's Apartments*

[75] Ceyhan Güran, **Bir Dünya İmparatorluklar Merkezi İstanbul**, (**Istanbul: the Centre of an Imperial World**) Akis Publications, İstanbul 2007, p.155.

The Chain described in the Legend of Sümbül Efendi

One of the events described in the legend of Sümbül Efendi concerns a huge old tree in the courtyard of Koca Mustafa Pasha Mosque goes thus:

Photograph 26: *A Centuries–old Plane Tree*

"In time, the old tree in the courtyard became rotten and its bark began to drop. Sümbül Efendi tried to preserve it by putting a chain around it. However, he left one end dangling, saying, " If anyone comes under this tree and tells a lie, this chain will lengthen towards the ground.'' A little while later, a Muslim came to the mosque to complain that he could not get back the money he had lent to a Jewish friend of his. He called his friend to meet him under the tree. The Jew, who allegedly had not paid back the loan, came hobbling, stick in hand, towards the tree where Sümbül Efendi told him about the special properties of the tree and the chain. After listening to him, the Jew walked towards the man who said he owed him money, standing there under the tree with the chain and said "Hold this stick." Then he declared, "I swear that I have given the money back to my friend." Surprisingl, the chain did not become any longer. "Ah, the man is telling the truth" said the bystanders. But the lender was still doubtful and twisted the stick he had taken from the Jew's hand, breaking it in two. What's this? Gold coins drop tinkling to the ground? So the Jew's trick was exposed. On handing his friend the stick in which he had hidden the money, he appeared to have given him back the money and, of course, the tree was deceived!"[76]

In Conclusion

In this chapter we have researched into the chains used from ancient times up to the present. More examples could be given but these examples from the fragments of chain found in these museums seem sufficient. First we looked at the chains used when it seemed necessary at harbour entrances in the Byzantine Empire. We learned that these chains were to be preserved as a symbol of victory and that the leader who broke these chains would be given the title of Zincirkıran (Chainbreaker).

[76] İstanbul Efsaneleri, (Istanbul Legends)**Focus Journal**, July 2005, p.29.

Illustration 13: *Constantinople and the Golden Horn*

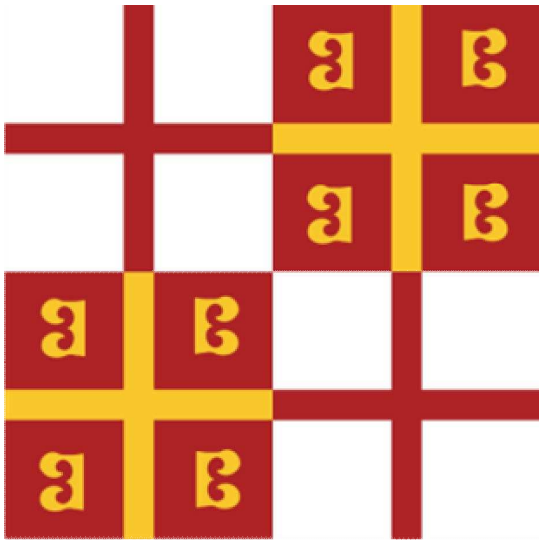


Illustration 14: *Flag of the Eastern Roman Empire*

Illustration 15: *Emblem of the Eastern Roman Empire*

CHAINS USED TO CLOSE THE GOLDEN HORN

The Golden Horn, the natural harbour of the eastern Roman Empire, important for both defence and trading purposes, was closed by a chain many times during its history.

The Golden Horn Chained Against Arab Sieges

In 716, in the time of the seventh Caliph, Süleyman İbn-i Abdülmelik, the Arabs beseiged İstanbul for the fourth time. We see that, for the first time, a chain was used to close the Golden Horn by the Emperor Leo III. Both eastern and western historians agree that the Horn was closed by a giant chain at this time.[77]

According to the sources, Abdülmelik came to Çanakkale via Bergama. He crossed from Nara Point into Thrace with the help of the navy and arrived at Istanbul to begin beseiging it by land. The fleet, arriving about a month later, entered the Sea of Marmara and after reaching the chain at the mouth of the Golden Horn anchored there. The fleet closed the entrance to the Bosphorus at both ends in order to prevent possible support from reaching Byzantium by sea After a siege of thirteen months, however, they went away empty-handed.[78]

Photograph 27: ***The*** *Arab Mosque*

"In 717, a Muslim Arab army with its captains and Sons of the Companions of the Prophet under the command of Mesleme Bin Abdülmelik came to conquer Istanbul. They built a mosque where for the first time the Byzantine inhabitants heard the muezzin's call to prayer and named it the Arab Mosque. This was built and opened for worship after an agreemeent was reached with the Emperor Leo. For the 7 years the Muslim Arab army stayed in Istanbul this was where they prayed. A long time later the Dominicans and their monks turned it into a church and added a bell tower, now used as a minaret."[79]

Semavi Eyice gives this information about the building above called the Arab Mosque:

"The story that the Arab Mosque, the largest mosque on the slopes of Galata on the Golden Horn, was built by Arab forces coming to besiege Istanbul in the years 716-717 does not agree with the historical date. Although the Arabs came and besieged Istanbul, they did not built a permanent mosque. Agreements made from time to time with the Emperors allowed the Muslims coming to Byzantium to build a mosque, but this was not within the walls but outside. It is known that this was either damaged or rebuilt in accrdance with political fluctuations. In fact, after the siege was lifted and the Arab army and fleet had retreated, it is unlikely that the mosque remained standing. According to some suggestons, there was a Byzantine church here before the building was given for use as the Arab Mosque Some ruined walls bear witness to this."[80]

---

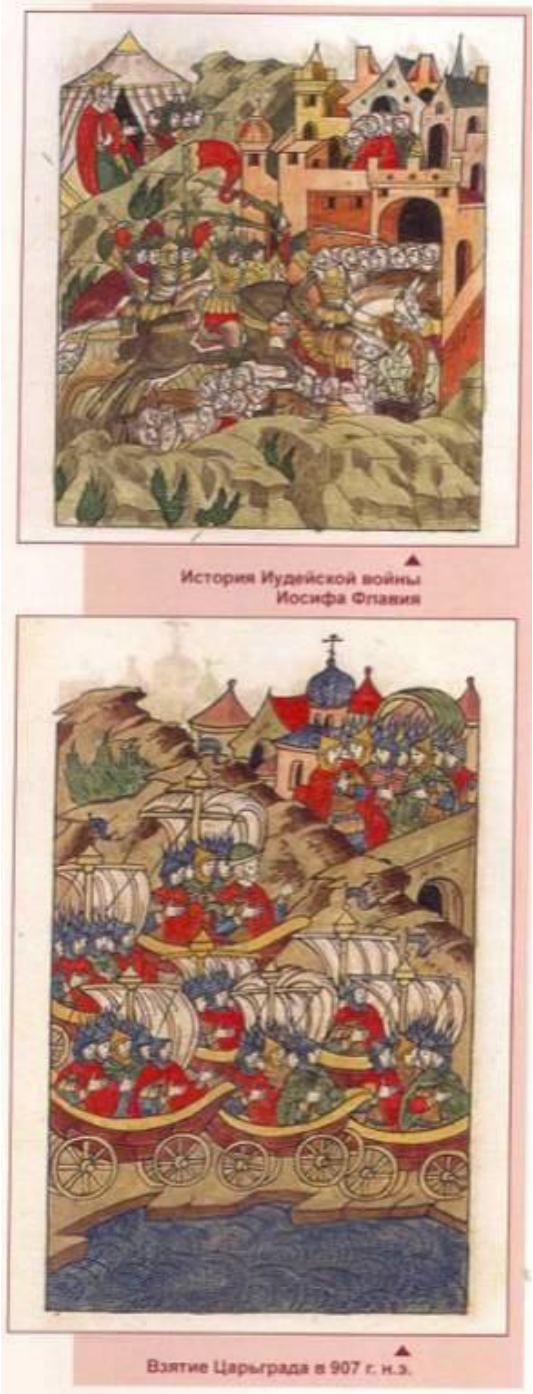
[77] İbrahim Atis, see above, p.376.

[78] İbrahim Sarıçam, "Arapların İstanbul Kuşatmaları", (The Arab Sieges of Istanbul, **Istanbul and the 550th Anniversary of the Conquest)** Turkish History Institute Publications, Ankara 2007, pp.59-60.

[79] http://www.arapcamii.org/tarih.html.

[80] Semavi Eyice, "Arap Camii", **Dünden Bugüne İstanbul Ansiklopedisi**, (The Arab Mosquec. Encyclpedia pf

The Golden Horn Chain Alleged to Have Been Breached by Prince Oleg



Miniature 3: ***The Istanbul Campaign of Prince Oleg***

In 907 the Russian Prince Oleg of Kiev brought a large fleet to Constantinople and gained many advantages for Russian merchants trading there through an agreement signed with the Byzantine State.[81]

Istanbul, in particular, played an important part in Russian literature following the start of pilgrimages to that and other holy cities. It is mentioned in many manuscript notes on travel.

İt is possible to find information about Istanbul in many of the manuscripts written between the XIIth and the XVth centuries. One of the foremost of these, "The Story of the Past" describes the journey to Istanbul undertaken by Prince Oleg in 907 and talks of the siege and the agreement made whereby the people were forced to give taxes. The efforts made by the people during the siege and the chain put across the Horn to prevent entry by sea are mentioned. Attention is drawn to the fact that during the siege many churches and other buildings were destroyed and, in particular, refers to Oleg's ships being drawn on rollers to be launched on the Golden Horn.

The Russian historian and poet, Nicolai Karamzin, is interested in this latter information and comments, "Perhaps Oleg wished to do what Mehmet II later accomplished." Sultan Mehmet II's using the same method to take the city is a notable parallel between Russian and Turkish history.[82]

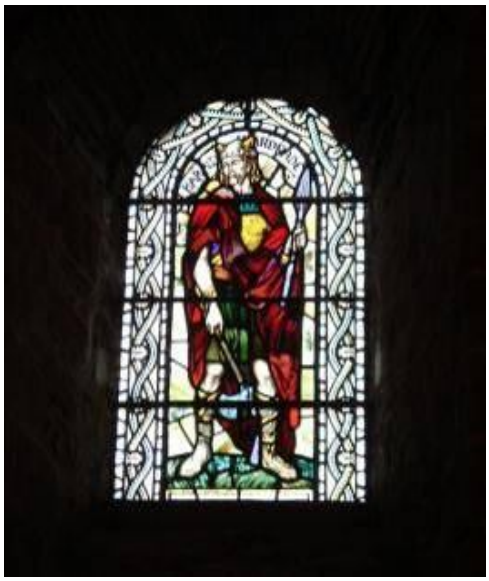
Istanbul Past and Present) 1, p.294.

[81] Timothy E. Gregory, **Bizans Tarihi**, (Byzantine History)Yapı Kredi Publications, İstanbul 2008, p.223.

[82] Hüseyin Kandemir, "Rus Edebiyatında İstanbul", (Istanbul in Russian Literature) **Selçuk University Journal of Literature**, p.19,Konya 2008, pp.154-155.

Harald Hardrada is said to have breached the Golden Horn

Story has it that seafaring Vikings came to Istanbul on perilous voyages in order to trade. They had heard of the fame of Istanbul, or, as they used to call it, Micklegard, (the Great City) and Harald Hardrada, later king of Norway, with five hundred picked Viking warriors undertook to serve the Byzantine Emperor.



Photograph 28: *Harald Hardrada*

It is said that, in order to break through the chain, Hardrada and his soldiers came to the shore of the Golden Horn. Harald ordered some of his soldiers to pull hard on the oars while the rest filled barrels with water and went to the stern of the ship. In this way, the prow was raised and the ship rested on the chain. Later the barrels were brought with speed to the front of the ship which thus passed over the chain into the Golden Horn.[83]

Illustration 16: *The Vareg Guards (Xıth century drawing)*

The American archaeologist and writer, David Gibbins, in his novel *Crusader Gold,* translated into Turkish as "Bizans Altınları" describes the method used by Harald Hardrada in crossing the chain on the Horn but says it was done, not to attack the Byzantines, but to get out of the Golden Horn.[84]

Can What Is Said Be True?

Even if this is just a story, it is possible that the chain could have been crossed in this way. The Vikings' chief weapon was their legendary longship. It came at the peak of the development over a thousand years or so in Scandinavia of this type of ship. Ships in the Mediterranean, the heart of seafaring in ancient times, were built of soft wood such as pine or elm, nailed together with wooden pegs but got their real strength from the skin or other material with which they were covered. In fact, the skeleton was laid down after the outer covering had been made. This construction was sufficient for the calm waters of the Mediterranean summer but for the constantly tossing waves of the northern seas this was not durable enough. Instead Scandinavian people would first build a skeleton of stout oak and then cover this with the same material nailed together with iron nails. Moreover, the way of

[83] "Vikingler, KoçMüzesi'nde Diriliyor", (The Vikings Come to Life in the Koç Museum) **Şafak Newspaper**, 08.12.2002.
[84] David Gibbins, **Bizans Altınları**, **(Crusader Gold**) Altın Books Opublications, Istanbul 2007, p.79.

covering the ship was very different. In the Mediterranean, the planks would be placed side by side whereas in Scandinavian ships the planks would be overlapping, like the scales of a fish.

This construction not only made the hull very strong but also made it flexible against the waves. Innovations in technology made by the Vikings were that in laying down the skeleton and the hull the bulwarks were raised, the ratio between length and width was improved and a new system of masts introduced which allowed the sails to be used more efficiently.[85]

Illustration 17: *Viking Ship*

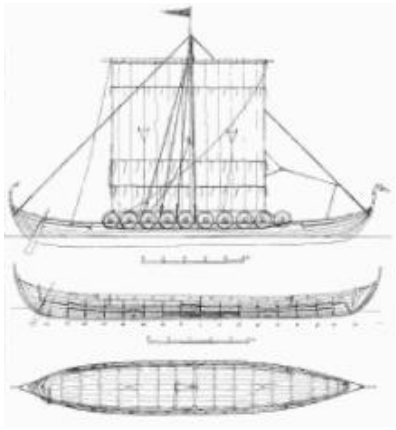


Illustration 1: *Viking Ship*

The longship which emerged could reach the shore if the wind was favourable within half an hour of sighting land with the naked eye. Thus they could make surprise attacks on coastal settlements without there being time either to take precautions or raise the alarm.

Halvdan Was Here

Photograph 29: *Runic Inscription on Marble in Hagia Sophia*

The names written in Runic script on the marble in Hagia Sophia are legible even today. One of these reads: "Halvdan Was Here".[86]

An exhibition of these signatures was shown at the Koç Museum in 2002. As well as Viking objects, fragments of chain from Rumeli Hisar were also on display. It was in that year that the use of chains was altered.

"The chain broken by Haral Hardrada in his attempt to capture Istanbul was perhaps the most interesting object in the exhibition"[87]

[85] Lionel Casson, **Antik Çağda Denizcilik ve Gemiler**, Homer Yayınları, İstanbul 2002.
[86] "Vikingler Buradaydı", (The Vikings Were here) **Radikal Newspaper**, 10.11.2002.
[87] Abdullah Kılıç, "Vikingler Meğer İyi Kalpli Korsanlar Değilmiş!", (Vikings Were Not Goodhearted Pirates After All)**Zaman Newpaper**, 11.11.2002.

The Chain used on the Horn in the Latin Invasion of 1204

The breaking of the chain blocking access by ship to the Golden Horn is described in two different ways. One of these is that a Venetian ship from the Crusader fleet first rammed the chain at speed and then soldiers hacked at the chain with axes and broke it allowing the Crusaders' ships to enter the Horn.[88] The most important source for this is Robert De Clary who took part in the 4th Crusade.

1. How a Galleon Broke the Chain

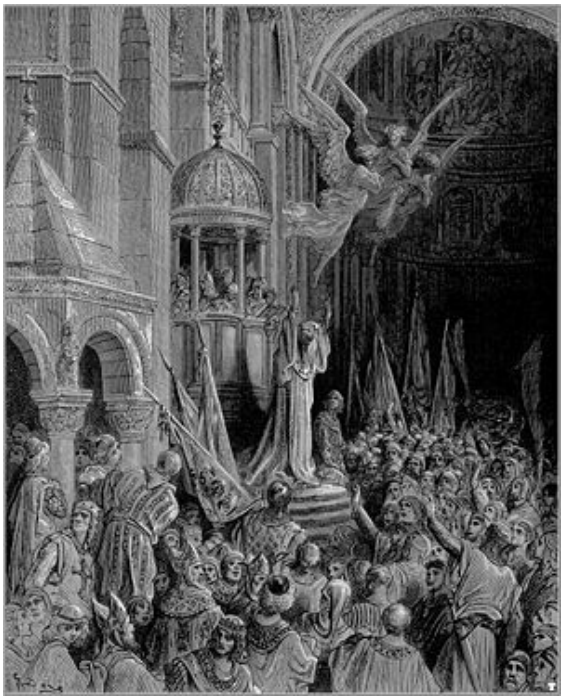


Illustration 18: *Enrico Dandolo announcing the start of the Crusade in front of St. Mark's Cathedral in Venice*

The IVth crusade under the command of Marquis Boniface of Monferrat was promoted by Pope Innocent III. Although Enrico Dandolo hired a Crusader army and a fleet, the largest of its time, to take the troops to Babylon or Alexandria in Egypt, for various reasons and through Venetian intervention the route was changed. In order to revenge himself on his uncle, Alexius III, who had taken the Byzantine throne by force, and to restore the throne to his father Isaac II, Alexius IV made an agreement with the Crusdaders in return for giving them money, food and soldiers.[89]

Following this, the fleet navigated the Straits of the Dardenelles and approached Constantinople mooring offshore at San Stefano (Yeşilköy) (23 June, 1203). After the galleon called the Aquila had breached the chain closing the Golden Horn, the fleet entered the protection of the inner harbour while the army settled into the Blacherna Palace and the Bohemond Castle enclosed by walls. A battle of six days was then fought by land and sea. Meanwhile, alarmed by the Crusader fleet and the army ranged against him, Alexius III retreated and fled by night from Constantinople. The Crusaders entered the city and placed Isaac II, whose eyes had been gouged out by his brother, and his son, Alexius IV, jointly on the throne. However, Alexius IV, who had come to the throne by means of the Crusaders, did not keep the promise he had made nor fulfil the conditions of the agreement. He sent messengers to the Blacherna Place, the Imperial residence, to demand payment of debts. After having abused the messengers, those around sent them back empty- handed to Alexius IV, insisting that he keep his promises. Subsequently the Crusaders began to destroy and set the place on fire, thus inciting the Byzantines to war. At the same time, Alexius Dukas, known as the Frowner (Mourtzuphlos) from his habit of knitting his brows, set his eyes on his lord, Alexius IV's place and so had

[88] **Silahlı Kuvvetleri Tarihi İstanbul'un Fethi 1453**, (The Conquest of Istanbul: Turkish Military History) General Staff Publications1979, vol.3, p.108.

[89] Robert De Clari, **İstanbul'un Zaptı (1204)**, (The Taking of Istanbul) Turkish History Institute Publications, Ankara 1994, p.Foreword

him and his father strangled.. He himself ascended the Byzantine throne with the title of Alexius V. Following this, after a battle lasting five days, the Crusaders entered Constantinople.

Illustration 19: *The Crusader Invasion of Comstantinople*

Mourtzuphlos retired to the Bucoleon Palace at the other end of the city and at night, unseen by anyone, escaped via the Porta Aurea. Although Theodoros Laskaris was proclaimed as Byzantine Emperor, he realised he could not stay in Comstantinople and went to Nicea. On 13 April, 1204 the Crusaders, having taken Byzantium, founded the Eastern Latin Empire, proclaiming Baldwin of Flanders the Emperor. Following the taking of Constantinople, looting, rape and torture took place. The glorious city of Constantinople became a ruin. Its dazzling riches became a legend. The Latin empire thus founded in 1204 lasted until 1261.[90]

2. The Chain Tower is Taken

Written sources which say that the chain was broken in a different way describe how Constantinople was defended.

In April, 1203, the Fleet carrying the Crusader army left Zara. After putting in at the harbour of Dıraç and the island of Corfu, they anchored at the mouth of the Bosphorus in front of the city of Constantinople on 24 June, 1203. The Byzantine Emperor, Alexios III had news of the army's approach but did not have sufficient troops at his disposal to withstand it.[91]

On hearing that the Crusaders were at anchor in front of Constantinople, Alexius sent a letter to the counts and barons ensconced in the palace at Üsküdar, asking why they were there and saying that if they wanted gold or silver he would gladly sent it to them. When the leaders heard this, they told the messenger that it was not gold or silver they wanted but that the emperor should give up the throne which he had taken illegally. The real heirs to the throne were Isaac's son, Alexius, and Isaac himself. Subsequently, the messengers left, saying that the emperor would never do such a thing.[92]

The new target of the Latins and the Venetians was now Constantinople. Emperor Alexius III was completely unprepared and had taken none of the precautions made by previous emperors when danger threatened the city. He merely ordered buildings on the outer walls of the city to be pulled down and the people to be brought inside the city. The fleet

[90] Robert De Clari, see above, foreword
[91] http://www.cnnturk.com/2009/tarihte.bugun/04/13/tarihte.bugun.13.nisan/521990.0/index.html.
[92] Robert De Clari, see above, p.14.

under his command had been left to rot. In fact, it was his brother who was at the head of the fleet. He was busy selling the anchors and chains he had had removed from the ships."[93]

The Ships Must not Enter Harbour!

Orders were given for the army and all the inhabitants, young or old, to be armed and then services of absolution were performed. On 5 July, all the Crusaders and the fleet went to a new headquarters position near the Galata tower, north east of the Golden Horn on the European shore. The Emperor sent all his troops there in order to defend the coast. The Crusaders together with the Venetians prepared the ships for on-shore dismembarkation. Archers were placed in the forefront of the ships to be used on landing to clear away the Greeks. When the Greeks saw the Crusaders approaching, they retreated in fear and the ships came to the shore where the cavalry mounted their horses and disembarked from the cargo ships The retreating Greeks were panic stricken when they saw the army disembark. A large Byzantine force was found to defend the tower where the chain was and, in order to boost their morale, Alexius III himelf assumed command of defending the tower and the surrounding area. However, when the mailed heavy-cavalry troops began the attack, the Byzantine troops, in spite of the Emperor's presence, immediately began to run away. When all the soldiers had left the ships, they pursued the Greeks to a bridge at the other end of the city. The Greeks escaped into Constantinople though a gate on the bridge. After setting the Greeks to flight, the Crusaders returned to have a conference among themselves. The Venetians declared that the ships had no protection if they were not inside anywhere so they decided to try to enter the harbour. At Constantinople the harbour was securely blocked by a heavy iron chain. One end of this was in the city, the other attached to Galata Tower on the other side of the harbour. The tower could easily be defended by the soldiers inside. A tower had been built on the sea shore at the end of the VIth century by Tiberius I and attached to the tower known as the *Kastellion ton Galatou*.[94]

Illustration 20:*Crusaders attack from the Golden Horn*

[93] Radi Dikici, see above, pp.366-367.
[94] Robert De Clari, see above, p.15.

The Fortress from which the Chain was Monitored

At that time Galata, situated outside the walls, was a trading centre. On the Galata side of the Horn there was only a huge circular fortress at the harbour entrance. There one end of the chain closing the Golden Horn went into the fortress and was lowered or raised by big pulleys. On 5 July, a landing was made at Galata, thus beginning the 7th siege of the city. During a time of siege there was no protective surrounding wall nor anything at Galata in the way of defence other than this fortress. So it had an important role to play as the chain which blocked the Horn was lowered or raised from there by means of a large capstan. In order for the Venetians to attack from the sea the chain at the mouth of the Horn had to be lowered.[95] In accordance with the decision made, the fortress was surrounded and taken by storm. Meanwhile the Greek ships strung from one end of the chain to the other helped to defend the tower.[96] The Byzantine troops inside the fortress put up a heroic resistance but the fortress was captured and the Crusader troops worked the capstan and lowered the chain with a great deal of noise.[97] After the fortress had been taken and the chain breached, the Crusader fleet entered harbour and thus brought their ships to safety.[98]

Illustration 21: *Crusaders Attacking the Walls*

Semavi Eyice Says:

In 1203 the Knights of the West coming to Istanbul with a very strong fleet took the Fortress of Kastellion to which one end of the chain was attached and opened the chain. Thus the Crusader fleet entered the Golden Horn and attacked the walls between Balat and Petrion on the shore nearest to the waters of the Golden Horn. The soldiers mounted the boarding planks fitted to the bows of the ships in order to scale the walls directly and within a short time had taken the fortress.[99]

An examination of the sources shows that, during the Latin invasion, the chain was lowered after the tower housing it had been taken and was broken up by the crew of a Venetian ship. There is no concrete evidence to suggest that the chain was broken by a ship approaching at speed.

[95] Radi Dikici, see above, p.367.
[96] Robert De Clari, see above, p.16.
[97] Radi Dikici, see above, p.367.
[98] Robert De Clari, see above, p.16.
[99] Semavi Eyice, **Tarih Boyunca İstanbul, (Istanbul Throughout History)** Etkileşim Publications, İstanbul 2006, pp242-243.

Map 13: *The oldest -known map of Constantinople (1422)*

Illustration 22: *The Ottoman Army Setting Out from Edirne for Istanbul*

The Golden Horn Chain Used During the Conquest

In any examination of the chain used to close the Golden Horn during the conquest it is necessary first to consider the ships used by the Ottoman State and the Byzantine Empire.

The Ottoman Fleet

Warships were the key to battles in the Mediterranean basin. The oared galleys starting in the Bronze Age and developing up to the XVII century, and those which were heirs to the Roman and Greek ships of ancient times, kept their predominance and reflected in the basic form of their hulls those old Cretan ships with their sails of Egyptian papyrus. During the later Medieval period, a typical war galley was up to 30 metres in length and 3.5 metres wide. The raised prow was fitted with a ram which might be used as a platform from which to board enemy ships. The tactics of sea warfare were practically the same as those for land warfare. After mutual exchange of fire, the war-galleys would come abreast in order for the troops on board to cross over on to the enemy ships. Thes ships were near enough to the water to scare anyone. In order for the oars to provide mechnical advantage to the best effect, a loaded galley would be as low to the water as sixty centimetres. The use of sail allowed it to advance but the main fighting strength and what gave flexibilty in battle were the oars. The oarsmen generally sat one to an oar, two or three on each wooden bench, in such a way that they were able to manouevre the ship to the greatest effect in battle. Great muscular strength was needed to control the 9-metre long, 45 kilo oar. Moreover, just as the gunwale was as low as possible for increased speed, so the hull was made as thin as possible. This created a serious disadvantage when attacking a merchant ship or a tall Venetian galleon.

Illustration 23: *Sultan Mehmet the Conqueror*

Sultan Mehmet II collected together quite a large fleet. He had old ships repaired and caulked and created triremes, a kind of warship with three oarsman to a bench. The Europeans called these ships 'fusta'; they were light ships, cut down in size and furnished with thirty or fifty pairs of oarsmen. Able to manoeuvre very swiftly, these galleys performed in the same way as the light cavalry.[100]According to information on the number of ships in the Ottoman fleet given by experienced Christian sailors such as Giacomo Tetaldi and Nicola Barbaro, it consisted of about 140 vessels: tri-remes and biremes with from 12 to 18 fully furnished galleons, 70 to 80 small fustae, about 25 heavy cargo ships and light brigantines with small pilot boats. If there were guns on board they were stll in their infancy: not only were they small but as they were there for the purpose of threatening merchant shipping, they were placed very low. The Venetians were fifty years ahead in their placement of cannon effectively enough to sink a galleon.

[100] Roger Crowley, **Son Büyük Kuşatma 1453**, (The Last Great Siege1453), A.P.R.I.L Publications, Ankara 2008, pp.161-162.

The Byzantine Fleet

There were five galleons anchored in the Golden Horn; three were under the command of Alvise Diedo, the other two under that of Gabriele Barbaro. The fleet had six Venetian warships and two others coming from Crete. On 26 February, Pietro Davanzano stole secretly out of the Horn with his ship. Six cargo ships from Crete laden with merchandise followed him. There were about 700 people in these ships. With the help of a favourable wind they passed by Gallipoli and arrived at Tenedos unseen by the Turks. However, Treviso had sworn that he would not leave harbour without the permission of the Emperor himself.[101]

Venice and Genoa, which owed their wealth and prosperity to the seafaring skills and courage of their sailors, both approached everything to do with the sea with great confidence. So in Constantinople they made joint plans. Therefore on 9th April they brought their ten largest merchant ships, in close formation and with booms pointing ahead, to the chain at the mouth of the Horn. Barbaro recorded one by one the names of all the ships and their captains, beginning with the heaviest (400 tonnes) of the Genoese ships under the command of Zorzi Doria to the three lightest (95 tonnes), the *Filomante* and the *Guro* from Candia and the *Gataloxa* from Genoa. The galleons took up their positions in the the safest place by the side of these ships. These well-armed ships, equipped in perfect fashion, each willing to join battle and each one stronger then the next, lined up along the chain stretching from Galata to the other side. In the inner harbour seventeen more- square rigged cargo ships, two more galleons, and five imperial ships were kept in reserve. It seems probable that these were unarmed and there simply to swell the number of ships protecting the chain. The few ships remaining surplus to requirements were sunk by opening the stopcocks in order to obviate the risk of being hit by cannon fire, even though this created the sailor's greatest nightmare when manoeuvering a fleet in close formation. The captains, defending the line they had formed in the full confidence of their skill as sailors, and under the added protection of the cannon set in place on shore, settled down to wait for the Ottoman fleet.[102]

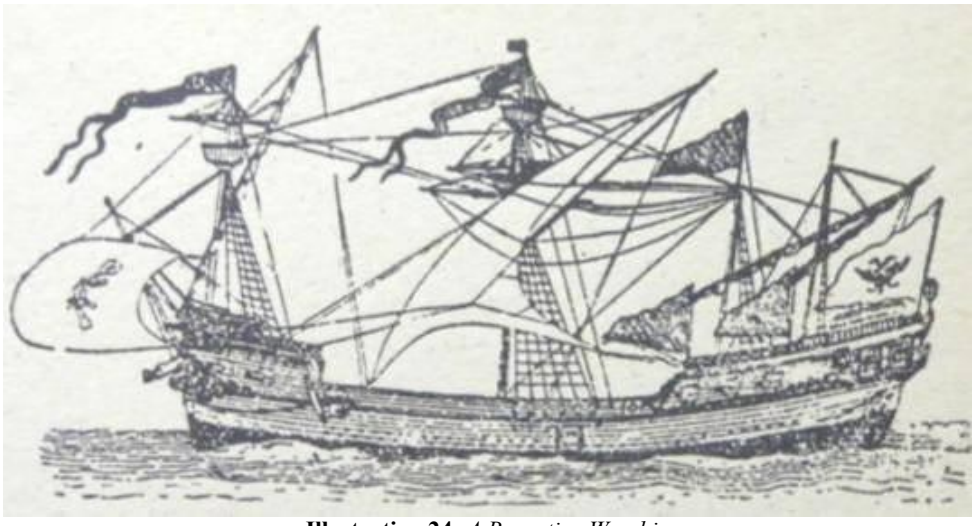


Illustration 24: *A Byzantine Warship*

[101] Donalt M. Nicol, **Bizans ve Venedik (Diplomatik ve Kültürel İlişkiler Üzerine Bir Araştırma)**, (**Byzantium and Venice – Diplomatic and Cutural Relationships Research**)Sabancı University Publications, İstanbul 2000, p.382.

[102] Roger Crowley, see above, p.165.

Byzantine Battle Preparations

Illustration 25: *The Byzantine Emperor Constantine Paleologus XI.*

In the face of such overwhelming superiority of number there were two factors in the Byzantines' favour. The first of these was the chain blocking the entrance to the Golden Horn. The Emperor had given orders for the chain to be put there at the beginning of April,1453. The chain was supported by floats. It stretched from the tower of Eugenius to the walls of Galata on the other side. In 1204 the Crusaders had done the same thing and by preventing the Turkish fleet from entering the harbour had warded off an attack on the seawalls there. The great sea walls stretching for roughly six miles along the Golden Horn shore to the Blacherna neighbourhood constituted a second obstacle. Quite rightly, it was expected that the main Turkish attack would be on these walls. The land wall or rather walls, as these were a three-fold defence, had never been taken in any attack since their construction in the Vth Century. First a ditch or moat 18m wide and 6-9 metres deep faced the attackers. Then there was a raised embankment protected by a low parapet and supported by the edge of the outer wall. The outer wall was further protected by square towers, 18 metres high, placed along its length at a distance varying from 40 to 90 metres. The last line of defence was an inner or great wall 12 metres high separated from the outer walls by a space of about 15 metres. This was protected by 96 towers, each about 18 metres high. These land walls of Constantinople were the despair of any enemies.[103]

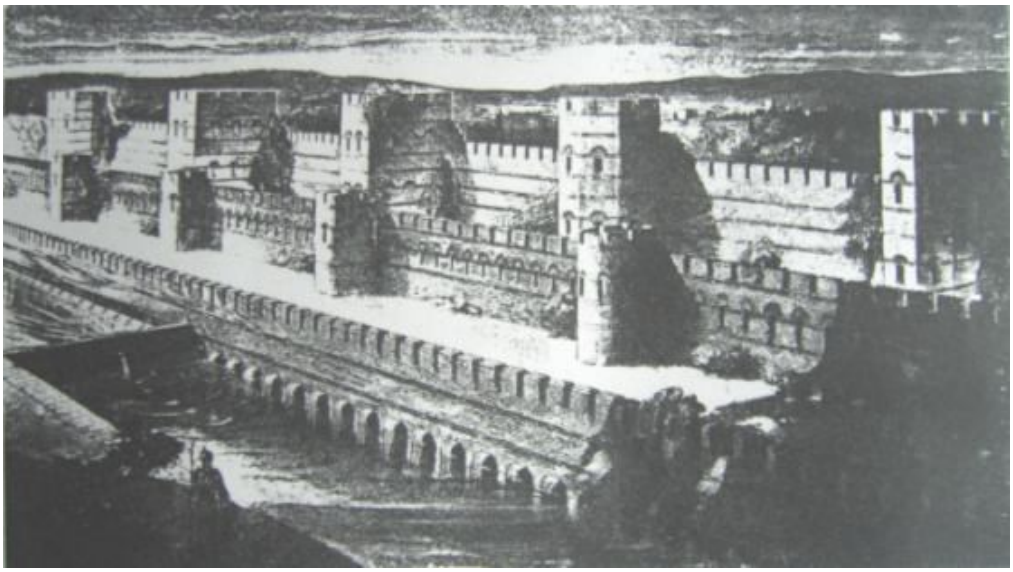


Illustration 26: *The Land Walls of Istanbul*

The Byzantine Army consisted of 9,000 soldiers, including 2,000 mercenaries. Sultan Mehmet II commanded a force of 100,000 which included 20.000 janissaries.

[103] Donald M. Nicol, **Bizans'ın Son Yüzyılları (1261-1453)**, **(The Final Years Of Byzantium 1261-1453)** Tarih Vakfi Yurt Publications, İstanbul 2003, p.408.

Greek Fire

In battle the Byzantines used a deadly liquid fire which burned the enemy fleet and war vehicles. This was the invention of a Greek scientist by the name of Kallinikos. This scientist had been born in Heliopolis in Syria in the VIIth century. After Kallinikos had invented this kind of fire he came to Istanbul and was received by the emperor of the time, Constantine Pogonatos (648-685), to whom he described his invention. In accordance with the Emperor's commands it was used against the great Arab fleet which was attacking the Byzantines at that time. The fleet was destroyed by fire near Erdek and as the battle ended in the Byzantines' favour the Arabs were forced to make peace and pay a huge indemnity. The formula for this Greek fire, like that for the atom bomb, was always kept secret by the Byzantines and the aforesaid material was made only by completely trustworthy experts. However, although the exact formula is not known, according to some sources the basic materials used were naphthalene, saltpetre, sulphur and black pinewood resin. No information is available as to the quantity of each used or how these materials were mixed.

When this mixture was set on fire it produced thick smoke and a dreadful noise at the time of the explosion. Later a pillar of fire would rise up into the sky, raining fire all around which would set alight anything it touched. Nothing could put out this fire. If water were poured on it, its strength and heat would double and the damage it did would increase. Only a few things such as sand, urine or vinegar could prevent the conflagration from getting worse. The Byzantines used to call this fiery material "liquid-fire." As a knowledge of chemistry increased over time, the basic materials changed. In fact, potassium nitrate (azoic acid mixed with potash) and coal, naphthalene and sulphur powder were used in its production.

The Byzantines defended their city with this fire from the VIIth to the XIIth century, and succeeded in saving it many times. The last time this fire was used occurred during the time of the Emperor Angelos(1185-1195). Following a rebellion by the fishermen in the Sea of Marmara, warships used this fire to destroy the fishermen's ships. During the following 250 years, up until the time of the conquest, history makes no mention of it being used in battle, not even when the Crusaders took the city in 1204. However, it is noted that the Byzantines used this fire when Istanbul was surrounded by the Ottoman forces.[104]

Illustration 27: *Greek Fire (Skylitzes' Writings, Bibliotheque Nationale, Madrid)*

[104] Alpay Kabacalı, **Osmanlı Devletini Avrasya İmparatorluğu'na Dönüştüren Hükümdar Fatih Sultan Mehmed**, (**The Ruler Sultan Mehmet the Conqueror Transforms the Ottoman State inot a European Enpire)** Denizbank **Cultural Publications**, İstanbul 2006, p.87.

The Battle Begins

After lunch on 12 April, the fleet sailed about three miles up the Bosphorus and anchored off the European shore at a place called Çiftedirek, now known as Dolmabahçe. Without doubt, the size and strength of the fleet made even the Italians' confidence in themselves waver. The ships on guard by the chain waited day and night by their weapons but nothing happened. This was the begining of a prolonged game of cat-and-mouse. In order to minimize the risk of being caught unaware two men were continuously on duty at the walls in the neutral territory of Galata from where the fleet at Çiftedirek and the Bosphorus beyond could easily be seen. If any movement at all were made, even a single ship passing down the Bosphorus, one of the guards would go down through the streets of Galata to the Horn to warn the commander, Alvise Diedo. When the trumpet called, the ships would immediately get into battle position. The ships anchored in the calm waters of the Golden Horn waited day and night in this nerve-racking situation.[105]

The First Attack on the Chain

Illustration 28: *The Ottoman Ships Facing the Chain*

Wishing to tighten the screws on the city, Sultan Mehmet ordered Baltaoğlu Süleyman to make a sortie on the chain blocking the Golden Horn. If the Ottoman ships could enter the Horn, the Emperor would be forced to deploy on the sea walls some of the forces greatly needed to defend the land walls. Each side prepared itself with care for such an eventuality. In spite of Mehmet's great interest in innovations in cannon strength and all his efforts, the Ottoman galleons were only equipped with small calibre guns. The decks of the warships were filled with infantry and granite cannon balls, arrows, spears and combustible materials were loaded on board. The watchmen on the Galata walls could see all these preparations so there was plenty of time for the commander of the Byzantine army, Lucas Notaras, to load the large cargo ships with soldiers and ammunition when the fleet from Çiftedirek sailed round the point and made at full speed for the chain. When the ships powered oarsmen approached the tall ships anchored in line formation in front of the chain, the crews started to encourage each other by shouting and uttering war cries. When they came within arrow- shot, they slowed down and began a salvo of arrow and cannon fire; stone cannonballs, arrows tipped with iron or fire rose whistling into the air over the water and rained down on the enemy ships. After this first widespread firing the fleet again moved forward to approach the chain. When they came within boarding distance, the Ottomans braced themselves for the usual practice of hand- to- hand fighting. When the ships came alongside each other, while on the one hand by throwing hooks they tried to get their ladders in place against the sides of the taller ships, on the other they also targetted the chains anchoring the ships. The stone cannonballs of the light guns placed on the Ottoman galleys were too small to damage the wooden hulls of the enemy ships and the marine soldiers tried to attack from below just as the infantry were attacking the landwalls

[105] Roger Crowley, see above, pp.166-167.

from the bottom of the ditch. The Christian sailors and soldiers on the decks, the platforms fore and aft, and the crow's nests of the masts could throw everything down on them. Spears, arrows and stones fell on many of those on the decks of the merchant ships, more or less defenceless against this attack, wounding or killing a significant number. The Christians were experienced in close fighting at sea; they had barrels of water ready to extinguish the fires started by fire-carrying arrows and a simple pulley system suspended from the masts picked up heavy stones and threw them on to the thin-hulled boats milling around them, inflicting great damage. The struggle for the chain blocking the mouth of the Golden Horn was fierce but in the end the Christians prevailed.[106] The enemy ships were bigger, their sides were higher, and the chain between gave neither of the sides the opportunity to ram each other. Eventually, the Ottoman ships, which had fought until evening to break the chain with no result and had been unable to enter the harbour by force, were forced to retreat to Dolmabahçe unrewarded.[107]

Battle with the Genoese Ships

Before three days had passed following this event, three large ships sent from Italy by the Pope were seen on the open sea approaching Istanbul. Having received news of the commencement of battle and the speedy encirclement of the city by the Ottomans, the Pope had immediately sent these three ships filled with food, ammunition and auxiiliary soldiers. Another thirty ships were being prepared. However, these ships did not arrive in time. The sultan was informed of their arrival. He immediately summoned Baltaoglu, the admiral of the navy, and told him to prepare whatever ships he had for battle, to ensure the oarsmen and marine infantry were in good order and procure whatever and as many weapons as were necessary, to put ashore all the officers and men who were not skilled at sea warfare and to replace them with those of courage who were. Enemy ships were to be taken and brought to him. He advised that not one of the commanders, officers or men should return alive if none were taken before giving Baltaoğlu the order to proceed.[108]

Illustration 29: *Genoese Ships Arriving at Constantinople*

[106] Roger Crowley, see above, pp 167-168.
[107] Feridun Dirimtekin, **İstanbul'un Fethi**, **(The Conquest of Istanbul)** Turkish Touring and Automobile Club, İstanbul 1976, p.155.
[108] Kritovulos, **İstanbul'un Fethi**, (**The Conquest of Istanbul**) Kaknüs Publications, İstanbul 2005, p.79.

Standing on the poop of his ship, Baltaoğlu ordered the advancing ships to lower their sails, But the Genoese kept their course; then the Ottoman commander ordered his ships to open fire. Stones whistled through the air and from every side spears began to rain down on the ships. Still the Genoese ships did not falter. The advantage still lay with the taller ships from which the mariners could attack from above; arrows, spears and stones poured down, especially from the masts and crows-nest. Without breaking line, this small convoy of three ships approached Acropolis Point. Just as they were turning to reach the safety of the Golden Horn, a catastrophe occurred. The wind suddenly dropped. The sails hung lifeless from the masts and the ships lost speed just when they could almost touch the walls. The ships were caught in a counter current at the mouth of the Golden Horn, and found thmselves being dragged towards the Galata shore where Mehmet was watching the fight with his army. The enemy seemed about to restore the balance by quickly forsaking sails for oars when Baltaoğlu sent his bigger boats forward and again rained down ammunition. However, this was no more successful than before. The guns were too small and too near the water to inflict any serious damage on the ships' hulls. The Christian crews immediately put out the fires with the water stored in the barrels. Seeing that his encircling action was unsuccessful, the Ottoman admiral shouted encouragingly to his men and ordered the fleet this time to sail nearer and board the ships. The galleons were almost stationary and the cargo ships buzzed around them like a swarm of bees. The ships struggled abreast of each other trying to find a place to ram. The battle became violent and bloody. For two hours the Ottoman fleet fought on, trying to bring the tenacious enemy to its knees In spite of heavy casualties, numerical superiority finally began to show itself. One of the ships was surrounded by five galleys. Another was battling against thirty boats. The third was being attacked by forty lighters filled with soldiers.[109]

Illustration 30*: Seabattle during the Siege of İstanbul*
Ricaut, Die Neueröffnete Ottamanische Pforte, Ausburg 1694

[109] Roger Crowley, see above, pp.173-178.

Illustration 31: *Sultan Mehme Angrily Giving Orders to the Fleet*

Meanwhile the Sultan was watching the battle on horseback, following every finer detail and expecting a result. It was certain that his fleet would prevail and the thought that the ships and sailors would be captured and brought to him made him happy. However, just as the hope was about to crystallize, a sudden breeze allowed the ships to escape.[110] On account of this breeze, the Christian ships were able to cut through the Ottoman ships and approach the Golden Horn. Consequently Baltaoğlu with the fleet returned to Dolmabahçe. At night the chain was lowered and the ships entered the safety of the Golden Horn.[111]

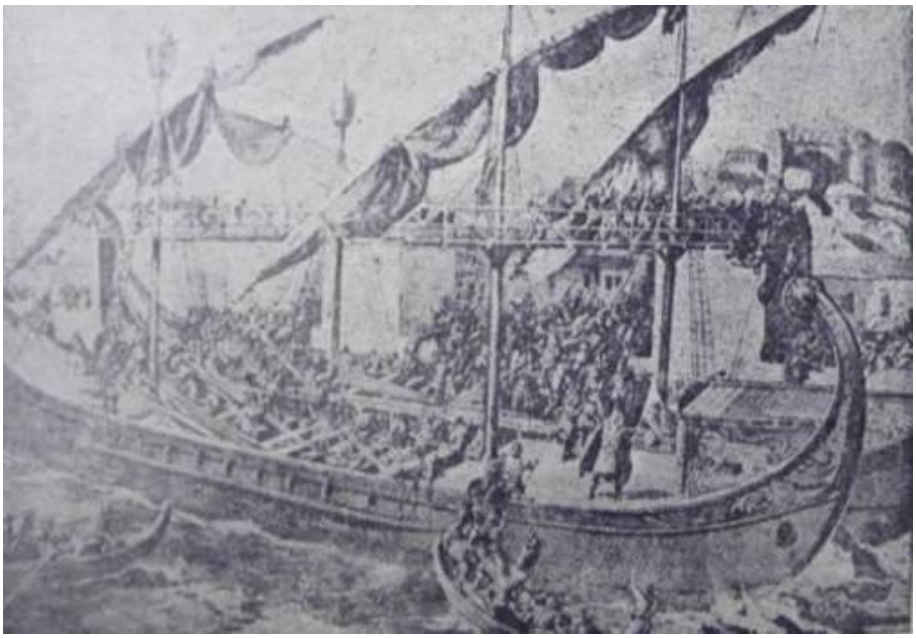


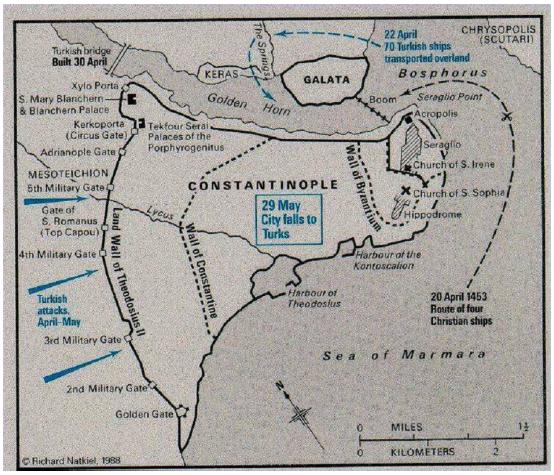
Illustration 32: *One of the Ships Coming to Aid the Byzantines*

[110] Kritovulos, see above, p.82-86.
[111] Halil İnalcık, "Fetih" (The Conquest) , **Dünden Bugüne İstanbul Ansiklopedisi**, (Encyclopedia of Istnabyul from Past to Present) vol.3, p.303.

An Inviolable Order: Drag the Ships Overland!

The Sultan took this lack of success in the face of all his hopes as an ominous sign and became very upset. He even thought of having Baltaoğlu seriously punished or even beheaded for his slackness and inefficiency. However, Baltaoğlu had been hit in the eye with a stone during the attack so, in consideration of his superior bravery during the battle, he simply took away his office. The Christians were encouraged and comforted by the Ottomans' defeat. But their joys and hopes were of short duration. Although all the Sultan's efforts to take the harbour and open the Golden Horn to the Ottoman fleet from that side of the city had failed, new proceedings were to result in the fulfilment of his desires. He ordered the naval officers and high ranking commanders to open up a road from Beşiktaş to the other shore and construct rollers along it to transport the fleet and land it on the Golden Horn.[112]

Apart from besieging Istanbul from the landwalls and the Sea of Marmara, there was a third way of breaking the siege, that is, by obtaining command of the Golden Horn.[113]



Map 14: *The Siege of Istanbul*

After the decision to do this had been made, the place where this could be done had to be examined. The space to be opened up was partly wooded and led down to the area of Kasımpaşa. The road over which the ships would be dragged would begin at the shore in front of Tophane, lead up through Boğazkesen and from there turn south west at today's Lebon Patisserie, go over the hill passing by the Pera Palace of today and come down at Kasımpaşa, that is, on the Golden Horn.[114]

The Sultan gave orders for the forested mountain road behind Galata to be cleared to the east of Galata in the direction of Çiftesütun below, and in the other direction from Galata to Kosmidion situated between Galata and the Golden Horn. After this road had been levelled as far as was possible, the ships were landed on the shore by means of rollers and sails were hoisted. Having been dragged to the mouth of the Mukaddes passage, the ships were ordered to be transported to the Golden Horn. The order was carried out in this manner.[115] The historian Tursun Bey describes the order given by Sultan Mehmet thus:

"The galleys and superior rowing boats were brought overland from the Bosphorus via the neck of Galata and landed in the waters of the harbour. Thus the siege was completely broken and this was the reason for the enemy's anxiety and disintegration."[116]

---

[112] Kritovulos, see above., pp.82-86.
[113] İsmet Koruk, **İstanbul**, Cömertiş Press, İstanbul 2000, p.157.
[114] İsmail Hakkı Uzunçarşılı, **Osmanlı Tarihi**, (**Ottoman History**) Turkish History Foundation, Ankara 1959, p.480.
[115] Dukas, **Bizans Tarihi**, (**Byzantine History)** İstanbul Fetih Derneği, İstanbul 1956, p.166.
[116] Tursun Bey, **Tarih-i Ebul Feth**, (**History of the Conquest)**İstanbul Fetih Cemiyeti, p.50.

Illustration 33: *Transporting the Ships Overland (Fausto Zonaro)*

Starting from the bay of what is today Dolmabahçe, and proceeding up the hill through vineyards to the north of Pera, a road was cleared through the bushes and undergrowth down to the place known as Kasımpaşa, paved with boards and fenced where the terrain was precipitous. This road which looked like a jumping-off ramp was greased with mutton and ox fat. The ships were to be drawn on rollers over this ramp from the Bosphorus to the Golden Horn.[117]

Since many workers were employed the road was finished within a very short while. In accordance with the Sultan's orders the ships were then beached. Blocks were placed under the keels and the ships were bound fast with strong ropes to sturdy planks on each side in order to keep them balanced. After belts and ropes had been put around the angled corners, the sultan gave orders for the ships to be placed on the slipway. The ships looked as though they were moving on the water and the sails filled in the breeze. Thus they began to move up the hill and down towards the harbour where they clustered together at Soğuksu very near to Galata. This fleet consisted of 67 medium- sized ships. On the morning of Sunday, 22 April, 1453, the Byzantines saw this fleet on the Golden Horn. Transporting the ships had taken from about six in the evening to about six in the morning. There is much speculation and rumour about the route taken by the ships. It is impossible to make a definite link between local and outside sources on this matter. The Byzantines had never expected such a happening, that is to see the enemy there in the Golden Horn, ready to attack the city in front of them, and so this dreadful sight shocked and confused them even more. Justinian had brought one of his own and three of the Italian ships to the mouth of the Golden Horn, where

[117] Franz Babinger, **Fatih Sultan Mehmet ve Zamanı**, (Mehmet the Conquerorand his Times) Oğlak Publications, İstanbul 2002, p.91.

the Ottoman ships were, in order to make a stand His aim had been to engage in battle and close the mouth of the Horn so that the Ottoman ships would be caught and unable to move or do any damage to the ships in the harbour.[118] However, the ships in the harbour were no longer of any importance. Mehmet II had succeeded in bringing most of his ships overland to the Horn and so the city lay open to bombardment, both from the land and from the Golden Horn.[119]

"To hear gunfire on the sea from the ships dragged from Yenihisar behind Galata to the waters beyond was an even greater surprise to those in the fortress."[120]

Miniature 4: *The Siege of Istanbul by the Ottomans*

According to Halil İnalcık, the landing of 70 vessels on the Golden Horn was no mean achievement and the decision to do this could not have been taken and implemented in one day. Since the siege itself had been planned beforehand down to the very last detail, the plan to transport these ships overland must have been thought out previously.[121]

[118] Kritovulos, see above, pp.82-86.
[119] Georg Ostrogorsky, **Bizans Devleti Tarihi, (History of the Byzantine State**)Turkish History Foundation, Ankara 1991, p.525.
[120] Hoca Sadettin Efendi, **Tacüt-Tevarih,** Ministry of Culture Publications, Ankara 1992, p.50.
[121] Halil İnalcık, see above, p.302.

Illustration 34: *Ships Landing on the Golden Horn during the Siege of Istanbul*
Ricaut, Die Neueröffnete Ottamanische Pforte, Ausburg 1694

The Chain Remains in Place

In the opinion of Nicola Barbaro, the Byzantines and the Venetians were beside themselves with rage when they saw more than 72 Turkish ships well within the Golden Horn, at a considerable distance from the chain blocking it. As the larger Turkish warships remained at anchor in the harbour of Diplokionion or Çiftesütun, the chain was still performing its duty. The Venetians should not have been surprised. They had used the same tactic during a battle in Northern Italy. Their first reaction was to send fireships among the ships of their uninvited guests. This was a hasty decision. In fact, Barbaro was not the only person to send a spy to inform the Sultan of this plan. On 28 Nisan, two hours after dawn, Giacomo Coco, captain of a galleon from Trebizond was happy to suggest leading a united raid. Two large transport ships, one Venetian, the other Genoese, were covered with bales of cotton and wool in order to withstand cannon fire. These together with three small ships, one under the command of Coco, were to accompany the galleons of Gabriele Trevisano and Zaccaria Grioni. It was Coco who spoiled theis plan by carelessly going ahead in order to be the first to fire on the enemy. The Turks fired on his ship and sank it with all its crew. Trevisano's ship was also hit but was able to reach the shore in a waterlogged state. Subsequently a fierce battle began between the Venetian and Turkish ships. One and a half hours later, each side gave up the struggle. However, this was undoubtedly a victory for the Turks and was celebrated as such in the Sultan's headquarters.[122]

[122] Donald M. Nicol, **Byzantium amd Venice (Diplomatic and Cultural Relationships Research))**, Sabancı University Publications, İstanbul 2000, p.387.

Victory on the Golden Horn and the Final Attack

Illustration 35: *The Conqueror Entering Istanbul (Fausto Zonaro)*

This triumphant victory on the Golden Horn was a great morale booster for the Ottomans. It meant that the whole of the city was under siege from all the seawalls. In order to facilitate communications between the troops on both sides of the Horn, the Sultan had a bridge built between Ayvansaray and Sütlüce. The bridge was built of planks set on barrels firmly lashed together. Heavy gun carriages or five people abreast could cross this bridge. So guns placed on platforms lashed to the bridge began to batter the walls of Blacherna.

At 1:30a,m on the night of 28 May the Sultan gave the order to attack and the army began to assualt the city by land and sea with all its might. The final assault was made on 29 May and the city fell that day.[123] As a result of this victory a new era in world history was begun.

Ships In the Harbour

The ships in the harbour and their crews were fortunate. At the time of the attack, the seventy or so Turkish ships there set sail from Galata to go and attack the sea walls. But as soon as the sailors saw the sultan's standard planted on the citadel they immediately landed to join in the looting. In this way a means of escape by sea opened up for the Venetians and other Christian refugees. Gabriele Trevisano was captured while fighting on the walls. Alvise Diedo, as captain of the fleet, took on the responsibility for its escape. The obstacle stretching from one end of the harbour to the other was still in place. Two of Dieodo's best sailors climbed on to the chain and struck it with their axes until the links broke. Then Diedo made good his escape and most of the Venetian warships went with him. Girolamo Morosini was in command of his own ship while the galleon which had come from Trebizond under the command of Dolfin Dolfin had great difficulty in making headway. 164 of the crew had been killed or lost and there were scarcely enough sailors to raise the sails. As Trevisano was a prisoner of war, his galleon sailed without him.. After leaving the Golden Horn through the opening in the chain, the ships were at the mercy of the Turkish fleet. All of the Venetian merchant ships, as well as four or five of the Emperor's galleons and two or three Genoese ships, were captured. The first news of the fall of Constantinople was given by the Cretan ships which arrived at the island on 9 June, 1453 The news reached Venice at the end of the same month.[124]

[123] Halil İnalcık, see above, p.305.
[124] Donald M. Nicol, **Byzantium amd Venice (Diplomatic and Cultural Relationships Research))**, Sabancı University Publications, İstanbul 2000, pp.389-390.

The Turkish Fleet Breaks Up the Chain

Hamza Bey, commander of the fleet, on seeing that the city had been taken and soldiers were entering the city, ran his ships over the chain, breaking it up as they entered the harbour. After the Italian ships both large and small had sailed through the Ottoman ships to set sail on the open sea, only the Byzantine ships remained there. Hamza Bey sank some of them and took the crews of the others prisoner. At this point, other soldiers on land came and, having broken open the other gates, all the soldiers and the ships' crews spread out around the city.[125]

What the Sources Relate About the Chain

Barbaro reports that on 2 April, 1453, the Emperor had asked Bortolomeo Soligo to stretch the chain as far as Pera. According to Nicola Barbaro, the chain was made of very thick round wooden tree trunks linked together by strong hooks and thick chains. It has been ascertained that, in order for it to be made stronger and more secure, one end of it was fastened to the walls of Constantinople and the other to the walls of Pera.[126] Isidore descrbes how the chain stretched *a montis Galatae* (from the Galata hill) to the Pulchera Gate and that 5 Venetian galleons and 12 merchant ships prevented the Turkish fleet from approaching the chain and entering the harbour.. Leonard of Chios says that 7 Genoese and 3 Cretan ships armed with rams and weapons prevented other ships from entering. Tetaldi says there were 30 Christian ships, 3 ships belonging to the Emperor and Giustiniani's galleon defending the chain." Dukas maintains that the chain stretched from the city gate known as Horaia as far as Galata. Kritovulos explains that there was a chain closing off the harbour from the walls of Galata as far as the Gate of Eugenius.[127]

According to Ibrahim Hakkı Konyalı one end of a chain or chains was certainly fastened to the Galata Tower while the Istanbul end, according to some Byzantine historians, was atttached to a tower near the Neorion gate. Previouly called the Dockyard Gate this place was between the Customs building and the Vakif Han at Sirkeci. This gate was called by the Turks the Cıfıt or Garden Gate. Some historians say that the chain was attached to the Centenarion Tower next to the Tower of Eugenius, which was behind the old Military Wood Depot, and the Military Transport Office. As for Hayrullah Efendi, he says that this chain stretched from the Fish Market in Galata to the Zindan gate on the Istanbul shore. The former name of this gate was Caravion or Dru Nagarion. According to Hammer, this chain went from the gate of the Galata Fish Market to the gate of the Istanbul Fish Market.[128]

Ther remaining portion of the chain on the Galata side was probably strung between Galata and Sirkeci and one end kept in the Tower bearing its name, the Zincirli Tower. After the conquest of Istanbul it became known as the Sultan's Storeoom and used as a depot for weapons or ammunition. According to older sources it was also named the Galata Fortress.[129]

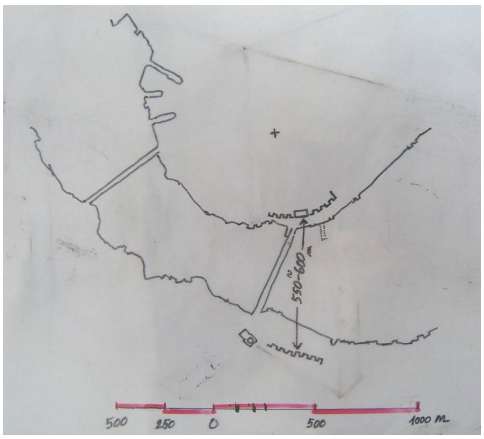
---

[125] Kritovulos**, İstanbul'un Fethi**, (**The Conquest of Istanbul**) Akşam Publications, İstanbul 1967, pp.94-95.
[126] Nicola Barbaro, **Konstantıniyye Muhasarası Ruznâmesi 1453**, İstanbul Fetih Cemiyeti Publications, İstanbul 1976, p.30.
[127] Erendiz Özbayoğlu, "Bizans ve Batı Kaynakları", (Byzantiunm in Western Sources) **550. Yılında Fetih ve İstanbul**, Turkish History Foundation Publications, Ankara 2007, p.116.
[128] İbrahim Atis, see above, p.377.
[129] http://www.yeralticami.com/yeralticami.html.

The Accepted Line Ran between the Kentenarios and Kastellion Towers

In the Middle Ages, the Golden Horn was one of the most important and busiest trade centres in the Mediterranean and the Near East. In Byzantine times, the neighbourhoods, gates or landing stages along the coast of the Golden Horn were called by the name of the church or monastery behind them. The Eugenios Gate and the Chalcedonisia Landing Stage, in what is today Sirkeci, were used for great religious ceremenonies. The place to which one end of the chain to prevent entry to the Golden Horn was attached was the Kentenarios tower beyond this gate. The other end was attached to the tower known as the Castellion at Karaköy. In the XVIIIth century this tower storeroom was turned into the Yer altı (Underground) Mosque.[130]

Photograph 30: *The Underground Mosque(YeraltıCami)*

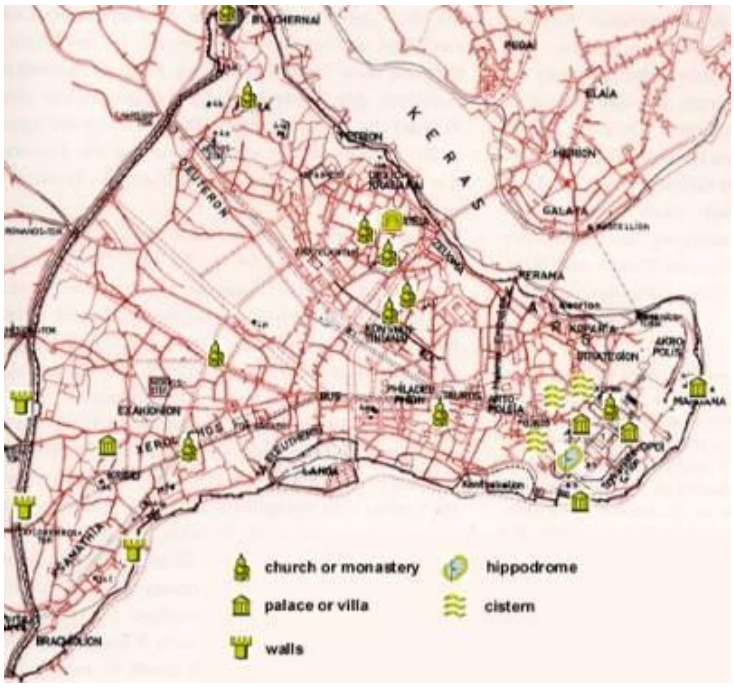


Planı 1: *Kastellion-Eugenios Towers*

Photograph 31: *Working the Capstan*

[130] Semavi Eyice, **Tarih Boyunca İstanbul**, (**Istanbul Throughout History**) Etkileşim Publications, İstanbul 2006, p. 238-239.

Photograph 32: *Between Sarayburnu and Galata (Entrance to the Horn)*



Map 15: *The Chain Blocking the Horn*

The End of the Chapter

Since the chain had been broken from the inner side, if the chains in the museuems are parts of the Golden Horn chain then we should be able to see broken links. A Byzantine emblem, a workshop mark or the emperor's monogram may be found on the chains.

MUSEUMS WHERE CHAINS ARE TO BE FOUND

Museums are places where history or science is brought to life by the objects housed there, where historical objects are preserved and catalogued, protected and restored as well as being educational institutions where scientific research is initiated or carried out. Various objects belonging to the former Ottoman navy were stored in museums simply for their safe-keeping and preservation. However far this departs from today's view of museum curatorship, that phase is now over and many objects, at least, have been saved in this way.[131] Previously a few selected objects from Ottoman State collections were displayed in places open to the public in order to show the power and dominance of the Empire. So the historical roots of Turkish museum curatorship go back at least as far as the conquest of Istanbul.[132]

Now let us examine the museums where parts of the alleged chain are exhibited and see what their situation there is like.

The Military Museum

The Directorate for the Military Museum and Culture Centre, attached to the General Staff Military History and Strategic Studies Command, is situated on Valikonak Street in the Harbiye district of Istanbul.

Photograph 33: *The Military Museum*

[131] Semavi Eyice, "Arkeoloji Müzesi ve Kuruluşu", (The Founding of the Archaeological Museum) **Encyclopedia of Turkey from the Reform Period up to the Republic**, İletişim Publications, İstanbul, p.1596.

[132] Wendy M. K. Shaw, **Osmanlı Müzeciliği, (Ottoman Museumship)**İletişim Publications, İstanbul 2004, p.20.

History of the Military Museum

"After Sultan Mehmet's conquest of Istanbul, valuable weapons, apparatus and equipment were placed in the Church of St Irene at Sultanahmet which was then given the name of the Armoury. This practice continued after the Conqueror's death and weapons taken as war booty or used during the Ottoman era were stored there."[133]

Photograph 34: *Church of Hagia Eirene*

The Church of St. İrene where weapons of war and other equipment was stored is situated in the outer courtyard of Topkapı Palace just inside the palace walls. The second largest Byzantine church after the Church of Holy Wisdom, St Irene is now in a good state of preservation after undergoing repairs. Sources reveal that during the Roman period temples to Artemis, Aphrodite and Apollo were situated on this site. The church was built by Constantine (324-337)at the beginning of the IVth century. The Emperor called the larger church (known in Turkish as "Ayasofya) the church of 'Holy Wisdom, Holy Strength" and St Irene the church of 'Divine Peace." Within the same walled courtyard as Ayasofya, St Irene was burned down with the neighbouring Sampson Zenon during the Nika uprising in 532. Emperor Justinian I (527-565) had Ayasofya and St Irene rebuilt. The rebuilding of St Irene began in 532 but when it was completed is not certain. However, it is assumed that it was finished after the death of the Empress Theodora (548).[134]

The Foundations Of Ottoman Museum Curatorship

After the Conquest St. Irene was turned into an armoury but the building continued to have important symbolic significance, not simply architecturally as a church building, but for the collection of military material and sacred relics stored there. From the very beginning of Ottoman rule over Istanbul, the Armoury became and continued to be a repository for the weapons taken at the time of the Conquest, and for other spoils of war taken later. It also housed important sacred Christian objects from the Byzantine Empire. These objects symbolized the military as well as the religious hegemony passed on to the Ottoman from the Byzantine administration as well as maintaining their religious importance for the Christian community and pointing out that the new ruling family had taken on the hierachy and religious authority previously embodied in the empire. There is nothing to show that these military weapons and sacred heirlooms were brought together in order to be examined or exhibited. However, preserving these objects in an old church functioned as a continuous physical reminder that Ottomans now ruled over a city which had formerly belonged to

[133] Burhan Emiroğlu, **Askeri Müze**, (**Military Museum**) Ak Publications Art Books Series 6, İstanbul 1983, p.5.

[134] Erdem Yücel, "Aya İrini Kilisesi", (The Church of St. Irene) **Encyclopedia of Istanbul from Past to Present**, vol.1, Ministry of Culture and History Foundation Joint Publication, p.433.

Christians. İt is impossible to infer what this collection was supposed to represent, so far removed is it from the basic tenets of museum curatorship. However, the value of this collection is that it sowed the seed for later Ottoman museums.[135]

In the first half of XVIIIth century, what is striking is the new movement of the Ottoman Empire towards the west. The idea of setting up a Military Museum was an innovation which took place in the reign of Ahmet III. This idea, with a few changes, became reality with the organization of the weapons and objects in the Armoury under the name of Dar-ül Esliha. This institution was short-lived as it was closed down after being attacked and partly looted in janissary rebellions in the reigns of Selim III and Mahmut II. In the time of Abdulmecid I, a new military museum was set up in St Irene, then known as the Military Depot, through the efforts of the advisor to the Director of the Cannon Factory, Fethi Ahmet Paşa, and named first as the Military Museum and then the Sultan's Museum of Ancient Artefacts. After alterations and restoration of the building had been carried out,\ the museum was comprised of two sections. The first, the"Mecma-i Esliha-i Atika," included weapons and equipment for war, while the other, the "Mecma-i Asar-ı Atika," consisted of archaeological artefacts. Later the Mecma-i Asar-ı Atika was moved by Osman Hamdi Bey to the Çinili Köşk and became the basis for today's Archaeological Museum.[136]

Collections Were Only Open for Private Visits

According to Wendy's research on Ottoman Museum Curatorship, the fact that visitors, even if only a select number and foreigners in particular, were allowed to view the objects in Darü'l-Esliha shows that there was an exhibition space. It seems that what the visitors could see was very restricted. In the XIXth century in the West an object was displayed to be admired at length by the viewer as well as to be a show of strength. The Ottoman public as a whole were prevented from seeing such objects and it may be that their obscurity brought about a reverse psychological effect in that these objects were regarded by the people as stronger and more effective. The displaying of military equipment side by side with sacred artefacts provided a link between them, reflecting the fact that these sacred objects were prizes gained in war. The collection was opened to European travellers, such as Flachat and Clarke, and fucntioned in a similar way to a museum but its real strength lay in its being almost incaccessible. Both these travellers comment that they were allowed a mere glance at the valuable artefacts inside before being hastily taken away. Sarcophagi exhibited at strategic points around the ancient church, the display of weapons side by side with Byzantine treasures from the city strengthened the association between them and stressed the theme of mortality.[137]

The Golden Horn Chain Displayed in St. Irene's Courtyard in 1891

The sarcophagi in the inner courtyard stood side by side with the chains made by the Byzantines to block the Golden Horn which the Ottomans had succeeded in bypassing. The kettle drums of the janissaries were placed in front of sarcophagi; thus the theme of an interwoven cultural and military hegemony was open to view. Visitors to the collection, even before entering the ancient church, were brought face to face with the sarcophagi which identified the history of the city. Even if it is debatable who these sarcophagi belonged to, they still created a concrete framework for the exhibition. The Byzantine sarcophagi there in

[135] Wendy M. K. Shaw, see above, pp.21-22.
[136] Burhan Emiroğlu, see above, pp.5-6.
[137] Wendy M. K. Shaw, see above, pp.92-93.

the inner courtyard of the museum constituted a physical memorial for the Byzantine administrators in the same way that the chains piled on front of them were a symbol of the death of the Byzantine Emperor.[138]

Photograph 35: *The Golden Horn Chain in the Inner Court of St Irene: Photograph by Abdullah Brothers 1891*

Efforts to Establish a Military Museum

During the 1877-1878 Ottoman-Russian War the ancient church ceased to be a msueum and was turned into an armoury once more. The museum was closed but the exhibits remained. In 1908 a commission to found a museum was set up under the direction of Ahmet Muhtar Paşa. The Minister for War, Mahmut Şevket Paşa, appointed Ahmet Muhtar Paşa to found an "Esliha-i Askeriye" (Military)Museum and selected him as the first director.

The commission set up a special model museum on the second floor of the Acem Pavilion of Yıldız Palace where Abdülhamit II resided. This museum, which was closed to the public, could only be visited by the sultan and his entourage. But plans for a new and bigger museum were under way. Just like Abdülhamit's reign, the model museum came to a swift and sudden end when Ahmet Muhtar Paşa managed to establish a new museum in its former place, the church of St Irene. In this he had the support of the Minister for War, Mahmut Şevket Paşa. Mahmut Şevket Paşa had visited some museums in Berlin and Paris and understood their importance and the influence they had on cultural life. From photographs of the number of weapons arranged as medallions or in long lines on tables the museum looks very crowded. There was also a glass-roofed area. Weapons and cannon piled one on top of the other filled the galleries behind; nearby were the chains which at one time

[138] Wendy M. K. Shaw, see above, pp.92-93.

had been used to block the Golden Horn. Flags and standards awoke a feeling of patriotism and gave a festive air.The decision to found the museum on the site of the old Mecmua-i Esliha-i Atika emphasized the museum's role. In Abdülhamit II's reign the reason for choosing a place for the museum so far from the city centre was to make a connection between the sultanate and progress. However, choosing this traditional site for the museum attracted attention to the history of the Empire. The buuilding itself remained one of the constant victories won by the Ottoman over the Byzantine Empire and so brought to mind the high point reached when a Turkish/Islamic regime established its domination over a Hellenic/ Christian one. In 1910 the museum was given the name Esliha-i Askeriye Müzesi.[139]During the Seecond World War, part of the meseum's collection was sent to Ankara and some to Niğde. After the war the objects were first sent to the Maçka Barracks in Istanbul and then in 1950 to the Gymnasium at the War College where they were put on display in 1959.[140] In the War College archives there is a photograph of the chains as exhibited at that time.

Photograph 36: *Chain and Capstan: from the Military Museum Archives*

The War College building used today as the Military Museum was first built in 1834 as a hospital for the Cannon Foundry. It was destroyed by fire in 1853 but rebuilt in 1862. Until 1936 it was used as the War College and Ataturk studied here from 1899 to 1905. The War College was moved to Ankara in 1936 after which the building was used until 1966 as the headquarters of the 1st Army, the 3rd Army Corps and the Central Command. Later it was remodelled and turned into a museum. Opened in part in 1985 and as a whole in 1993, the Military Museum, together with the Cultural Centre which constitutes a separate but integral part, with its rich collection of artefacts is counted among the foremost military museums in the word.[141]

[139] Wendy M. K. Shaw, see above, p.265.
[140] Tülay Ergil, **Istanbul Museums,** İstanbul Cultural and Educationsl Foundation Publications, Istanbul 1993, p. 116.
[141] **Türkiye Müzeleri,** (Turkish Museums) see above, p.99.

Chains Exhibited in the Military Museum

The chains were first displayed in the museum garden before being brought inside and exhibited in various halls.

Photograph 37

Photograph 38

Photograph 39

Photograph 40

Photograph 41

Chains exhibited outside the Military Museum and in various different halls

At this time the chains in the Military Museum Collection are on exhibition in the Conqueror's Corner.

Photograph 42: *Chain and Anchor Exhibited in the Military Museum*

Some of the links in the chain shown here are in the shape of a figure of eight while others are open in the middle. Some found near the anchor have the shape of an 'S" Three double rows of blocks put under the chain recall the fact revealed by the sources that it was supported in some way.

Four links of the chain, examples of both the bent and open style, are to be found near a model of Mehmet the Conqueror on horseback with his tutor which brings to life his entrance into Istanbul.

Photograph 43: *The Conqueror's Corner*

An Examination by Ibrahim Hakkı Konyalı in 1951

After an examination, the first of its kind, of the Golden Horn chain, the Turkish history researcher, İbrahim Hakkı Konyalı, shared the findings of his research with readers of the joural *Tarih Hazinesi* (Treasures of History). According to Konyalı:

"When the artefacts in the Military Museum were in St Irene's Church within the Bab-ı Hümayun, an oil painting of Ataturk was hung above the apse of the church. It was striking that the chains piled underneath it looked like like a coiled serpent. It was as if four centuries of Turkish wrath were in that leg of Ataturk arched like a bow to strike the head of this snake."[142]

" *There are two kinds of links in this piled- up chain. Some of the links, which vary in length from 42-52 centimetres, and in width from 24-28 centimetres, are open in the centre while some are in the shape of a figure of eight. Others are in the shape of an 'S.'On top of the piled chain there is also a large anchor in the shape of a double fork with two links at the top. This anchor attached the chain to the land. Many of the chains have been thinned and corroded by the sea water. There is no written documentation as to when these chains were brought to the musuem. However, it is said that part of the chain belongs to the chain at the Golden Horn and part to that of the harbour at Rhodes.*"[143]

"As the pile of chains is very heavy it was at that time unfortunately impossible for me to weigh or measure them. According to the museum officials there are eight separate parts, the total length of which is about 150 metres. At that time I requested the Director, Mr. Şükrü to weigh and measure the chains."[144]

İbrahim Hakkı Konyalı also considers that two chains were needed to protect the city which is why there are two chains in the Military Museum and agrees that the chain was attached to a tower on the Istanbul side.

An Examination by Iskender Pala in 2000

Admired by everyone who loves Dîvan literature, in particular the younger generation, İskender Pala, a researcher into and a lover of literature, gives space in his work *Istanbul Bir Rüya* (Istanbul, a Dream*)* to an examination of the Horn chain and its visual appearance.

"Each link made of wrought iron is approximately half a metre long and 20 centimetres thick. After many years in the sea, their appearance of being bowed and exhausted by time gives a lesson to the passers by. Though warped by time so that some have become elongated, others transformed into an 'S', a person must really trust in the strength of his arms to lift even one of them."[145]

At this minute, I am of the same opinion as these two writers who have examined these chains.

---

[142] İbrahim Atis, see above, p.375.
[143] İbrahim Atis, see above, p.377.
[144] İbrahim Atis, see above, p.413.
[145] İskender Pala, *"Haliç'e Gerilen Zincir"*, (*The Chain Across the Horn*) **İstanbul Bir Rüya**, **Istanbul: A Dream** İ.B.B. Publications, İstanbul 2000, p.35.

The Istanbul Archaeological Museum

The Istanbul Archaeological Musuem, attached to the General Directorate for Monuments and Museums under theTurkish Ministry of Culture, stands at the entrance to Gülhane Park in the Sultan Ahmet area at the top of the Osman Hamdi Bey Hill leading to the Topkapı Palace Museum.

Photograph 44: *Istanbul Archaeological Museum*

The Istanbul Archaeological Museum consists of three parts: the Archaeological Museum itself, the Works of the Ancient Orient Museum and the Tiled Pavilion (Çinili Köşk).

History of the Archaeological Museum

The Archaeological Museum was founded as the Müze-i Hümayun (Imperial Museum) by the museum curator Osman Hamdi Bey towards the end of the XIXth century and opened to visitors on 13 June, 1891. It is important in being the first 'Turkish Museum' as well as taking a distinguished place among the few other museums in the world built expressly as a musuem. It still keeps its place among the largest museums in the world today with its more than one million artefacts from many different civilizations. For the museums's centenary celebrations in 1991 the rooms on the lower floor were re-organized and an exhibition opened in the annexe which received the European Council Museum Award.[146]

Chain Exhibited in the Archaeological Museum

In his book on the Archaeological Museum, Alpay Pasinli, has this to say:

The "Mecma-i Esliha-i Atika formed the basis for the Military Museum. In 1856 old guns from Yedikule Fortress were brought there. The section containing a collection of archaeological artefacts became the Mecma-i Asar-ı Atika. It was there that the chain which closed the Golden Horn at the time of the Conquest was to be found."[147]

[146] **Turkish Muzeums,** see above, p.80.
[147] Alpay Pasinli, **Arkeoloji Müzesi**, **(The Archaeological Museum)** Akbank Publications, Istanbul 2003, p.12.

The chain in the Istanbul Archaeological Museum is on display in the room with the title “Istanbul Throughout the Ages.”

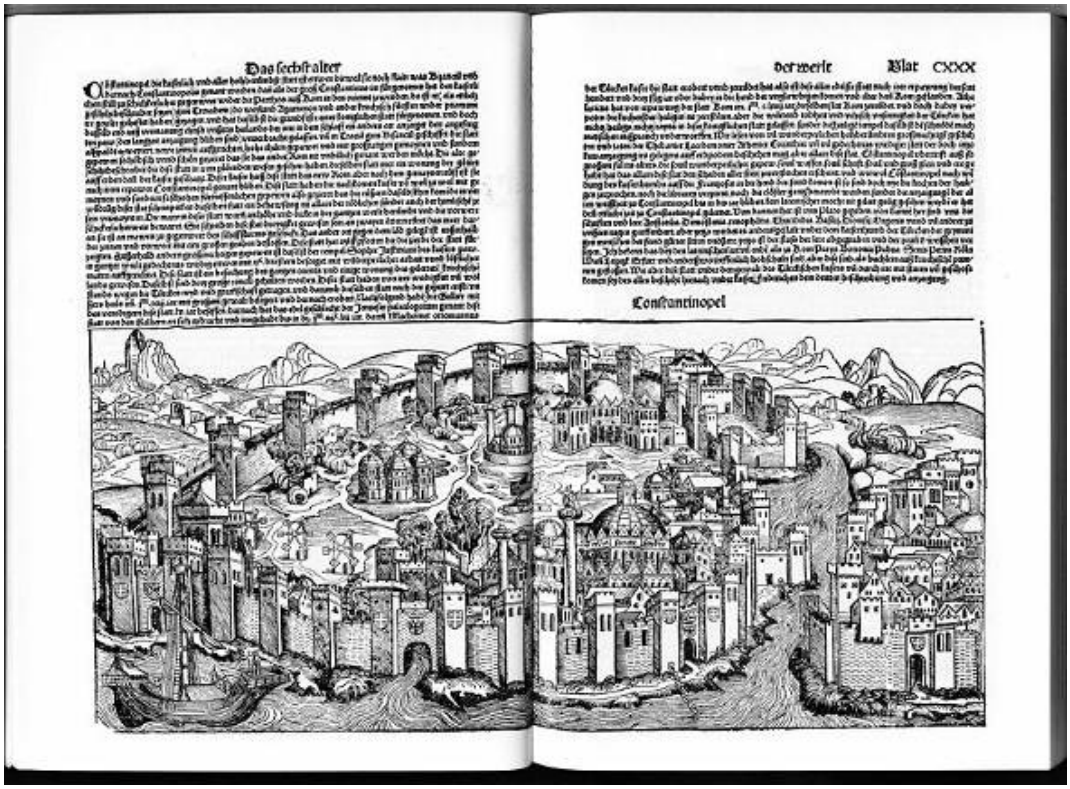
Photograph 45: *Chain on Display in the “Istanbul Throughout the Ages” Room*

The chain is placed in front of a painting inspired by an engraving by Hartmann Schedel done in 1493. In this painting by Oya A. Şirinöz the chain closing the Golden Horn can be seen. The chain in the painting is seen to stretch unbroken to the opposite side while in the engraving it trails broken in the sea.

Photograph: *Picturing the Chain*

Why Were There Two Chains?

In Hartmann Schedel's 1493 engraving of Constantinople from the historic Liber Chronicarum two chaims are to be seen. However, no sources mention that two chains were used on the Horn.



Engraving 11: *Hartmann Schedel's Constantinople (first edition)*

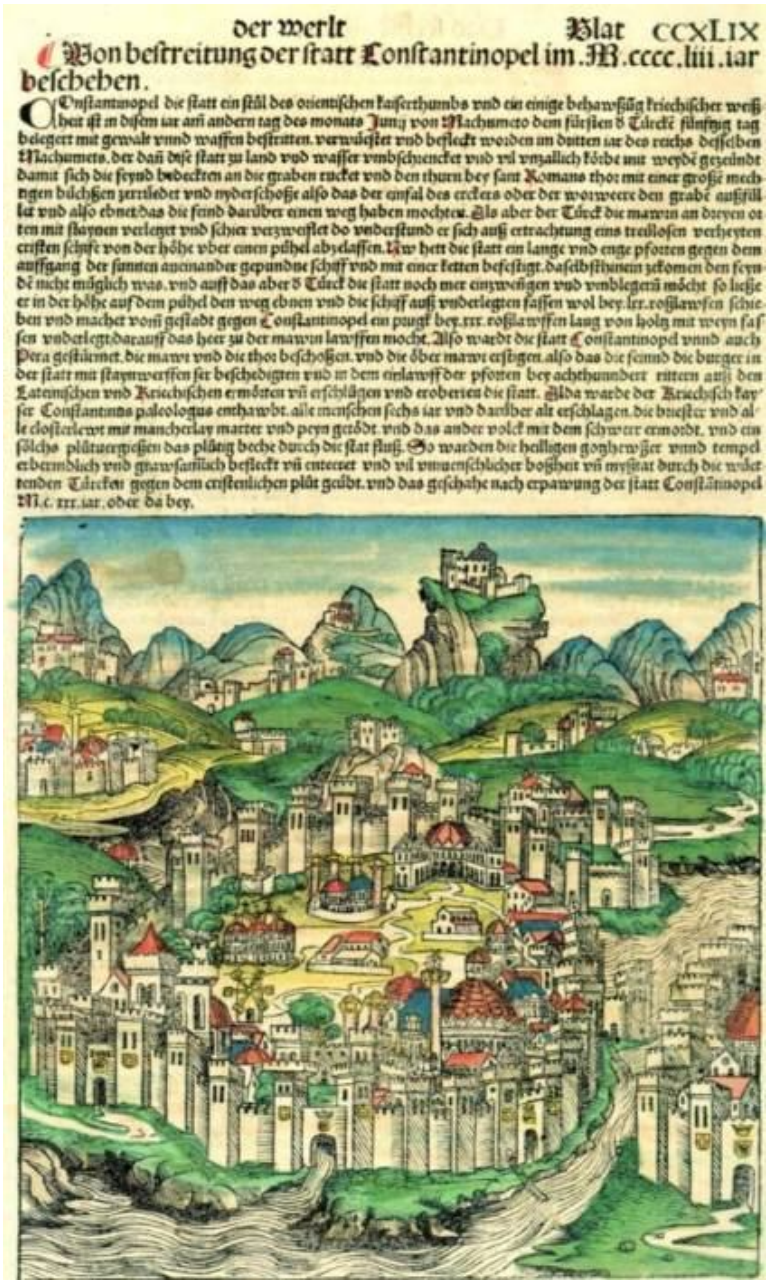
Engravings and miniatures are used in books in order to give a lot of information in a small area, so here this may be a symbolic reminder that the chain on the Golden Horn was twice breached during the Fourth Crusade. A careful look at the engraving will reveal that there is no chain on the Galata side nor any place on the wall to which a chain could be attached.

In his engraving of Rhodes, Schedel connects the walls by a chain. But here the chain seen in front is angled towards the Sea of Marmara and therefore it could not be joined to a tower in the Galata area seen in the background. It is clear that the chain is broken. Perhaps this is an indication that the chain was fixed to the Maiden's Tower but in that case the chain in the background is too far away to defend the city.

Schedel may be showing what the Byzantines did to prevent the tower in the Galata area being taken and the chain broken, the harbour entered and the towers taken or the walls attacked, or the city of Galata remaining neutral.

A Small Alteration in Angle Can Change Many Things

Hartmann Schedel, a German doctor who lived in Nürnberg, had a great deal of cultural knowledge. His book Liber Chronicarum (Chronicles) published on 12 July, 1493 was published in German on 23 December of the same year. About 1,500 copies of the Latin version were printed while the German edition ran to between 700-1000. The second edition contains an engraving of Constantinople in which the first chain across the Golden Horn can be seen facing towards Galata. The second chain stretches from a different tower. So it seems that Schedel's aim was simply to picture two broken chains.


der werlt Blat CCXLIX

Von bestreitung der statt Constantinopel im .M.cccc.liii.iar beschehen.

Constantinopel die statt ein stäl des orientischen kaiserthumbs vnd ein einige behawsung kriechischer weiß
heit ist in disem iar am andern tag des monats Junij von Machumeto dem fürsten d Türckē fünffzig tag
belegert mit gewalt vnnd waffen bestritten. verwüestet vnd befleckt worden im dritten iar des reichs desselben
Machumets. der dann diss statt zu land vnd wasser vmbschloss vnd vil vnzallich körbe mit weydē gezeindt
damit sich die feynd bedeckten an die graben ruckt vnd den thurn bey sant Romans thor mit einer grossē mech
tigen büchssen zerrüttet vnd mit pfeilschossen also das der einfal des erckers oder der wörwerre den grabē auffüll
ten vnd also ebnet das die feind darüber einen weg haben mochten. Als aber der Türck die mawrn an dreyen or
ten mit schussen verletzt vnd schier verzweyflet do vnderstund er sich auß ertrachtung eins treulosen verheyten
cristen schyff von der höhe vber einen pühel abzelassen. Nw hett die statt ein lange vnd enge pforten gegen dem
auffgang der samten aneinander gepundne schiff vnd mit einer ketten befestigt. daselbs hinein zekomen den feyn
den nicht möglich was. vnd auff das aber d Türck die statt noch mer einzwengen vnd vnbelegern möcht so ließ
er in der höhe auf dem pühel den weg ebnen vnd die schiff auß vnderlegten fassen wol bey .lxx. roßlawffen schie
ben vnd machet vom gestadt gegen Constantinopel ein pawgt bey .xxx. roßlawffen lang von holtz mit weyn fas
sen vnderlegt. dar auff das heer zu der mawrn lawffen mocht. Also wardt die statt Constantinopel vnnd auch
Pera gestürmet. die mawrn vnd die thor beschossen. vnd die öber mawrn erstigen. also das die feind die burger in
der statt mit staynwerffen ser beschedigten vnd in dem einlawff der pforten bey achthundert rittern auß den
Latenischen vnd Kriechischen ermörten vil erschlügen vnd eroberten die statt. Alda wardt der Kriechisch kay
ser Constantinus paleologus enthawbt. alle menschen sechs iar vnd darüber alt erschlagen. die brüester vnd al
le closterleywt mit mancherley marter vnd peyn getödt. vnd das ander volck mit dem schwert ermordt. vnd ein
sölchs plütvergiessen das plütig beche durch die stat fluß. So wurden die heiligen gozhewßer vnnd tempel
erbermklich vnd grawsamlich befleckt vñ entteret vnd vil vnmenschlicher boßheit vñ mysstat durch die wüter
tenden Türcken gegen dem cristenlichen plüt geübt. vnd das geschahe nach erpawung der statt Constantinopel
M.c. xxx. iar. oder da bey.

Engraving No.12: *Constantinople in Hartmann's Second Edition*

The First Pirated Book

Schadel's book aroused great interest and four years later in 1497 a pirated edition was published. Smaller than the original, this is the first known pirated or illegally published book. The interest shown in this in Augsberg prompted the publisher Johann Schönsperger to publish the first pirated edition of the Chronicles in February,1497. As this is much scarcer than the real thing, it is therefore more expensive and has become a collector's item.[148]

Engraving 13: *Constantinople in the Pirated Edition*

These three engravings are from the Byzantine period.

[148] http://www.ntvmsnbc.com/id/24942648/.

Istanbul Naval Museum

The Istanbul Naval Museum under the aegis of the Naval Forces Command is to be found in Beşiktaş on Barbaros Hayrettin Paşa Iskelesi Street.

Photograph 47: *Istanbul Naval Museum*

A History of the Naval Museum

The Naval Museum; The Naval Dockyard was started after the conquest by Sultan Mehmet the Conqueror to make and develop the small ships of the time. However, its most important period began at the time of Beyazit II when the Tersane-i Amire was built to become the largest dockyard in the country, pushing the dockyard at Gallipoli into second place. Here ship-building went on side by side with the making of weaponry and other artefacts. Permission to build the Roayal Naval Dockyard was given by Sultan Abdülhamit II and the order issued by Admiral-in-Chief of the Navy, Hasan Hüsnü from Bozcaada. The building, first given the name of Museum House, then later the Museum Directorate, was opened in 1897, on the twentieth anniversary of Sultan Abdülhamit's accession to the throne. It was situated on the upper floor of an old mine depository in Kasımpaşa. During World War II the museum was moved to the Nakkarhane (Military Band) building and the name was changed to the Naval Museum Directorate.[149] At the beginning of the 20th century, all the caiques belonging to the Topkapı and Dolmabahçe Palaces were brought together. In 1913 the caiques with or without pavilions from the boathouse of the Topkapı Palace Seaside Mansion, together with one galleon, were taken for various reasons and placed on to the former galleon stocks at the Royal Naval Dockyard. The ones from the Dolmabahçe Palace boat house were left where they were. The galleon, the sultan's caiques and the very heavy marble inscriptions and stones were transported from the boat-house of the mansion by the sea and placed in the galleon basin.[150]

[149] Tülay Ergil, see above, p.122.
[150] Haluk Özdeniz, **İstanbul Deniz Müzesi,** (Istanbul Naval Museum) Ak Publications, İstanbul 1978, p.8.

During World War II the mueum artefacts and archives were taken to Anatolia and the museum remained closed for a while. After the war some of the museum artefacts were taken and deposited in the Northern Naval Command Headquarters. In 1948 the museum, under the name of the Naval Museum, was opened to the public again in the garage of the Dolmabahçe Mosque and Palace, and the boathouse and pool. In 1956 when Dolmabahçe Avenue was widened, the Coachman's Quarters of the former Shore Palace were given to the museum and the archives and some artefacts were taken there. Until 1960 the artefacts of the Naval Museum were on show in Dolmabahçe Mosque. In 1961 the artefacts were moved to the Beşiktaş Tax Office and exhibited for the fourth time. In 1970 a separate section of the museum, the Historic Caiques Gallery, was opened to the public.[151]

The Chains on Exhibition at the Naval Museum

"On exhibition in the open area is a part of the massive wrought iron chain strung across the Golden Horn from Galata to Saryaburnu. This was done by the Byzantines to protect the weakest part of the sea walls along the Golden Horn during the conquest of Istanbul by the Turks, which closed one era in history and began a new one."[152]

Photograph 48: *Chains on Show in the Garden*

Three chains are to be found in the Naval Museum: one is exhibited in the Main Exhibition Building in the Room of the Conquest and Sultan Mehmet the Conqueror, while

[151] Tülay Ergil, see above, p.122.
[152] Haluk Özdeniz, see above, p.47.

the two others are on show in the Gallery of the Sultan's Caiques. These chains are all made of articulated links.

It is noticeable that some of the chains end in a broken link. It can be seen that the length and thickness of the links resemble those of the articulated chain in the Military Museum.

Photograph 49: *The Chain in the Main Building*

The chain in the Gallery of the Sultan's Caiques is at present being stored in a temporary depot in the garden on account of the construction of a new building.

Photograph 50: *The Chain in the Sultan's Caiques Gallery*

Rumeli Hisar Museum

The Fortress Museums attached to the Directorate for Monuments and Museums of the Ministry of Culture are: Anadolu Hisar (Anatolian Fortress),Rumeli Hisar (Rumelian Fortress) and Yedikule Hisar (Seven Towers Fortress). The information booklet about the Fortress Musuems published in 1968, states that in the collection in Rumeli Hisar " *a part of the chain said to have closed the Golden Horn is on exhibition here*."

Photograph 51: *Rumeli Hisar*

A History of Rumeli Hisar

İsmail Hakkı Uzunçarşılı, the historian, in attributing the construction of Rumeli Hisar to Dukas and İbn-i Kemal, explains the reasons for its construction thus:

"The Ottomans succesfully attempted to eliminate or forestall each and every obstacle to their conquest of Istanbul. As long as this area remained in the hands of the emperor it seemed impossible for the Ottomans to gain hegemony over Rumelia as a whole. In fact, while on their way to the battle of Varna the army was in great danger since Istanbul, the areas around Çanakkale and even towards Sarayburnu and the Bosphorus were in enemy hands, a sum of forty thousand ducats was given to the Genoese fleet. They were able to cross with their equipment at the place called Yenicekale from Anatolia to Rumelia as guns placed on the Rumeli shore and the wind blowing from the south forced the enemy ships to depart from the Bosphorus. In the light of this experience the Ottomans who, as yet, were not in possession of a strong navy found it imperative to remove this obstacle. Subsequently as soon as possible the sultan ordered the building of a fortress to cut the straits (Boğazkesen, which was to become known as Rumeli Hisar) in order to prevent the arrival of aid of any kind, as well as to facilitate passage from one shore to the other. As soon as he retunred from the Karaman campaign, the sultan sent orders to Anatolia and Rumelia for one thousand soldiers expert in construction work to build a castle on the Boshphorus and for preparation by the spring of materials needed by workmen and limeburners in the construction of this castle."[153]

[153] İsmail Hakkı Uzunçarşılı, see above, p.458.

"The timber was brought from Izmit and Ereğli on the Black Sea and the stone from Anatolia. Use was made in the construction of some marble pillars from the ruined church of Saint Michael found on the site. The castle was to be constructed at Anadoluhisar, the narrowest part of the Bosphorus along the part stretching from there to the harbours of Beykoz and Yeniköy. The sultan divided the building of the castle among three viziers. He gave the task of building a great fortress to act as an acropolis at one of the three corners, that is on the eastern shore, to Halil Pasha. Zagano Pasha was appointed to build another great tower on the hill in the southern corner; and the building of the fortress in the third corner, that is to the north, was given to Saruca Pasha. In order that no passage should be given to ships and to prevent any attacks by sea while the construction was in progress, about thirty naval ships from the dockyards at Gallipoli and many transport ships were brought to the Bosphorus. Construction of the fortress known as Boğazkesen began on 21 March,1452, and was completed four months later at the end of July. The sultan ordered the commandant of the castle, Firuz Ağa, to see that every ship of whatever nation which was passing through the Bosphorus dipped its sails and paid a customs tax; any ship which failed to obey was to be sunk."[154]

On the land at Rumelihisarı which is ten donums in area, a castle comprising three great towers, named Halil Paşa, Saruca Paşa and Zağnos Paşa, thirteen smaller towers and the walls which join these came into being. On the shore was a further tower separate from the thirteen other towers and surrounded by walls, known as the Baby Tower. Near the base of this tower were twenty gun emplacements. The cannon balls fired from the guns here skimmed across the water to their target. In 1452 a ship under the command of its captain Antonio Rizzo which disobeyed the order to stop was sunk by the first ball fired.[155]

After the conquest of Istanbul, Rumeli Hisar was for a time used as a customs base.

The Minister for the Navy, Ahmet Cemal Paşa, wanted to repair Rumeli Hisar as a museum. He wrote this report from the Ministry to the State authorities in which he gave this order;

"*...the castles which have a connection with the navy and which contain anchors and chains and old cannons belonging to the Navy, each of which is a historical treasure, will become a Navel Museum in which to preserve and display these...*[156]

The Grand Vizier Gedik Ahmet Paşa is known to have been first imprisoned in Saruca Paşa Tower

In 1953 the castle was set up as a museum/ monument by order of President Celal Bayar.[157]

---

[154] İsmail Hakkı Uzunçarşılı, see above, pp.461-463.
[155] Tülay Ergil, see above, p.51.
[156] **Haluk Y. Şahsuvaroğlu, Asırlar Boyunca İstanbul, (Istanbul Through the Ages)** Cumhuriyet Newspaper Publications, p.36.
[157] Tülay Ergil, see above, p51.

Chains Exhibited at Rumeli Hisar Museum

Photograph 52: *The Chain at the Fortress Entrance*

The four links of chain exhibited in the Halil Pasha Tower situated on the left on entering Rumeli Hisar attract attention. Visitors are not informed, however, what this piece of chain exhibited here as the Halil Chain is, since there is no label on the chain to inform them of this.

Considering the reason from a historical point of view as to why this chain or piece of chain is to be found in the castle, it may be that it was used either to prevent any kind of aid which might come from the Black Sea, or perhaps at the time when Rumeli Hisar was used as a customs centre to close the crossing between there and the Anatolian castle.

Saruca Paşa, who was one of the Comqueror's generals and who built one of the three towers of the castle, had been Admiral of the Fleet at Gallipoli during the reign of Beyazit, known as the Thunderbolt. He had built the Dockyard at Gallipoli in 1391, repaired the castle, dredged the harbour and put two-story towers on either side of the entrance to the outer harbour. He had also closed the mouth of the harbour with a three-fold chain.[158] Perhaps the chain in the museum was brought by sea from the dockyard at Gallipoli with the ships which came to Istanbul when the castle was being built. Perhaps this chain was used to chain ships together to form a protective barrier.

Cemal Paşa, in accordance with the written command to establish a Naval Museum, had a chained cannon brought to the castle. The chain may have later been removed from the cannon and kept separate from it. It is therefore possible that this chain in the museum labelled as the Golden Horn chain may, in fact, be this other chain.

In Conclusion

A preliminary examination of the chains in these four museums shows that, apart from the group of chains in the Military Museum, all were made of articulated links. These links are 50-52 cm in length and 17-18 cm in width. As the links of these chains are of a length and width sufficient to close off a harbour, these may be the chains used to block the harbour of the Golden Horn. It was for this reason that research began on these chains.

[158] www.gelibolukaymakamligi.com/pages/sarucapasa.htm.

CATALOGUING and EXAMINATION

Having ascertained that the chains were of the type used to close harbor entrances, the chains were measured and examined with the help of the museum guards and officials.

Photograph 53: *Opening out the chain*

The chains found in the exhibition halls or storerooms were opened out to their full length and then measured metrically.

After labelling the front and sides of the links to be photographed their length was measured using a metric scale and callipers.

Photograph 54: *Measuring the length of the link*

Photograph 55: *Measuring the width of the link*

Photograph 56: *Measuring the width of the link*

Photograph 57: *Measuring the width of the link*

Using callipers to measure the thickness of the link

Photograph 58:*Measuring the thickness of the link*

Photograph 58: *Measuring the weight of the link*

Each link was weighed by attaching it to an electronic scale.

Special care was taken to observe any mark, seal or monogram.

The order in which the chains in the museums were measured was in accordance with when permission was obtained from the director of the museum or the organization to which the museum is attached. So work was performed at the Istanbul Archaeological Museum, the Istanbul Naval Museum, the Rumeli Hisar museum and the Military Museum in that order. Within this order the work was done in company with Art Historian Serdar Gündoğdu and Conservator Fırat Buzlu.

In the catalogue of chains the name used for the chain in question was arrived at by using the first letter of the museum in which the chain is kept and the number given to the chain, together with the number of the room in which it is exhibited. Thus:

İstanbul Archaeological Museum : A.z
İstanbul Naval Museum : D.z
Rumeli HisarıMuseum : R.z
Harbiye Military Museum : H.z

Chains Kept in the Istanbul Archaeological Museum

Chain : A.z1
Link Number : 18

Length : 8.2
Weight : 219.45 kg

Median Length of Link : 52.0 cm
Median Weight of Link : 12.19 kg

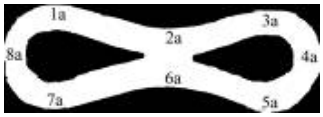
Longest Link : 56.0 cm
Shortest link : 47.4 cm

Heaviest Link : 17.13 kg
Lightest Link : 7.11 kg

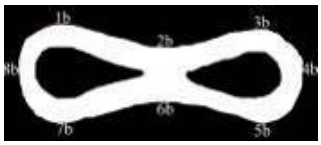
A.z1-1	A.z1-2	A.z1-3
		
		

	Link Measurements		
Link	**A.z1-1**	**A.z1-2**	**A.z1-3**
Length			
1-7	16.5 cm	18.0 cm	17.5 cm
2-6	10.0 cm	10.7 cm	11.1 cm
3-5	16.0 cm	17.5 cm	17.5 cm
4-8	47.5 cm	53.5 cm	50.5 cm
Thickness			
1a	4.5 cm	4.4 cm	4.7 cm
1b	3.6 cm	4.8 cm	4.6 cm
2a	4.1 cm	--	--
2b	3.2 cm	4.4 cm	4.8 cm
3a	3.5 cm	5.0 cm	5.4 cm
3b	3.6 cm	5.4 cm	4.4 cm
4a	1.7 cm	3.1 cm	2.4 cm
4b	4.0 cm	5.3 cm	4.2 cm
5a	5.1 cm	4.9 cm	4.6 cm
5b	3.2 cm	4.9 cm	4.6 cm
6a	3.9 cm	--	--
6b	4.6 cm	4.7 cm	4.7 cm
7a	4.4 cm	4.4 cm	4.8 cm
7b	3.9 cm	4.2 cm	5.1 cm
8a	2.5 cm	3.9 cm	3.3 cm
8b	2.7 cm	4.6 cm	5.3 cm
Weight	8.75 kg	15.35 kg	14.47 kg

Surface Thickness

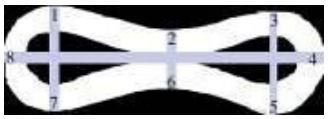


Lateral Thickness

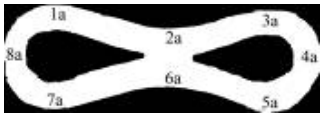


A.z1-4	A.z1-5	A.z1-6
		
		

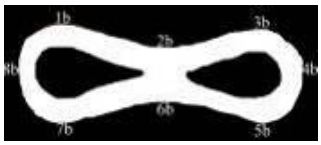
	Link measurements		
Link	**A.z1-4**	**A.z1-5**	**A.z1-6**
Length			
1-7	21.5 cm	17.0 cm	17.5 cm
2-6	11.0 cm	10.2 cm	9.4 cm
3-5	18.0 cm	16.0 cm	16.5 cm
4-8	51.0 cm	53.0 cm	52.0 cm
Thickness			
1a	4.3 cm	4.2 cm	3.9 cm
1b	4.9 cm	4.3 cm	3.9 cm
2a	3.8 cm	--	--
2b	4.0 cm	4.8 cm	3.8 cm
3a	4.7 cm	3.5 cm	4.1 cm
3b	3.6 cm	4.5 cm	4.8 cm
4a	4.5 cm	3.9 cm	3.6 cm
4b	3.3 cm	4.9 cm	4.7 cm
5a	4.2 cm	5.3 cm	4.4 cm
5b	4.5 cm	5.1 cm	5.1 cm
6a	4.4 cm	--	--
6b	5.4 cm	4.3 cm	5.1 cm
7a	5.0 cm	5.3 cm	5.7 cm
7b	5.0 cm	4.6 cm	5.1 cm
8a	2.0 cm	5.1 cm	3.6 cm
8b	2.9 cm	4.8 cm	3.9 cm
Weight	12.84 kg	14.29 kg	12.93 kg

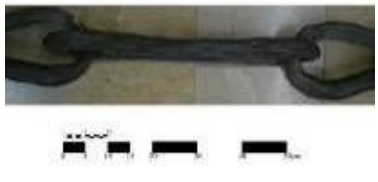


Surface tnickness

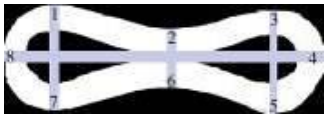


Lateral thickness

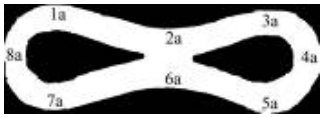


A.z1-7	A.z1-8	A.z1-9
		
		

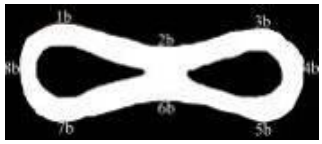
	Link measurements		
Link	**A.z1-7**	**A.z1-8**	**A.z1-9**
Length			
1-7	17.0 cm	16.5 cm	17.0 cm
2-6	10.2 cm	9.5 cm	9.2 cm
3-5	17.5 cm	16.5 cm	16.5 cm
4-8	53.0 cm	54.5 cm	55.5 cm
Thickness			
1a	4.1 cm	3.4 cm	4.3 cm
1b	4.3 cm	3.9 cm	3.6 cm
2a	--	4.4 cm	3.7 cm
2b	4.7 cm	4.2 cm	3.8 cm
3a	4.6 cm	3.1 cm	4.4 cm
3b	4.8 cm	2.5 cm	3.7 cm
4a	3.5 cm	2.6 cm	3.0 cm
4b	4.9 cm	3.9 cm	3.4 cm
5a	4.8 cm	4.7 cm	4.3 cm
5b	4.6 cm	4.5 cm	5.0 cm
6a	--	4.5 cm	4.3 cm
6b	4.7 cm	4.7 cm	4.5 cm
7a	4.9 cm	4.8 cm	4.0 cm
7b	4.8 cm	4.6 cm	4.5 cm
8a	3.8 cm	3.2 cm	4.8 cm
8b	4.2 cm	3.8 cm	4.3 cm
Weight	13.85 kg	11.62 kg	11.83 kg

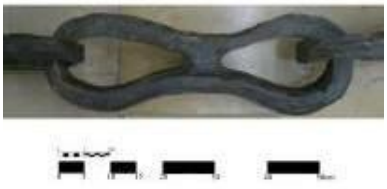


Surface Thickness



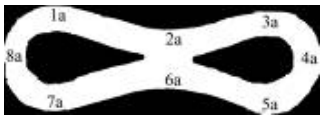
Lateral thickness



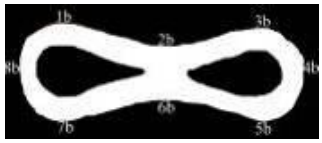
A.z1-10	A.z1-11	A.z1-12
		
		

	Link measurements		
Link	**A.z1-10**	**A.z1-11**	**A.z1-12**
Length			
1-7	17.5 cm	17.0 cm	20.0 cm
2-6	10.2 cm	9.5 cm	11.4 cm
3-5	17.5 cm	17.5 cm	17.7 cm
4-8	54.0 cm	53.5 cm	51.0 cm
Thickness			
1a	3.9 cm	3.3 cm	4.6 cm
1b	4.2 cm	4.6 cm	4.9 cm
2a	--	--	3.6 cm
2b	3.8 cm	4.2 cm	4.7 cm
3a	4.3 cm	3.4 cm	3.7 cm
3b	3.5 cm	4.0 cm	3.2 cm
4a	4.0 cm	2.4 cm	3.1 cm
4b	4.3 cm	3.9 cm	3.3 cm
5a	4.8 cm	3.7 cm	4.3 cm
5b	5.1 cm	4.1 cm	4.3 cm
6a	--	--	3.9 cm
6b	4.9 cm	3.6 cm	4.7 cm
7a	4.4 cm	4.2 cm	4.1 cm
7b	4.3 cm	3.9 cm	4.1 cm
8a	3.3 cm	3.4 cm	2.6 cm
8b	4.5 cm	3.9 cm	4.0 cm
Weight	12.82 kg	10.78 kg	11.69 kg

Surface Thickness

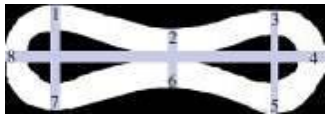


Lateral Thickness

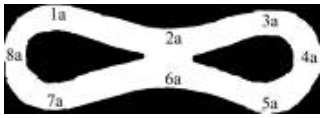


A.z1-13	A.z1-14	A.z1-15
		
		

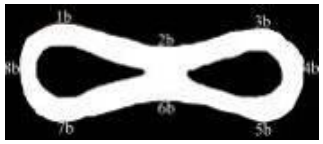
	Link measurements		
Link	**A.z1-13**	**A.z1-14**	**A.z1-15**
Length			
1-7	17.5 cm	15.0 cm	17.0 cm
2-6	9.4 cm	9.0 cm	9.3 cm
3-5	18.0 cm	15.5 cm	16.5 cm
4-8	52.5 cm	47.0 cm	54.5 cm
Thickness			
1a	4.4 cm	3.9 cm	4.3 cm
1b	4.8 cm	4.4 cm	4.3 cm
2a	--	--	--
2b	4.7 cm	4.1 cm	4.3 cm
3a	4.6 cm	3.7 cm	4.3 cm
3b	4.4 cm	4.0 cm	3.9 cm
4a	3.9 cm	2.6 cm	4.1 cm
4b	3.9 cm	4.9 cm	4.4 cm
5a	4.5 cm	4.3 cm	4.7 cm
5b	4.5 cm	4.7 cm	4.2 cm
6a	--	--	--
6b	4.1 cm	4.6 cm	4.3 cm
7a	3.6 cm	3.6 cm	4.5 cm
7b	2.8 cm	4.7 cm	4.3 cm
8a	2.4 cm	2.1 cm	2.1 cm
8b	3.1 cm	3.7 cm	3.9 cm
Weight	11.04 kg	10.8 kg	12.65 kg

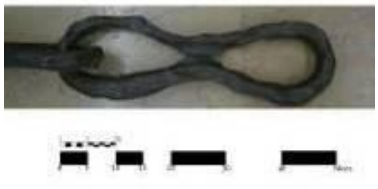


Surface Thıckness



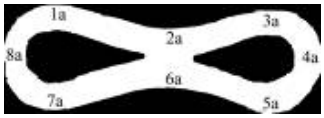
Lateral Thickness



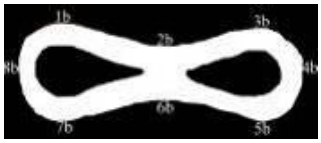
A.z1-16	A.z1-17	A.z1-18
		
		

	Link measurements		
Link	**A.z1-16**	**A.z1-17**	**A.z1-18**
Length			
1-7	17.5 cm	16.5 cm	14.5 cm
2-6	10.4 cm	8.6 cm	8.2 cm
3-5	16.0cm	16.5 cm	15.5 cm
4-8	55.5 cm	47.5 cm	48.5 cm
Thickness			
1a	4.9 cm	4.6 cm	2.7 cm
1b	5.2 cm	4.2 cm	3.8 cm
2a	--	5.0 cm	3.5 cm
2b	5.2 cm	4.3 cm	3.5 cm
3a	5.0 cm	4.3 cm	2.8 cm
3b	5.0 cm	2.4 cm	3.3 cm
4a	4.2 cm	3.2 cm	3.0 cm
4b	4.6 cm	3.4 cm	4.2 cm
5a	4.4 cm	2.9 cm	3.8 cm
5b	4.4 cm	3.1 cm	4.2 cm
6a	--	3.7 cm	3.8 cm
6b	4.8 cm	4.6 cm	3.7 cm
7a	4.8 cm	4.0 cm	4.3 cm
7b	4.8 cm	4.2 cm	4.3 cm
8a	3.7 cm	3.5 cm	2.8 cm
8b	5.0 cm	4.1 cm	3.8 cm
Weight	17.13 kg	9.50 kg	7.11 kg

Surface Thickness

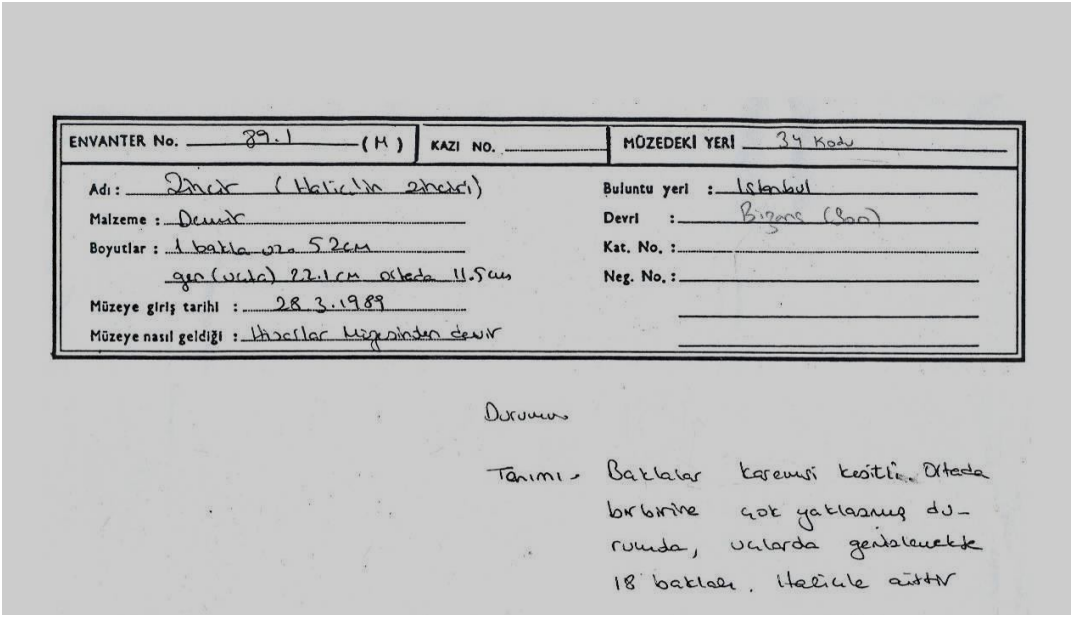


Lateral Thickness



Inspection Results A.z1

- The chain is made of wrought iron links Hammer marks are observable .
- No monogram or other marks were observed
- The first and last links in the chain are closed.
- The chains are articulated
- The length of the chain is 8.21metres
- The chain had been handed over from the Hisar Museum



Photograph 60: Information from the Archaeological Museum Inventory

Surprise Source

On looking at the history of the Istanbul Archaeological Museum it seems that this chain must have come from the former 'Mecma-i Asar-ı Atika' established at Cebehane. Work continues at the Naval Museum to establish that the chain kept at Rumeli Hisar was unlikely to have been the chain across the Golden Horn.

Chains Kept at the Istanbul Naval Museum

Chain : D.z1
Number of Links: 30

Length : 14.32 m
Weight : 432.74 kg

Median Length of Link **:** 53.5 cm
Median Weight of Link **:** 14.50 kg

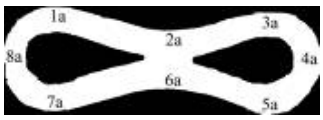
Longest Link : 59.0 cm
Shortest Link : 47.0 cm

Heaviest Link : 18.65 kg
Lightest Link : 8.60 kg

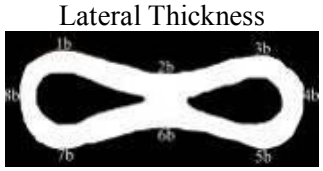
D.z1-1	D.z1-2	D.z1-3
		
		

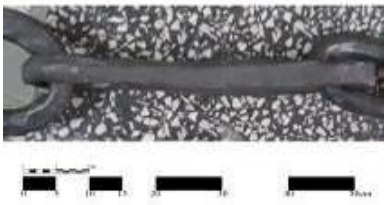
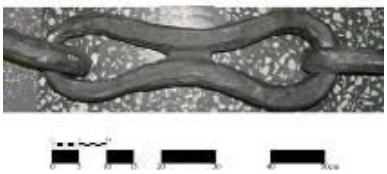
	Link Measurements		
Link	**D.z1-1**	**D.z1-2**	**D.z1-3**
Length			
1-7	17.5 cm	17.0 cm	18.0 cm
2-6	10.8 cm	10.2 cm	10.9 cm
3-5	18.0 cm	17.0 cm	21.0 cm
4-8	58.5 cm	58.5 cm	55.5 cm
Thickness			
1a	3.3 cm	3.8 cm	4.2 cm
1b	4.1 cm	3.7 cm	4.5 cm
2a	--	--	4.0 cm
2b	5.2 cm	4.9 cm	4.1 cm
3a	5.2 cm	4.6 cm	4.3 cm
3b	5.2 cm	5.0 cm	4.2 cm
4a	3.2 cm	3.5 cm	3.7 cm
4b	4.2 cm	4.9 cm	4.1 cm
5a	4.8 cm	5.3 cm	4.7 cm
5b	5.0 cm	4.8 cm	4.1 cm
6a	--	--	4.7 cm
6b	4.7 cm	5.5 cm	4.8 cm
7a	4.5 cm	4.8 cm	4.5 cm
7b	4.5 cm	5.2 cm	4.7 cm
8a	3.0 cm	4.1 cm	3.0 cm
8b	4.2 cm	4.7 cm	4.5 cm
Weight	16.07 kg	16.24 kg	14.13 kg

Surface Thickness



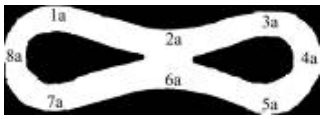
Lateral Thickness



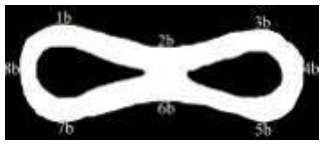
D.z1-4	D.z1-5	D.z1-6
		
		

	Link Measurements		
Link	**D.z1-4**	**D.z1-5**	**D.z1-6**
Length			
1-7	16.0 cm	16.0 cm	18.0 cm
2-6	10.3 cm	10.0 cm	10.3 cm
3-5	18.0 cm	18.5 cm	18.0 cm
4-8	53.0 cm	53.5 cm	54.5 cm
Thickness			
1a	4.0 cm	4.7 cm	4.7 cm
1b	4.1cm	4.8 cm	4.6 cm
2a	--	--	--
2b	4.3 cm	4.5 cm	4.6 cm
3a	4.6 cm	4.9 cm	4.0 cm
3b	3.7 cm	4.4 cm	3.6 cm
4a	4.2 cm	3.7 cm	3.9 cm
4b	4.3 cm	4.1 cm	5.0cm
5a	4.6 cm	4.6 cm	5.0 cm
5b	4.4 cm	4.4 cm	4.7 cm
6a	--	--	--
6b	4.8 cm	4.3 cm	4.9 cm
7a	3.6 cm	3.7 cm	4.8 cm
7b	3.6 cm	4.0 cm	5.1 cm
8a	2.5 cm	3.8 cm	3.2 cm
8b	3.8 cm	4.3 cm	5.1 cm
Weight	12.90 kg	13.90 kg	15.15 kg

Surface Thickness

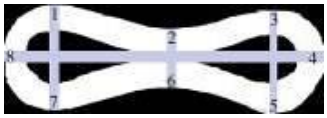


Lateral Thickness

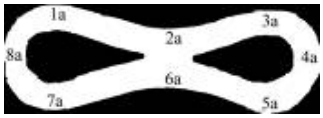


D.z1-7	D.z1-8	D.z1-9
		
		

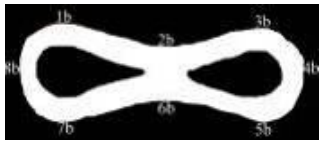
	Link Measurements		
Link	**D.z1-7**	**D.z1-8**	**D.z1-9**
Length			
1-7	18.5 cm	16.5 cm	18.0 cm
2-6	9.2 cm	10.3 cm	9.5 cm
3-5	15.0 cm	17.0 cm	17.0 cm
4-8	48.0 cm	51.0 cm	53.0 cm
Thickness			
1a	3.7 cm	4.7 cm	4.3 cm
1b	3.9 cm	4.5 cm	4.5 cm
2a	--	--	--
2b	3.4 cm	3.5 cm	3.8 cm
3a	4.0 cm	4.9 cm	3.9 cm
3b	3.6 cm	4.4 cm	3.8 cm
4a	2.4 cm	4.3 cm	2.3 cm
4b	3.1 cm	5.2 cm	3.3 cm
5a	3.3 cm	5.6 cm	4.0 cm
5b	2.6 cm	4.5 cm	3.5 cm
6a	--	--	--
6b	4.3 cm	4.6 cm	3.0 cm
7a	4.2 cm	4.5 cm	3.9 cm
7b	4.0 cm	4.7 cm	4.0 cm
8a	4.0 cm	4.1 cm	3.6 cm
8b	3.9 cm	4.6 cm	4.4 cm
Weight	8.60 kg	14.06 kg	9.50 kg

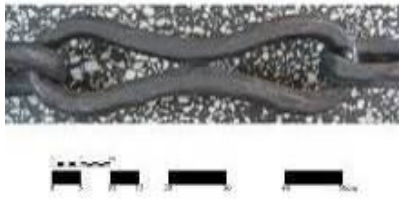


Surface Thickness



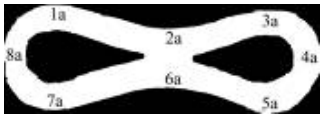
Lateral Thickness



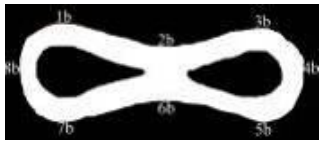
D.z1-10	D.z1-11	D.z1-12
		
		

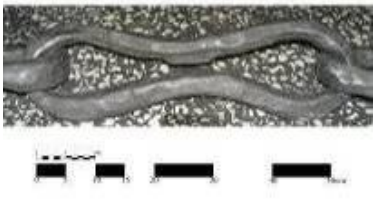
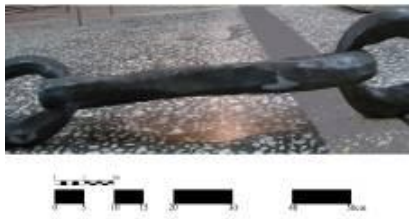
	Link Measurements		
Link	**D.z1-10**	**D.z1-11**	**D.z1-12**
Uzunluk			
1-7	16.5 cm	18.5 cm	17.5 cm
2-6	9.3 cm	9.5 cm	9.7 cm
3-5	15.5 cm	18.5 cm	17.5 cm
4-8	52.0 cm	51.5 cm	56.5 cm
Thickness			
1a	5.0 cm	4.5 cm	4.6 cm
1b	3.7 cm	4.1 cm	4.4 cm
2a	--	3.3 cm	--
2b	3.4 cm	4.4 cm	4.3 cm
3a	4.0 cm	4.4 cm	4.6 cm
3b	4.3 cm	4.4 cm	4.8 cm
4a	3.1 cm	3.0 cm	3.7 cm
4b	4.4 cm	4.8 cm	5.2 cm
5a	3.8 cm	5.0 cm	4.8 cm
5b	4.0 cm	4.7 cm	4.7 cm
6a	--	2.7 cm	--
6b	4.0 cm	3.5 cm	4.8 cm
7a	4.8 cm	3.9 cm	4.7cm
7b	4.1 cm	5.3 cm	4.9 cm
8a	3.6 cm	4.2 cm	3.1 cm
8b	4.0 cm	4.4 cm	4.9 cm
Weight	11.60 kg	11.35 kg	14.45 kg

Surface Thickness

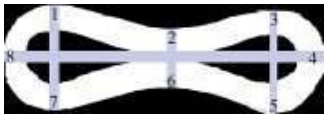


Lateral Thickness

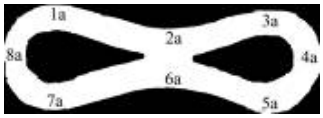


D.z1-13	D.z1-14	D.z1-15
		
		

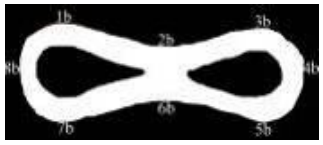
	Link Measurements		
Link	**D.z1-13**	**D.z1-14**	**D.z1-15**
Length			
1-7	17.0 cm	16.5 cm	18.5 cm
2-6	9.7 cm	10.4 cm	10.2 cm
3-5	17.5 cm	18.0 cm	17.0 cm
4-8	57.0 cm	56.5 cm	55.0 cm
Thickness			
1a	3.3 cm	4.5 cm	4.4 cm
1b	4.1 cm	4.1 cm	5.2 cm
2a	4.3 cm	--	--
2b	4.5 cm	4.5 cm	5.2 cm
3a	4.0 cm	4.9 cm	4.6 cm
3b	3.8 cm	4.6 cm	5.2 cm
4a	3.3 cm	3.6 cm	4.0 cm
4b	4.4 cm	4.7 cm	5.5 cm
5a	3.6 cm	4.6 cm	3.8 cm
5b	3.5 cm	4.8 cm	3.9 cm
6a	4.5 cm	--	--
6b	4.2 cm	4.7 cm	5.1 cm
7a	4.8 cm	4.3 cm	4.6 cm
7b	4.2 cm	4.0 cm	4.6 cm
8a	3.7 cm	3.5 cm	3.0 cm
8b	4.8 cm	4.4 cm	5.1 cm
Weight	12.70 kg	14.45 kg	16.50 kg

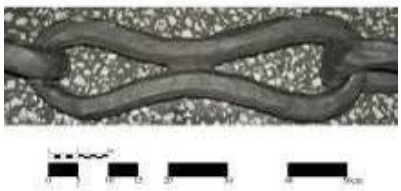
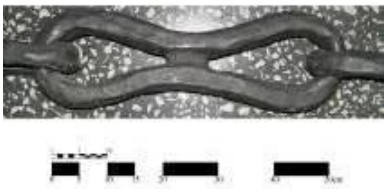


Surface Thickness

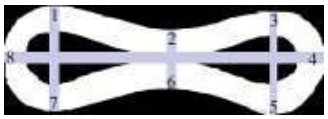


Lateral Thickness

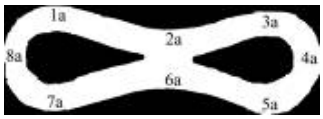


D.z1-16	D.z1-17	D.z1-18
		
		

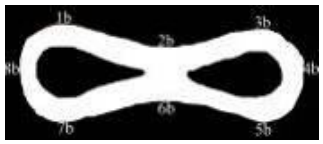
	Link Measurements		
Link	**D.z1-16**	**D.z1-17**	**D.z1-18**
Length			
1-7	18.0 cm	16.5 cm	17.5 cm
2-6	10.1 cm	10.0 cm	9.9 cm
3-5	18.0 cm	18.0 cm	17.5 cm
4-8	56.5 cm	57.0 cm	55.5 cm
Thickness			
1a	4.6 cm	4.4 cm	5.0 cm
1b	4.7 cm	4.9 cm	4.9 cm
2a	--	--	--
2b	4.5 cm	4.6 cm	4.8 cm
3a	4.2 cm	4.6 cm	4.5 cm
3b	4.5 cm	4.6 cm	5.3 cm
4a	3.2 cm	3.7 cm	3.7 cm
4b	4.9 cm	5.0 cm	5.2 cm
5a	5.0 cm	4.8 cm	4.2 cm
5b	4.3 cm	4.7 cm	5.1 cm
6a	--	--	--
6b	4.5 cm	4.5 cm	4.7 cm
7a	4.2 cm	3.8 cm	4.6 cm
7b	4.1 cm	3.8 cm	4.6 cm
8a	4.2 cm	3.6 cm	3.8 cm
8b	5.2 cm	4.7 cm	5.5 cm
Weight	14.95 kg	15.40 kg	16.73 kg

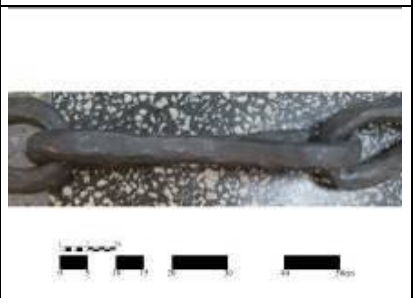


SurfaceThickness



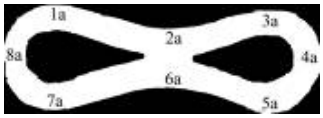
Lateral Thickness



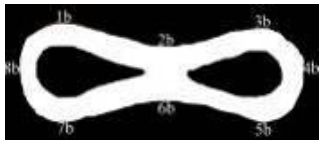
D.z1-19	D.z1-20	D.z1-21
		
		

	Link Measurements		
Link	**D.z1-19**	**D.z1-20**	**D.z1-21**
Length			
1-7	20.5 cm	17.5 cm	17.0 cm
2-6	13.3 cm	10.6 cm	10.2 cm
3-5	19.5 cm	18.5 cm	17.0 cm
4-8	54.5 cm	55.5 cm	55.5 cm
Kalınlık			
1a	4.9 cm	4.6 cm	4.9 cm
1b	4.9 cm	5.3 cm	4.9cm
2a	4.2 cm	--	--
2b	5.2 cm	5.2 cm	4.7 cm
3a	5.3 cm	5.1 cm	4.8 cm
3b	4.9 cm	5.0 cm	4.8 cm
4a	3.4 cm	4.0 cm	2.6 cm
4b	5.0 cm	5.5 cm	4.0 cm
5a	4.9 cm	5.1 cm	4.3 cm
5b	5.5 cm	5.0 cm	5.1 cm
6a	4.7 cm	--	--
6b	5.3 cm	4.9 cm	5.1 cm
7a	4.8 cm	4.4 cm	3.8 cm
7b	4.8 cm	5.1 cm	4.4 cm
8a	3.3 cm	4.1 cm	3.2 cm
8b	4.4 cm	5.5 cm	5.4 cm
Ağırlık	16.20 kg	18.65 kg	16.15 kg

Surface Thickness



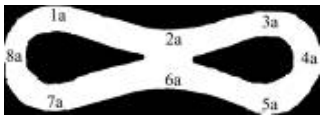
Lateral Thickness



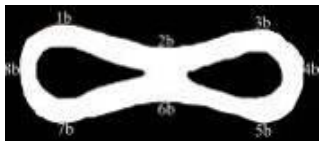
D.z1-22	D.z1-23	D.z1-24
		
		

	Limk Measurements		
Link	**D.z1-22**	**D.z1-23**	**D.z1-24**
Length			
1-7	17.0 cm	17.0 cm	17.0 cm
2-6	10.2 cm	10.5 cm	10.3 cm
3-5	17.0 cm	19.0 cm	17.5 cm
4-8	56.0 cm	59.0 cm	54.0 cm
Thickness			
1a	5.0 cm	4.0 cm	5.1 cm
1b	4.8 cm	4.3 cm	5.0 cm
2a	--	--	--
2b	4.9 cm	4.8 cm	5.2 cm
3a	4.6 cm	5.2 cm	4.7 cm
3b	4.5 cm	5.2 cm	4.6 cm
4a	3.1 cm	4.1 cm	3.5 cm
4b	3.9 cm	5.0 cm	4.9 cm
5a	4.3 cm	4.8 cm	5.0 cm
5b	5.1 cm	4.8 cm	5.0 cm
6a	--	--	--
6b	5.2 cm	5.2 cm	5.3 cm
7a	3.5 cm	4.8 cm	4.5 cm
7b	4.8 cm	4.8 cm	4.7 cm
8a	3.1 cm	3.2 cm	4.6 cm
8b	5.0 cm	4.2 cm	5.0 cm
Weight	14.65 kg	16.45 kg	15.70 kg

Surface Thickness



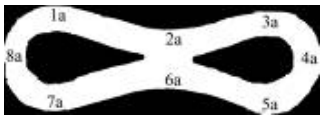
Lateral Thickness



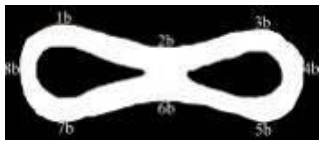
D.z1-25	D.z1-26	D.z1-27
		
		

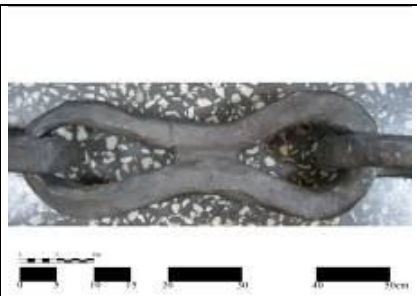
	Link Measurements		
Link	**D.z1-25**	**D.z1-26**	**D.z1-27**
Length			
1-7	18.0 cm	17.0 cm	18.5 cm
2-6	10.3 cm	10.4 cm	11.1 cm
3-5	18.5 cm	17.5 cm	18.5 cm
4-8	55.5 cm	53.5 cm	53.0 cm
Thickness			
1a	4.5 cm	4.9 cm	4.6 cm
1b	4.3 cm	4.9 cm	4.0 cm
2a	--	--	4.6 cm
2b	4.9 cm	5.1 cm	5.2 cm
3a	4.2 cm	5.2 cm	4.2 cm
3b	3.4 cm	4.8 cm	4.1 cm
4a	2.9 cm	4.6 cm	3.8 cm
4b	4.5 cm	5.2 cm	5.0 cm
5a	4.9 cm	4.8 cm	4.6 cm
5b	5.1 cm	5.4 cm	4.8 cm
6a	--	--	4.3 cm
6b	5.2 cm	5.5 cm	4.8 cm
7a	5.0 cm	5.1 cm	4.5 cm
7b	5.3 cm	4.9 cm	4.4 cm
8a	3.5 cm	3.8 cm	5.0 cm
8b	5.3 cm	5.0 cm	5.0 cm
Weight	16.40 kg	17.25 kg	14.15 kg

Surface Thickness



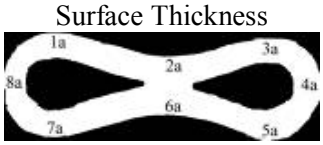
Lateral Thickness



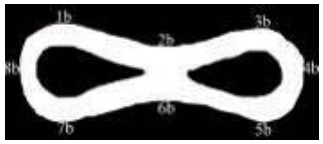
D.z1-28	D.z1-29	D.z1-30
		
		

	Link Measurements		
Link	**D.z1-28**	**D.z1-29**	**D.z1-30**
Uzunluk			
1-7	17.5 cm	16.5 cm	16.0 cm
2-6	10.5 cm	9.5 cm	9.1 cm
3-5	17.5 cm	17.0cm	16.0 cm
4-8	51.5 cm	47.0 cm	54.5 cm
Thickness			
1a	4.7 cm	3.9 cm	4.3 cm
1b	4.7 cm	3.7 cm	3.9 cm
2a	--	--	--
2b	4.5 cm	4.4 cm	4.1 cm
3a	4.7 cm	4.9 cm	4.4 cm
3b	4.2 cm	4.1 cm	3.9 cm
4a	3.7 cm	4.1 cm	4.2 cm
4b	4.7 cm	5.0 cm	4.1 cm
5a	4.3 cm	4.2 cm	3.4 cm
5b	3.1 cm	4.5 cm	3.6 cm
6a	--	--	--
6b	4.2 cm	4.8 cm	4.1 cm
7a	5.4 cm	5.0 cm	4.1 cm
7b	5.0 cm	5.0 cm	4.2 cm
8a	3.7 cm	3.2 cm	3.4 cm
8b	4.7 cm	4.5 cm	4.1 cm
Weight	13.97 kg	12.05 kg	12.44 kg

Surface Thickness

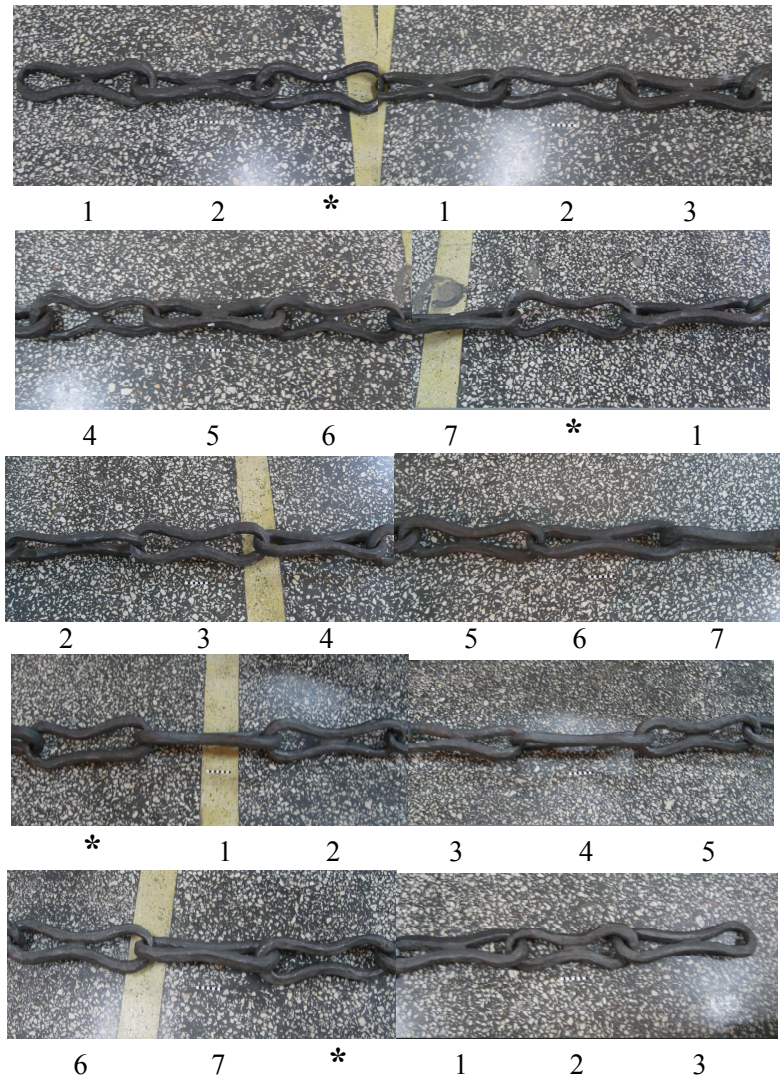


Lateral Thickness



Conclusions

While documenting the particulars of the 30 links in the chain belonging to the Naval Museum, a difference in the order was noticed. Every seventh link is succeeded by an eighth link in which the centre has not been mortized but deliberately left open. This formula of 7 +1 is used throughout the whole of the chain. It is an important factor in our understanding of the chain in so far that it proves the chain was attached to a block at regular intervals.



Subsequently we re-examined the chain in the Archaeological Museum and discovered the same order in that chain, too.

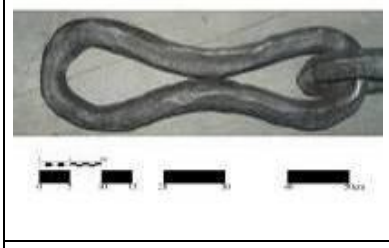
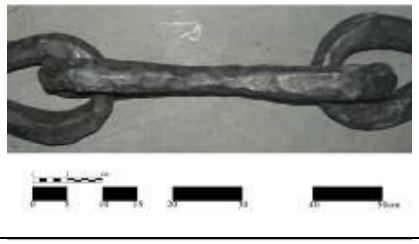
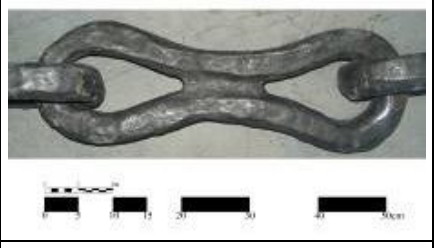
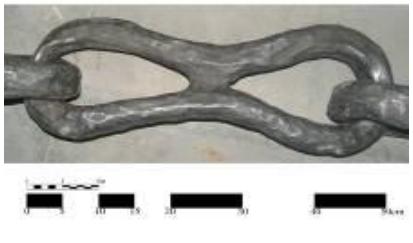
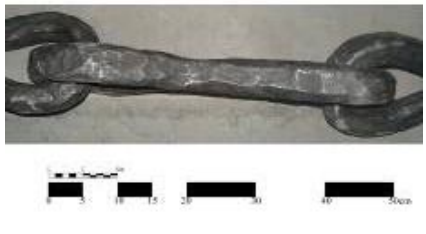
Chain : D.z2
No. of Links : 22

Length : 10.40 m
Weight : 315.94 kg

Median Link Length : 53.5 cm
Median Link Weight : 14. 36 kg

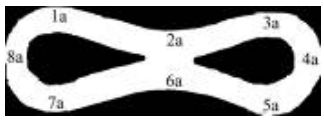
Longest Link : 62.5 cm
Shortest Link : 48.5 cm

Heaviest Link : 17.45 kg
Lightest Link : 7.50 kg

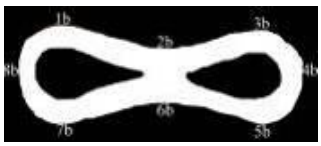
D.z2-1	D.z2-2	D.z2-3
		
		

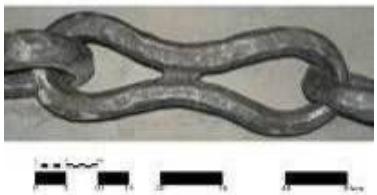
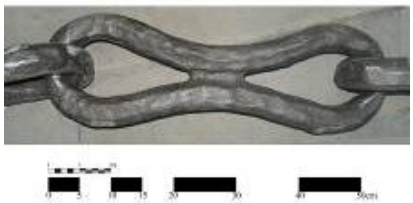
	Link measurements		
Link	**D.z2-1**	**D.z2-2**	**D.z2-3**
Length			
1-7	18.0 cm	16.5 cm	17.5 cm
2-6	9.9 cm	10.2 cm	10.3 cm
3-5	17.5 cm	17.5 cm	18.0 cm
4-8	53.5 cm	51.5 cm	54.0 cm
Thickness			
1a	4.8 cm	4.5 cm	5.1 cm
1b	5.2 cm	4.6 cm	4.6 cm
2a	--	--	--
2b	4.5 cm	4.2 cm	4.2 cm
3a	4.0 cm	4.0 cm	4.7 cm
3b	4.7 cm	4.2 cm	4.8 cm
4a	3.1 cm	3.2 cm	4.7 cm
4b	4.5 cm	5.0 cm	5.0 cm
5a	4.5 cm	4.5 cm	4.8 cm
5b	5.0 cm	4.7 cm	5.3 cm
6a	--	--	--
6b	5.1 cm	3.2 cm	4.6 cm
7a	4.2 cm	4.3 cm	4.5 cm
7b	4.5 cm	4.3 cm	5.5 cm
8a	3.8 cm	2.7 cm	4.0 cm
8b	5.0 cm	3.5 cm	4.8 cm
Weight	14.84 kg	11.30 kg	16.50 kg

SurfaceThickness

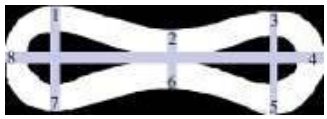


Lateral Thickness

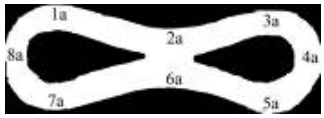


D.z2-4	D.z2-5	D.z2-6
		
		

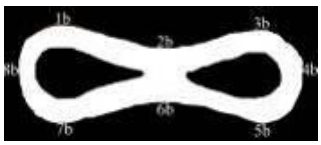
	Link Measurements		
Link	**D.z2-4**	**D.z2-5**	**D.z2-6**
Length			
1-7	17.5 cm	19.5 cm	17.5 cm
2-6	10.2 cm	12.0 cm	10.1 cm
3-5	18.0 cm	20.5 cm	16.5 cm
4-8	51.0 cm	52.0 cm	54.5 cm
Thickness			
1a	4.7 cm	5.0 cm	4.2 cm
1b	5.0 cm	5.0 cm	4.2 cm
2a	--	4.3 cm	--
2b	5.8 cm	4.6 cm	4.5 cm
3a	4.4 cm	4.9 cm	4.2 cm
3b	5.4 cm	5.0 cm	4.5 cm
4a	3.3 cm	3.4 cm	3.3 cm
4b	4.6 cm	4.4 cm	4.3 cm
5a	4.1 cm	4.9 cm	4.7 cm
5b	4.6 cm	5.1 cm	5.0 cm
6a	--	4.6 cm	--
6b	4.7 cm	4.8 cm	5.1 cm
7a	4.4 cm	5.1 cm	4.8 cm
7b	5.2 cm	4.7 cm	4.8 cm
8a	4.1 cm	3.2 cm	3.8 cm
8b	5.4 cm	4.8 cm	4.5 cm
Weight	14.70 kg	15.35 kg	14.84 kg



Surface Thickness

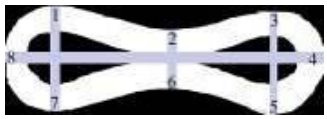


Lateral Thickness

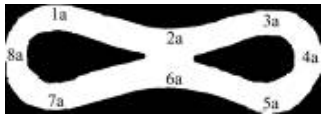


D.z2-7	D.z2-8	D.z2-9
		
		

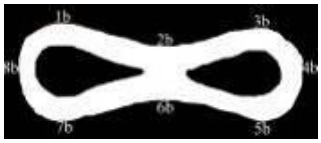
	Link Measurements		
Link	**D.z2-7**	**D.z2-8**	**D.z2-9**
Length			
1-7	18.0 cm	17.5 cm	18.5 cm
2-6	10.2 cm	10.2 cm	10.6 cm
3-5	18.5 cm	17.5 cm	17.0 cm
4-8	57.0 cm	52.0 cm	56.5 cm
Thickness			
1a	4.5 cm	4.7 cm	4.6 cm
1b	5.0 cm	4.7 cm	4.9 cm
2a	--	--	--
2b	5.3 cm	4.8 cm	5.2 cm
3a	4.7 cm	5.0 cm	4.1 cm
3b	5.2 cm	4.8 cm	4.7 cm
4a	3.7 cm	3.5 cm	2.5 cm
4b	5.3 cm	4.7 cm	3.8 cm
5a	4.5 cm	4.7 cm	4.8 cm
5b	4.6 cm	4.8 cm	5.1 cm
6a	--	--	--
6b	4.6 cm	4.8 cm	5.0 cm
7a	4.4 cm	4.3 cm	4.8 cm
7b	4.5 cm	4.7 cm	5.1 cm
8a	3.5 cm	3.1 cm	4.4 cm
8b	4.8 cm	2.9 cm	5.3 cm
Weight	16.57 kg	13.41 kg	17.05 kg

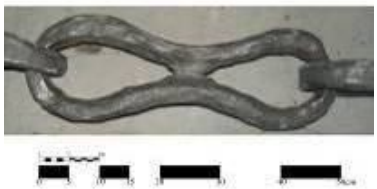
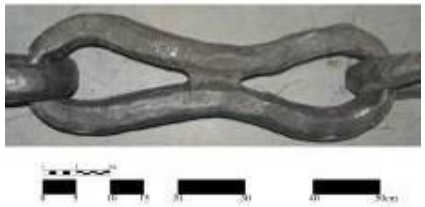


Surface Thickness

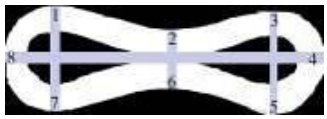


Lateral Thickness

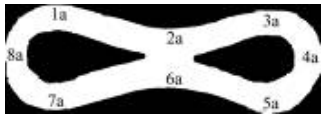


D.z2-10	D.z2-11	D.z2-12
		
		

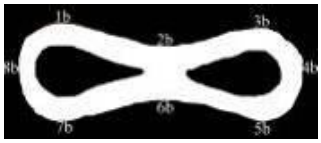
	Link Measurements		
Link	**D.z2-10**	**D.z2-11**	**D.z2-12**
Length			
1-7	18.0 cm	18.0 cm	17.5 cm
2-6	10.1 cm	10.6 cm	10.4 cm
3-5	16.5 cm	19.0 cm	17.5 cm
4-8	51.5 cm	57.5 cm	55.0 cm
Thickness			
1a	4.9 cm	4.7 cm	5.1 cm
1b	4.7 cm	5.0 cm	4.8 cm
2a	--	--	--
2b	4.4 cm	5.0 cm	5.3 cm
3a	4.1 cm	5.0 cm	3.9 cm
3b	4.1 cm	5.2 cm	4.9 cm
4a	2.5 cm	3.6 cm	3.9 cm
4b	3.2 cm	5.0 cm	5.4 cm
5a	4.3 cm	4.8 cm	5.0 cm
5b	4.6 cm	5.1 cm	4.8 cm
6a	--	--	--
6b	5.1 cm	5.4 cm	5.1 cm
7a	3.4 cm	4.1 cm	4.9 cm
7b	4.0 cm	4.1 cm	5.0 cm
8a	3.7 cm	3.2 cm	3.7 cm
8b	4.1 cm	4.0 cm	5.3 cm
Weight	11.44 kg	16.74 kg	16.50 kg

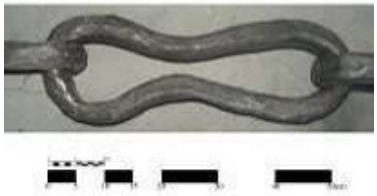
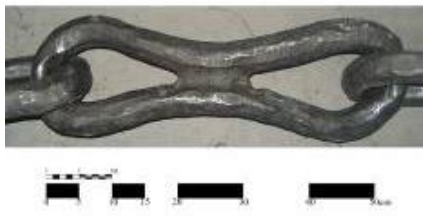
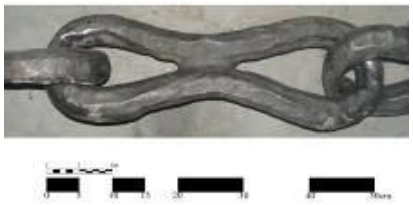


Surface Thickness

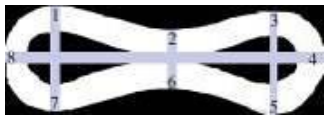


Lateral Thickness

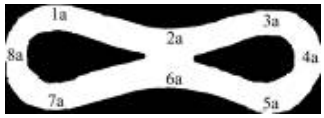


D.z2-13	D.z2-14	D.z2-15
		
		

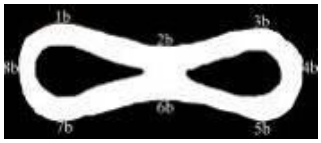
	Link Measurements		
Link	**D.z2-13**	**D.z2-14**	**D.z2-15**
Length			
1-7	18.5 cm	16.5 cm	17.5 cm
2-6	11.3 cm	10.2 cm	10.7 cm
3-5	18.0 cm	17.5 cm	18.5 cm
4-8	54.5 cm	51.5 cm	57.0 cm
Thickness			
1a	3.6 cm	4.6 cm	4.5 cm
1b	3.5 cm	5.1 cm	5.0 cm
2a	4.2 cm	--	--
2b	4.3 cm	5.0 cm	5.5 cm
3a	4.1 cm	4.6 cm	5.3 cm
3b	4.4 cm	4.4 cm	5.0 cm
4a	4.2 cm	3.8 cm	3.9 cm
4b	5.2 cm	4.7 cm	4.9 cm
5a	4.9 cm	5.1 cm	4.9 cm
5b	4.6 cm	4.5 cm	5.1 cm
6a	4.5 cm	--	--
6b	4.8 cm	4.9 cm	4.9 cm
7a	4.7 cm	5.1 cm	4.9 cm
7b	4.9 cm	5.3 cm	5.4 cm
8a	3.6 cm	2.9 cm	3.2 cm
8b	4.4 cm	5.0 cm	4.6 cm
Weight	13.70 kg	14.81 kg	17.05 kg

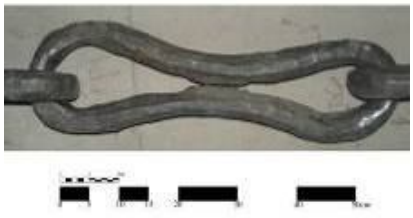
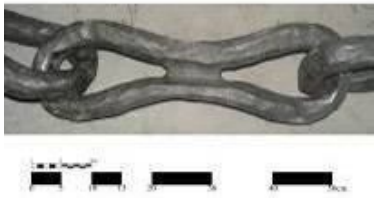
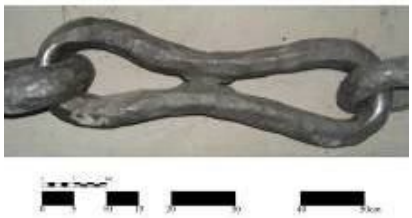


Surface Thickness

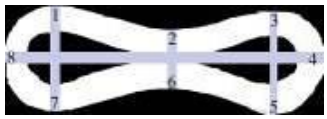


Lateral Thickness

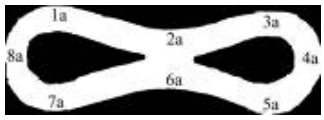


D.z2-16	D.z2-17	D.z2-18
		
		

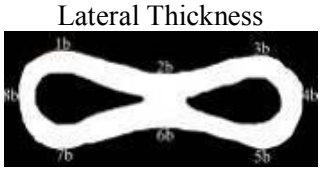
	Link measurements		
Link	**D.z2-16**	**D.z2-17**	**D.z2-18**
Length			
1-7	16.5 cm	19.0 cm	16.5 cm
2-6	9.7 cm	10.1 cm	9.6 cm
3-5	17.0 cm	18.0 cm	17.5 cm
4-8	53.0 cm	62.5 cm	56.0 cm
Thickness			
1a	4.6 cm	5.0 cm	45 cm
1b	4.7 cm	4.9 cm	51 cm
2a	--	--	--
2b	4.4 cm	4.5 cm	46 cm
3a	4.6 cm	4.1 cm	45 cm
3b	4.9 cm	4.9 cm	43 cm
4a	3.1 cm	3.8 cm	38 cm
4b	4.5 cm	5.0 cm	50 cm
5a	4.2 cm	4.7 cm	48 cm
5b	4.6 cm	5.6 cm	42 cm
6a	--	--	--
6b	4.5 cm	5.2 cm	41 cm
7a	4.7 cm	4.6 cm	50 cm
7b	4.8 cm	4.9 cm	49 cm
8a	4.0 cm	3.7 cm	38 cm
8b	5.1 cm	4.9 cm	48 cm
Weight	14.10 kg	17.45 kg	14.65 kg

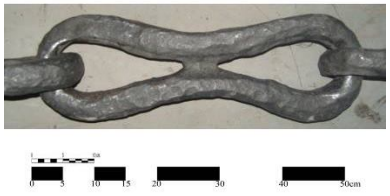
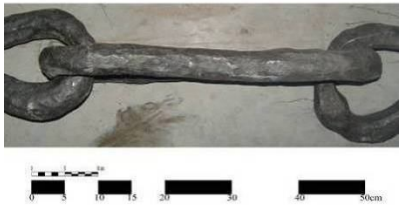
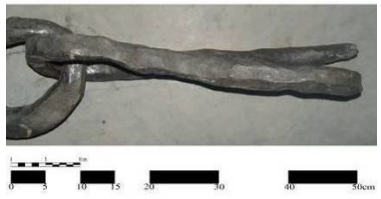
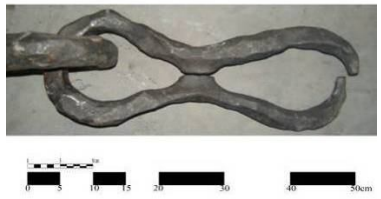


SurfaceThickness



Lateral Thickness



D.z2-19	D.z2-20	D.z2-21	D.z2-22
			
			

	Link measurements			
Link	**D.z2-19**	**D.z2-20**	**D.z2-21**	**D.z2-22**
Length				
1-7	16.5 cm	16.5 cm	20.0 cm	17.5 cm
2-6	10.2 cm	9.4 cm	11.5 cm	8.8 cm
3-5	17.5 cm	15.0 cm	18.5 cm	17.0 cm
4-8	52.0 cm	51.5 cm	52.5 cm	48.5 cm
Thickness				
1a	4.7 cm	5.4 cm	3.7 cm	3.6 cm
1b	4.7 cm	4.4 cm	3.7 cm	3.6 cm
2a	--	--	4.6 cm	--
2b	5.1 cm	4.6 cm	4.6 cm	3.5 cm
3a	3.9 cm	4.0 cm	4.1 cm	2.9 cm
3b	5.0 cm	4.2 cm	4.4 cm	4.0 cm
4a	3.4 cm	3.5 cm	3.6 cm	1.6 cm
4b	4.6 cm	4.7 cm	4.1 cm	1.9 cm
5a	5.4 cm	3.7 cm	4.8 cm	3.3 cm
5b	5.3 cm	3.8 cm	5.0 cm	3.6 cm
6a	--	--	4.2 cm	--
6b	5.0 cm	4.1 cm	5.1 cm	3.3 cm
7a	4.8 cm	4.7 cm	4.4 cm	3.8 cm
7b	4.5 cm	4.0 cm	4.5 cm	3.3 cm
8a	3.4 cm	3.3 cm	2.7 cm	3.4 cm
8b	5.1 cm	4.0 cm	2.4 cm	3.6 cm
Weight	14.10 kg	10.44 kg	12.90 kg	7.50 kg

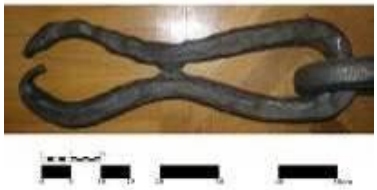
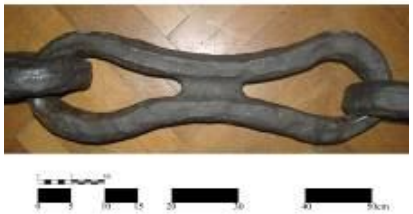
Chain : D.z3
No. of Links : 17

Length : 8.50 m
Weight : 215 kg

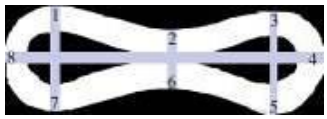
Median Link Length : 54.5 cm
Median Link Weight : 12.70 kg

Longest Link : 58.5 cm
Shortest Link : 51.0 cm

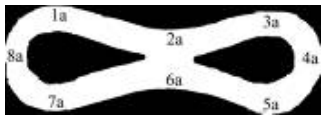
Heaviest Link : 15.27 kg
Lightest Link : 8.15 kg

D.z3-1	D.z3-2	D.z3-3
		
		

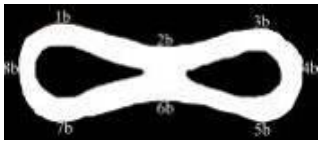
	Link Measurements		
Link	**D.z3-1**	**D.z3-2**	**D.z3-3**
Length			
1-7	18.5 cm	16.5 cm	17.0 cm
2-6	9.1 cm	9.8 cm	10.2 cm
3-5	16.5 cm	17.5 cm	17.0 cm
4-8	57.5 cm	55.0 cm	53.0 cm
Thickness			
1a	3.2 cm	4.0 cm	4.4 cm
1b	3.3 cm	4.0 cm	5.2 cm
2a	--	--	--
2b	4.0 cm	4.4 cm	4.9 cm
3a	4.2 cm	4.1 cm	4.0 cm
3b	4.9 cm	4.3 cm	4.2 cm
4a	4.5 cm	3.7 cm	4.1 cm
4b	5.1 cm	4.4 cm	5.1 cm
5a	3.9 cm	4.1 cm	4.2 cm
5b	4.6 cm	4.1 cm	4.2 cm
6a	--	--	--
6b	4.2 cm	4.0 cm	4.7 cm
7a	4.7 cm	4.4 cm	4.3 cm
7b	4.6 cm	4.7 cm	4.9 cm
8a	2.3 cm	3.5 cm	3.5 cm
8b	2.9 cm	4.5 cm	4.9 cm
Weight	12.90 kg	12.95 kg	14.60 kg



SurfaceThickness

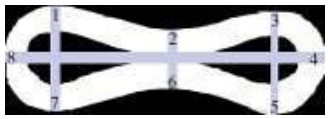


Lateral Thickness

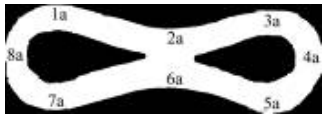


D.z3-4	D.z3-5	D.z3-6
		
		

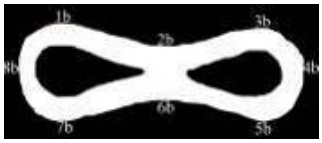
	Link measurements		
Link	**D.z3-4**	**D.z3-5**	**D.z3-6**
Length			
1-7	15.5 cm	16.5 cm	18.0 cm
2-6	9.1 cm	11.3 cm	9.5 cm
3-5	15.5 cm	19.0 cm	17.0 cm
4-8	55.0 cm	53.0 cm	51.0 cm
Thickness			
1a	3.2 cm	2.7 cm	4.4 cm
1b	3.2 cm	3.2 cm	4.4 cm
2a	3.2 cm (worn)	4.4 cm	--
2b	3.7 cm	4.3 cm	4.5 cm
3a	3.0 cm	4.0 cm	3.6 cm
3b	2.5 cm	4.0 cm	4.6 cm
4a	3.6 cm	3.2 cm	2.7 cm
4b	3.2 cm	4.2 cm	3.3 cm
5a	4.4 cm	4.0 cm	3.9 cm
5b	3.5 cm	4.0 cm	3.8 cm
6a	3.9 cm (worn)	3.8 cm	--
6b	3.3 cm	4.6 cm	3.9 cm
7a	3.3 cm	4.5 cm	4.2 cm
7b	3.0 cm	3.9 cm	4.0 cm
8a	2.4 cm	3.3 cm	3.4 cm
8b	4.4 cm	4.2 cm	4.6 cm
Weight	8.15 kg	10.50 kg	10.95 kg



SurfaceThickness

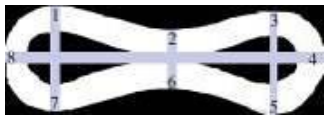


Lateral Thickness

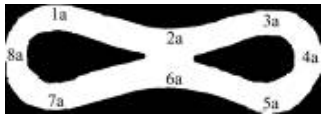


D.z3-7	D.z3-8	D.z3-9
		
		

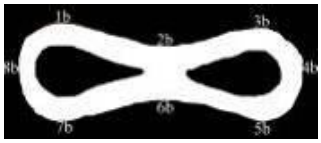
	Link Measurements		
Link	**D.z3-7**	**D.z3-8**	**D.z3-9**
Length			
1-7	16.0 cm	19.0 cm	17.5 cm
2-6	8.9 cm	10.1 cm	10.0 cm
3-5	17.5 cm	18.5 cm	16.5 cm
4-8	54.0 cm	55.0 cm	55.0 cm
Thickness			
1a	3.6 cm	4.4 cm	4.8 cm
1b	3.3 cm	4.6 cm	4.3 cm
2a	--	--	--
2b	3.7 cm	4.2 cm	4.5 cm
3a	3.4 cm	4.1 cm	4.0 cm
3b	4.5 cm	5.0 cm	4.7 cm
4a	3.7 cm	3.5 cm	3.5 cm
4b	4.9 cm	5.5 cm	4.7 cm
5a	4.1 cm	4.3 cm	4.7 cm
5b	4.6 cm	4.2 cm	4.7 cm
6a	--	--	--
6b	4.0 cm	4.1 cm	4.5 cm
7a	3.9 cm	4.6 cm	4.2 cm
7b	4.5 cm	4.2 cm	5.1 cm
8a	2.4 cm	3.0 cm	3.3 cm
8b	4.0 cm	3.5 cm	4.9 cm
Weight	10.31 kg	13.00 kg	14.12 kg



Surface Thickness

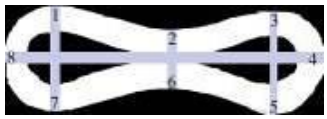


Lateral Thickness

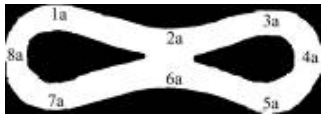


D.z3-10	D.z3-11	D.z3-12
		
		

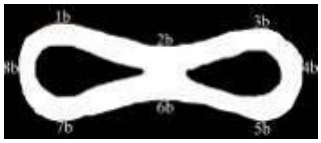
	Link Measurements		
Link	**D.z3-10**	**D.z3-11**	**D.z3-12**
Length			
1-7	18.5 cm	17.0 cm	19.0 cm
2-6	10.5 cm	10.3 cm	10.0 cm
3-5	19.0 cm	16.0 cm	19.0 cm
4-8	54.0 cm	51.5 cm	56.0 cm
Thickness			
1a	5.0 cm	4.2 cm	4.2 cm
1b	5.0 cm	4.7 cm	4.2 cm
2a	--	--	--
2b	4.5 cm	4.1 cm	4.2 cm
3a	4.1 cm	4.2 cm	4.4 cm
3b	4.7 cm	4.7 cm	4.0 cm
4a	3.5 cm	3.0 cm	3.5 cm
4b	4.4 cm	4.9 cm	4.6 cm
5a	4.5 cm	4.3 cm	4.4 cm
5b	5.0 cm	4.5 cm	4.6 cm
6a	--	--	--
6b	4.8 cm	4.6 cm	4.1 cm
7a	4.8 cm	4.5 cm	4.2 cm
7b	5.3 cm	4.5 cm	4.1 cm
8a	3.6 cm	3.3 cm	3.7 cm
8b	4.7 cm	4.7 cm	5.1 cm
Weight	15.27 kg	13.05 kg	13.73 kg

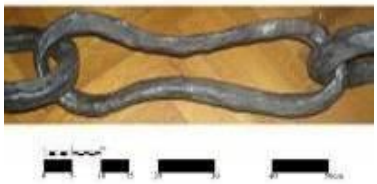
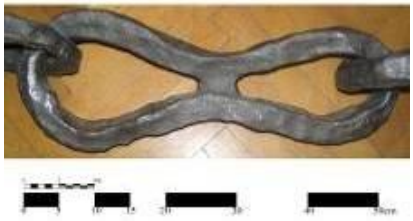


Surface Thickness

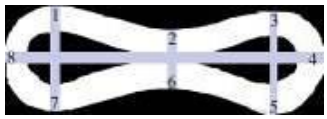


Lateral Thickness

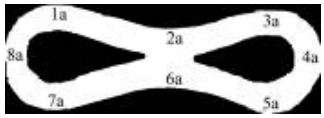


D.z3-13	D.z3-14	D.z3-15
		
		

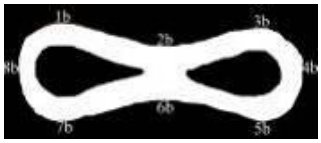
	Link Measurements		
Link	**D.z3-13**	**D.z3-14**	**D.z3-15**
Length			
1-7	19.0 cm	21.0 cm	19.0 cm
2-6	10.9 cm	9.2 cm	10.3 cm
3-5	17.5 cm	16.5 cm	18.0 cm
4-8	55.5 cm	54.0 cm	58.5 cm
Thickness			
1a	4.1 cm	4.4 cm	3.9 cm
1b	4.1 cm	4.8 cm	5.0 cm
2a	3.8 cm	--	--
2b	4.5 cm	3.8 cm	4.8 cm
3a	4.2 cm	4.5 cm	4.8 cm
3b	4.2 cm	4.9 cm	4.8 cm
4a	2.6 cm	2.9 cm	3.6 cm
4b	3.2 cm	4.6 cm	4.8 cm
5a	4.1 cm	3.9 cm	4.7 cm
5b	4.2 cm	4.6 cm	4.6 cm
6a	3.6 cm	--	--
6b	4.2 cm	4.9 cm	4.6 cm
7a	4.1 cm	4.0 cm	4.8 cm
7b	4.1 cm	4.2 cm	4.8 cm
8a	2.4 cm	5.1 cm	3.8 cm
8b	4.0 cm	5.1 cm	4.5 cm
Weight	10.39 kg	13.30 kg	13.05 kg



Surface Thickness

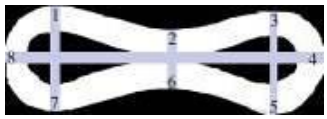


Lateral Thickness

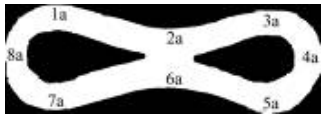


D.z3-16	D.z3-17
	
	

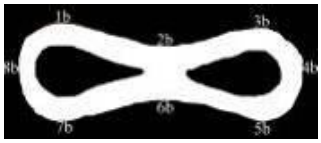
	Link measurements		
Link	**D.z3-16**	**D.z3-17**	
Length			
1-7	19.0 cm	20.0 cm	
2-6	10.1 cm	10.5 cm	
3-5	16.5 cm	18.5 cm	
4-8	54.5 cm	53.5 cm	
Thickness			
1a	4.5 cm	4.3 cm	
1b	4.1 cm	5.0 cm	
2a	--	--	
2b	4.4 cm	4.5 cm	
3a	4.7 cm	4.9 cm	
3b	5.3 cm	4.9 cm	
4a	3.3 cm	3.4 cm	
4b	5.4 cm	5.1 cm	
5a	4.7 cm	4.4 cm	
5b	4.7 cm	4.6 cm	
6a	--	--	
6b	4.5 cm	4.7 cm	
7a	4.8 cm	4.3 cm	
7b	4.1 cm	4.3 cm	
8a	3.9 cm	2.8 cm	
8b	4.4 cm	3.8 cm	
Weight	14.35 kg	**D.95** g	



Surface Thickness



Lateral Thickness



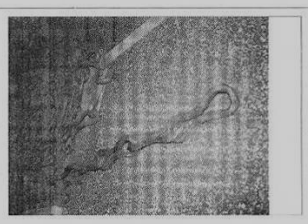
Inspection Results D.z1-D.z2-D.z-3

- The chain is made of wrought iron links. Hammer marks are observable
- No monogram or other marks were observed.
- The first and last links of D.z-1 are closed. The first link of D.z-2 is closed and the last one open, while the first link of D.z-3 is open and the last one closed. The links are morticed.
- Two forms of link were encountered. The first type is joined in the centre and so the joint is morticed (Sketch). In the second type the centre is left open. (Sketch 3).
- It was ascertaned that the links are arranged in a certain order along the chain according to type. The open-centred links are arranged in groups of seven followed by a morticed link and this order is followed throughout the chain
- The total length of the chain is about 33 metres
- The chains to be found in the Naval Museum were transferred to the Naval Museum from the Military Museum on the request of the former by means of an accession document.

It is Possible to Join the Chains!

The first link of D.z3 is twisted. It may thus have been part of a longer chain which was shortened. The series 7+1 is used in this chain which may be joined at either D.z1 or A.z1.

ENVANTER ANA DEFTERİ



ENVANTER NO	:	2585
ADI	:	HALİÇE GERİLEN DEMİR ZİNCİR BAKLALARI
MİKTAR	:	69 ADET
SATIN ALMA FİYATI	:	
CİNSİ	:	METAL
KAYIT YAPAN KİŞİ	:	ESİN TAYAN
MAL SORUMLUSU	:	MUHTELİF
ÖLÇÜSÜ	:	
GRUP	:	MUHTELİF
BULUNDUĞU YER	:	KARMA
GELDİĞİ TARİH	:	
NASIL GELDİĞİ	:	ASKERİ MÜZEDEN İSTEK GÖNDERME VE ALMA BELGESİ KARŞILIĞI MÜZEMİZE NAKLEDİLMİŞTİR.
VASIFLARI	:	
ETİKET BİLGİSİ	:	ETİKET BİLGİSİ: ZİNCİR 1453 YILINDA İSTANBUL'UN KUŞATILMASINI ENGELLEMEK İÇİN, BİZANSLILAR TARAFINDAN HALİÇ'İN AĞZINA GERİLMİŞTİR. 15. YÜZYIL, BİZANS DEMİR HER BİR BAKLA FARKLI EBATLARDADIR. EN GENİŞ VE EN UZUN OLAN BAKLA YAKLAŞIK: 60X20 CM ÖLÇÜSÜNDEDİR.

1 - 1

Photograph 61: *Information from the Istanbul Naval Museum Inventory*

Chains at the Rumeli Hisar Museum

When we went to inspect the 4-link chain at Hisar, the museum official, Archaeologist Pınar Hanım, gave us some surprising information. We learned that there were two more chains in the Saruca Paşa Tower at the entrance to the museum.

Photograph 62: *Saruca Paşa Tower*

First- a Look at the Links

While the museum officials were trying to set up some lighting to help us in our work in the tower, we used a torch as we started to count the links. We saw that they followed the same order.

Photograph 63: *Chains Found on the Entrance Floor of the Tower*

Photograph 64: *Chains Found on the Entrance Floor of the Tower*

Photograph 65: *Chains Found on the Third Floor of the Tower*

Photograph 66: *Chain Found on the Third Floor of the Tower*

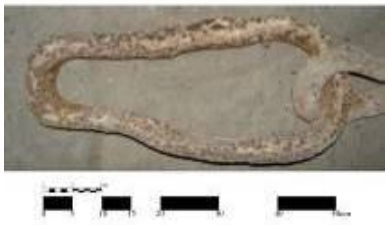
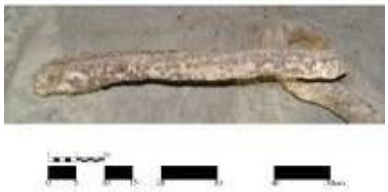
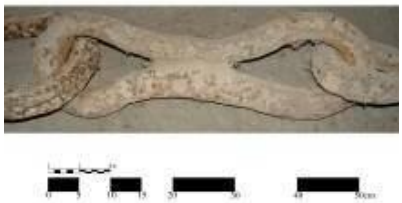
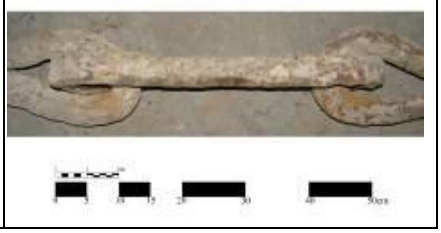
Chain **:** R.z1
No: of Links **:** 47

Length **:** 20.90 m
Weight **:** 717.78 kg

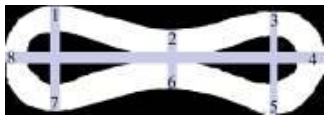
Median Length of Link **:** 54.5 cm
Median Weight of Link **:** 15.30 kg

Longest Link : 61.0 cm
Shortest Link **:** 47.0 cm

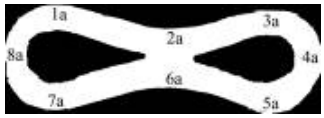
Heaviest Link **:** 21.70 kg
Lightes Link : 9.10 kg

R.z1-1	R.z1-2	R.z1-3
		
		

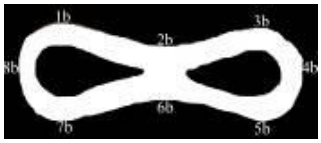
	Link Measurements		
Link	**R.z1-1**	**R.z1-2**	**R.z1-3**
Length			
1-7	15.5 cm	16.5 cm	17.5 cm
2-6	23.5 cm	9.6 cm	9.9 cm
3-5	25.3 cm	18.0 cm	18.0 cm
4-8	55.5 cm	55.0 cm	53.0 cm
Thickness			
1a	4.0 cm	3.7 cm	4.9 cm
1b	4.6 cm	4.1 cm	4.8 cm
2a	4.0 cm	--	--
2b	4.2 cm	4.3 cm	4.4 cm
3a	4.3 cm	4.5 cm	4.8 cm
3b	3.9 cm	4.6 cm	4.8 cm
4a	4.1 cm	4.9 cm	4.3 cm
4b	4.3 cm	4.8 cm	5.0 cm
5a	4.3 cm	4.6 cm	4.6 cm
5b	4.5 cm	5.0 cm	5.5 cm
6a	4.5 cm	--	--
6b	3.9 cm	5.0 cm	3.8 cm
7a	3.9 cm	4.9 cm	5.1 cm
7b	4.2 cm	4.4 cm	4.1 cm
8a	5.3 cm	5.2 cm	5.1 cm
8b	4.9 cm	4.0 cm	4.1 cm
Weight	12.79 kg	14.42 kg	14.44 kg

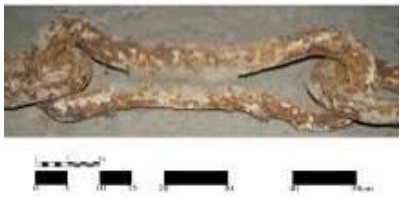
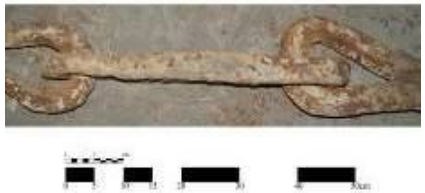


Surface Thickness

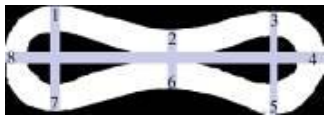


Lateral Thickness

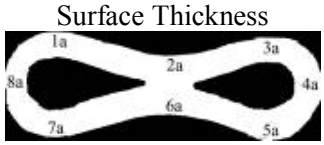


R.z1-4	R.z1-5	R.z1-6
		
		

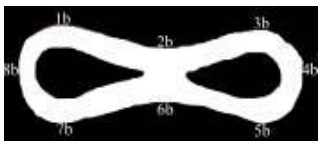
	Link Measurements		
Link	**R.z1-4**	**R.z1-5**	**R.z1-6**
Length			
1-7	16.5 cm	17.5 cm	15.5 cm
2-6	9.0 cm	10.2 cm	9.9 cm
3-5	14.5 cm	16.5 cm	18.0 cm
4-8	54.5 cm	55.0 cm	53.5 cm
Thickness			
1a	4.8 cm	5.0 cm	4.4 cm
1b	4.8 cm	4.0 cm	4.1 cm
2a	--	--	--
2b	4.9 cm	3.3 cm	4.9 cm
3a	4.4 cm	4.8 cm	4.9 cm
3b	5.0 cm	4.7 cm	5.4 cm
4a	4.5 cm	3.8 cm	4.7 cm
4b	4.7 cm	4.8 cm	5.7 cm
5a	3.6 cm	4.0 cm	4.7 cm
5b	4.0 cm	4.0 cm	4.3 cm
6a	--	--	--
6b	4.6 cm	3.4 cm	4.7 cm
7a	4.8 cm	4.5 cm	3.7 cm
7b	4.6 cm	3.9 cm	3.4 cm
8a	6.0 cm	5.0 cm	5.0 cm
8b	5.1 cm	4.4 cm	4.7 cm
Weight	14.54 kg	12.81 kg	15.20 kg

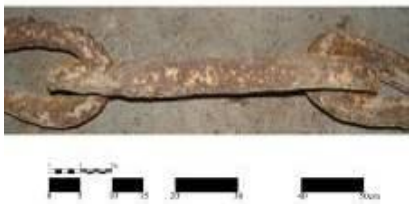
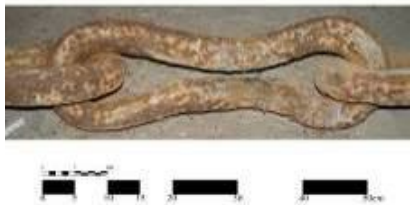
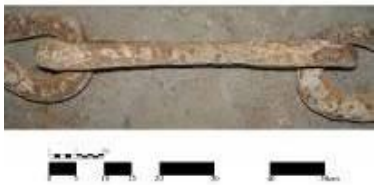
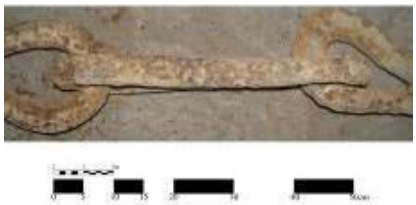


Surface Thickness

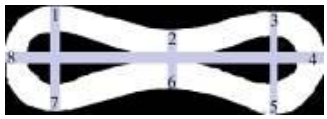


Lateral Thickness

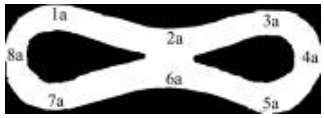


R.z1-7	R.z1-8	R.z1-9
		
		

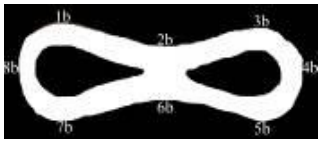
	Link measurements		
Link	**R.z1-7**	**R.z1-8**	**R.z1-9**
Length			
1-7	18.0 cm	20.0 cm	17.0 cm
2-6	10.3 cm	13.3 cm	11.2 cm
3-5	18.0 cm	21.0 cm	17.0 cm
4-8	59.0 cm	52.5 cm	53.0 cm
Thickness			
1a	4.7 cm	4.3 cm	5.1 cm
1b	4.4 cm	3.3 cm	5.1 cm
2a	--	4.7 cm	Worn 5.2 cm
2b	4.4 cm	5.4 cm	4.9 cm
3a	4.2 cm	5.0 cm	5.7 cm
3b	4.0 cm	5.0 cm	5.1 cm
4a	4.1 cm	4.5 cm	5.2 cm
4b	4.2 cm	4.6 cm	4.6 cm
5a	5.1 cm	4.7 cm	4.6 cm
5b	4.6 cm	4.7 cm	4.5 cm
6a	--	4.6 cm	Worn 4.6 cm
6b	4.2 cm	5.1 cm	4.9 cm
7a	4.8 cm	5.3 cm	4.7 cm
7b	4.4 cm	5.0 cm	5.1 cm
8a	5.5 cm	5.2 cm	4.6 cm
8b	4.1 cm	5.2 cm	4.8 cm
Weight	16.08 kg	16.18 kg	16.70 kg

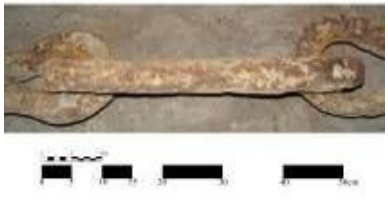
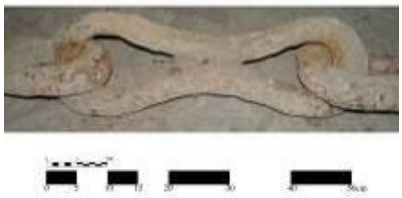
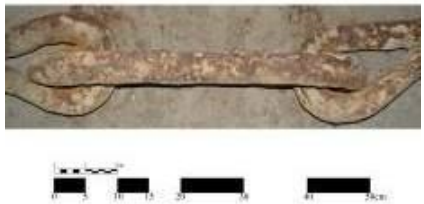
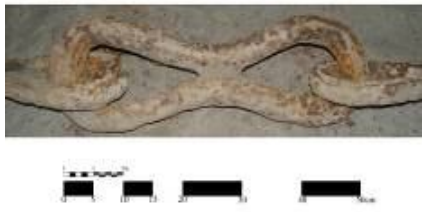


Surface Thickness

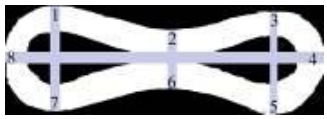


Lateral Thickness

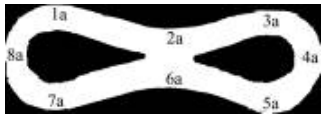


R.z1-10	R.z1-11	R.z1-12
		
		

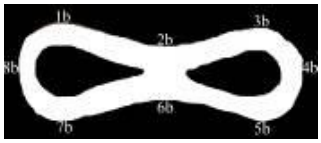
	Link measurements		
Link	**R.z1-10**	**R.z1-11**	**R.z1-12**
Length			
1-7	18.0 cm	17.5 cm	19.0 cm
2-6	10.6 cm	9.7 cm	10.3 cm
3-5	17.5 cm	17.0 cm	19.5 cm
4-8	53.0 cm	52.5 cm	53.5 cm
Thickness			
1a	5.1 cm	4.0 cm	4.6 cm
1b	4.8 cm	4.5 cm	4.7 cm
2a	--	--	--
2b	5.4 cm	4.5 cm	4.8 cm
3a	5.3 cm	4.0 cm	5.0 cm
3b	5.3 cm	3.7 cm	4.8 cm
4a	5.1 cm	5.3 cm	4.7 cm
4b	5.4 cm	5.3 cm	5.4 cm
5a	4.5 cm	5.3 cm	5.3 cm
5b	4.8 cm	4.9 cm	4.8 cm
6a	--	--	--
6b	4.9 cm	4.9 cm	4.7 cm
7a	4.4 cm	5.4 cm	4.4 cm
7b	4.2 cm	5.5 cm	5.5 cm
8a	6.1 cm	4.3 cm	5.6 cm
8b	4.9 cm	4.9 cm	5.0 cm
Weight	16.50 kg	16.50 kg	16.92 kg



Surface Thickness

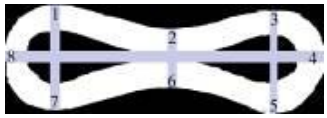


Lateral Thickness

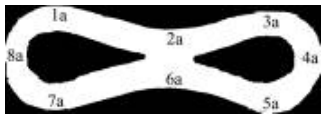


R.z1-13	R.z1-14	R.z1-15
		
		

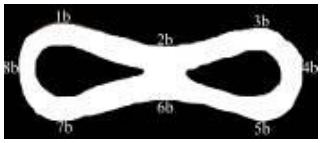
	Link measurements		
Link	**R.z1-13**	**R.z1-14**	**R.z1-15**
Len gth			
1-7	16.5 cm	18.0 cm	16.5 cm
2-6	8.9 cm	10.2 cm	11.3 cm
3-5	16.0 cm	17.0 cm	17.0 cm
4-8	55.0 cm	52.0 cm	52.5 cm
Thickness			
1a	4.6 cm	5.2 cm	4.8 cm
1b	3.5 cm	5.0 cm	4.9 cm
2a	--	--	--
2b	3.7 cm	4.8 cm	4.9 cm
3a	4.0 cm	4.7 cm	5.3 cm
3b	3.8 cm	5.0 cm	4.7 cm
4a	3.9 cm	4.8 cm	5.1 cm
4b	3.3 cm	5.5 cm	4.5 cm
5a	5.2 cm	4.7 cm	4.2 cm
5b	2.8 cm	4.4 cm	4.4 cm
6a	--	--	--
6b	4.0 cm	5.0 cm	4.6 cm
7a	4.2 cm	4.9 cm	4.7 cm
7b	3.7 cm	4.1 cm	5.3 cm
8a	4.3 cm	5.7 cm	4.5 cm
8b	3.8 cm	5.3 cm	4.8 cm
Weight	11.00 kg	15.80 kg	15.89 kg

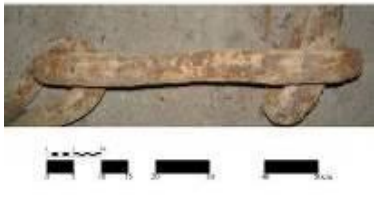
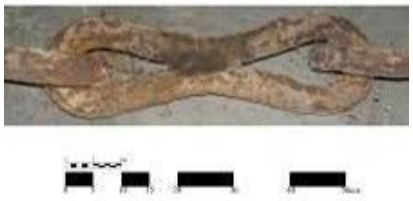
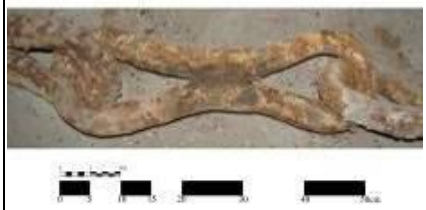


Surface Thickness

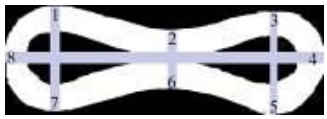


Lateral Thickness

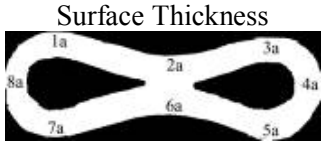


R.z1-16	R.z1-17	R.z1-18
		
		

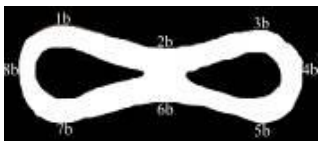
	Link Measurements		
Link	**R.z1-16**	**R.z1-17**	**R.z1-18**
Length			
1-7	20.5 cm	18.0 cm	18.0 cm
2-6	14.6 cm	10.3 cm	10.3 cm
3-5	17.5 cm	17.5 cm	17.0 cm
4-8	61.0 cm	59.0 cm	53.5 cm
Thickness			
1a	5.0 cm	5.5 cm	5.1 cm
1b	5.8 cm	6.0 cm	5.0 cm
2a	5.0 cm	--	--
2b	5.5 cm	5.6 cm	5.2 cm
3a	4.7 cm	5.2 cm	4.1 cm
3b	5.6 cm	5.2 cm	4.0 cm
4a	5.2 cm	5.4 cm	3.9 cm
4b	5.6 cm	5.4 cm	4.5 cm
5a	4.4 cm	4.9 cm	5.4 cm
5b	5.0 cm	5.0 cm	5.5 cm
6a	4.9 cm	--	--
6b	6.0 cm	6.1 cm	5.0 cm
7a	4.6 cm	5.3 cm	5.1 cm
7b	4.6 cm	5.5 cm	5.1 cm
8a	5.3 cm	5.9 cm	5.1 cm
8b	6.0 cm	6.0 cm	5.2 cm
Weight	21.10 kg	21.70 kg	16.72 kg



Surface Thickness

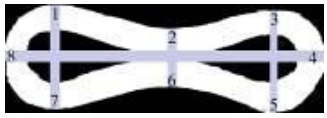


Lateral Thickness

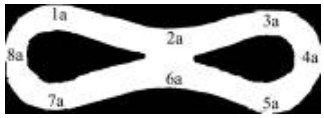


R.z1-19	R.z1-20	R.z1-21
		
		

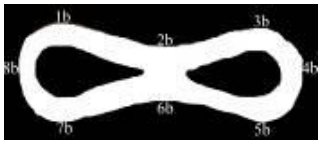
	Link measurements		
Link	**R.z1-19**	**R.z1-20**	**R.z1-21**
Uzunluk			
1-7	17.0 cm	19.0 cm	18.0 cm
2-6	11.0 cm	10.8 cm	10.3 cm
3-5	17.0 cm	18.0 cm	18.0 cm
4-8	52.5 cm	59.0 cm	56.5 cm
Thickness			
1a	4.4 cm	5.5 cm	5.3 cm
1b	5.0 cm	5.6 cm	5.6 cm
2a	--	--	--
2b	5.0 cm	5.7 cm	5.5 cm
3a	4.8 cm	5.2 cm	5.4 cm
3b	4.9 cm	5.4 cm	5.6 cm
4a	4.7 cm	5.4 cm	5.2 cm
4b	5.7 cm	5.7 cm	5.9 cm
5a	5.3 cm	4.4 cm	5.0 cm
5b	5.6 cm	4.4 cm	4.6 cm
6a	--	--	--
6b	5.7 cm	5.1 cm	4.3 cm
7a	5.1 cm	4.1 cm	4.0 cm
7b	5.2 cm	5.1 cm	3.9 cm
8a	4.3 cm	5.5 cm	5.5 cm
8b	3.9 cm	5.6 cm	6.2 cm
Weight	18.35 kg	20.30 kg	18.70 kg

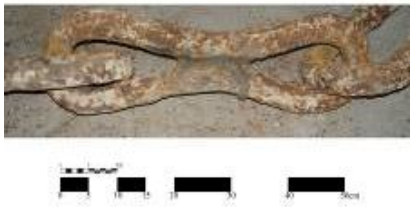
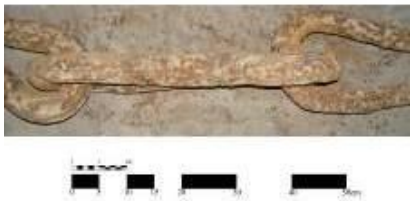
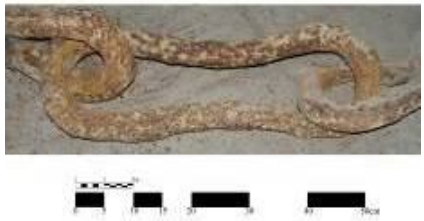


SurfaceThickness



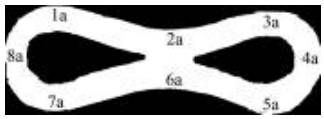
Lateral Thickness



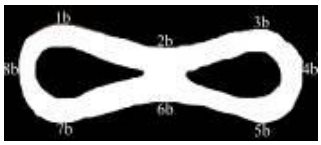
R.z1-22	R.z1-23	R.z1-24
		
		

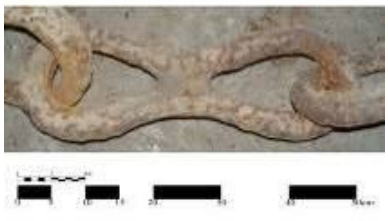
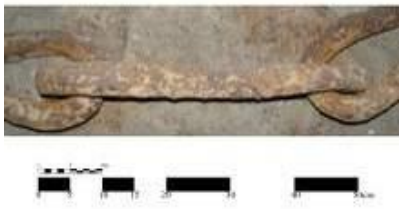
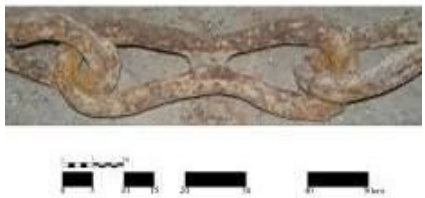
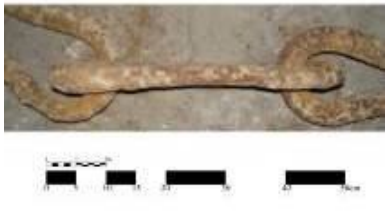
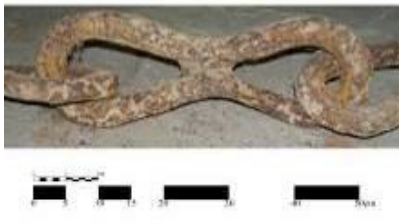
	Link Measurements		
Link	**R.z1-22**	**R.z1-23**	**R.z1-24**
Length			
1-7	18.0 cm	18.5 cm	20.0 cm
2-6	11.2 cm	10.4 cm	14.7 cm
3-5	19.0 cm	17.0 cm	20.0 cm
4-8	54.0 cm	58.0 cm	59.0 cm
Thickness			
1a	5.4 cm	5.4 cm	4.3 cm
1b	5.8 cm	5.1 cm	4.8 cm
2a	--	--	4.1 cm
2b	5.3 cm	5.9 cm	5.1 cm
3a	5.8 cm	5.2 cm	4.8 cm
3b	5.1 cm	6.1 cm	5.0 cm
4a	4.6 cm	5.1 cm	4.4 cm
4b	5.0 cm	5.7 cm	5.2 cm
5a	5.8 cm	4.7 cm	3.3 cm
5b	5.2 cm	5.7 cm	3.6 cm
6a	--	--	4.5 cm
6b	6.0 cm	5.1 cm	4.7 cm
7a	5.3 cm	4.6 cm	5.1 cm
7b	5.8 cm	3.9 cm	5.9 cm
8a	5.3 cm	5.8 cm	4.5 cm
8b	5.4 cm	5.6 cm	4.9 cm
Weight	21.55 kg	19.70 kg	16.75 kg

Surface Thickness

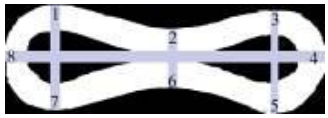


Lateral Thickness

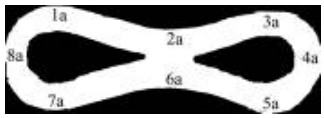


R.z1-25	R.z1-26	R.z1-27
		
		

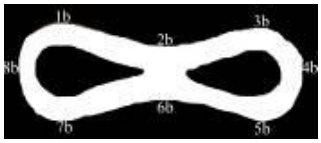
	Link Measurements		
Link	**R.z1-25**	**R.z1-26**	**R.z1-27**
Length			
1-7	17.0 cm	18.0 cm	15.5 cm
2-6	9.8 cm	9.4 cm	10.2 cm
3-5	17.0 cm	16.5 cm	17.5 cm
4-8	50.0 cm	51.5 cm	50.0 cm
Kalınlık			
1a	3.8 cm	4.2 cm	4.7 cm
1b	2.8 cm	4.7 cm	4.7 cm
2a	--	--	--
2b	4.3 cm	4.7 cm	4.3 cm
3a	4.3 cm	4.5 cm	4.9 cm
3b	4.3 cm	4.1 cm	4.3 cm
4a	4.4 cm	5.1 cm	4.6 cm
4b	4.2 cm	4.5 cm	4.1 cm
5a	4.1 cm	4.3 cm	4.5 cm
5b	3.4 cm	4.1 cm	3.9 cm
6a	--	--	--
6b	3.7 cm	4.0 cm	4.1 cm
7a	4.9 cm	4.6 cm	4.0 cm
7b	4.5 cm	4.0 cm	4.3 cm
8a	4.8 cm	4.6 cm	3.5 cm
8b	4.0 cm	4.5 cm	4.8 cm
Weight	11.68 kg	12.46 kg	12.57 kg

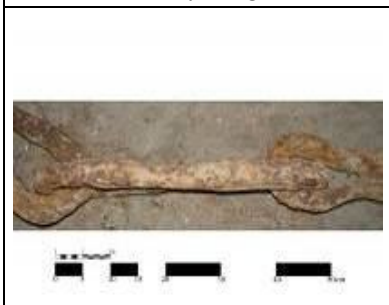


Surface Thickness

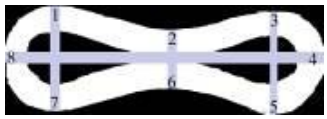


Lateral Thickness

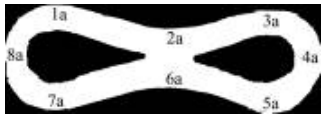


R.z1-28	R.z1-29	R.z1-30
		
		

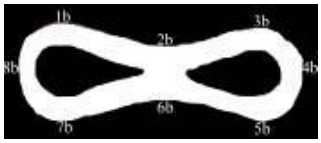
	Link Measurements		
Link	**R.z1-28**	**R.z1-29**	**R.z1-30**
Length			
1-7	17.0 cm	16.0 cm	17.5 cm
2-6	10.2 cm	10.1 cm	9.2 cm
3-5	17.5 cm	17.0 cm	17.0 cm
4-8	53.5 cm	47.0 cm	53.5 cm
Thickness			
1a	4.5 cm	4.2 cm	4.6 cm
1b	4.1 cm	4.2 cm	4.5 cm
2a	--	--	--
2b	3.3 cm	4.3 cm	4.1 cm
3a	4.5 cm	5.0 cm	4.3 cm
3b	4.2 cm	4.4 cm	4.6 cm
4a	3.8 cm	5.1 cm	4.6 cm
4b	3.8 cm	5.0 cm	4.7 cm
5a	4.7 cm	4.1 cm	3.7 cm
5b	4.9 cm	4.0 cm	3.9 cm
6a	--	--	--
6b	3.8 cm	3.9 cm	4.2 cm
7a	3.8 cm	4.0 cm	3.8 cm
7b	4.4 cm	4.2 cm	3.8 cm
8a	5.2 cm	4.4 cm	4.3 cm
8b	4.1 cm	4.5 cm	5.0 cm
Weight	12.28 kg	11.65 kg	13.73 kg

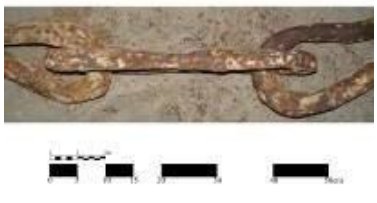
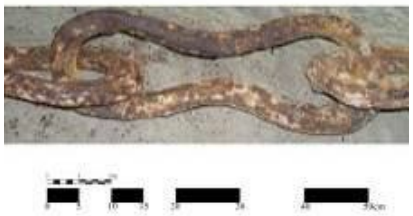


Surface Thickness

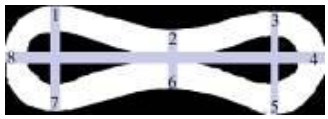


Lateral Thickness

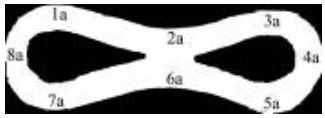


R.z1-31	R.z1-32	R.z1-33
		
		

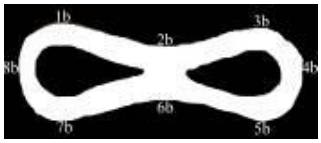
	Link Measurements		
Link	**R.z1-31**	**R.z1-32**	**R.z1-33**
Uzunluk			
1-7	17.0 cm	17.0 cm	18.0 cm
2-6	9.6 cm	11.6 cm	10.2 cm
3-5	16.5 cm	20.5 cm	17.5 cm
4-8	49.0 cm	52.0 cm	56.0 cm
Thickness			
1a	4.4 cm	3.9 cm	3.8 cm
1b	4.1 cm	3.3 cm	4.0 cm
2a	Aşınmış 4.5 cm	3.8 cm	--
2b	3.3 cm	3.3 cm	3.8 cm
3a	5.0 cm	3.6 cm	4.6 cm
3b	4.6 cm	3.4 cm	3.9 cm
4a	5.0 cm	4.4 cm	4.9 cm
4b	4.6 cm	4.8 cm	5.5 cm
5a	4.7 cm	4.4 cm	4.8 cm
5b	3.1 cm	4.3 cm	5.0 cm
6a	Aşınmış 4.1 cm	4.2 cm	--
6b	2.7 cm	4.8 cm	4.6 cm
7a	3.9 cm	4.1 cm	4.8 cm
7b	4.0 cm	4.3 cm	4.1 cm
8a	4.3 cm	4.2 cm	5.1 cm
8b	4.2 cm	4.4 cm	5.5 cm
Weight	9.10 kg	10.80 kg	13.35 kg

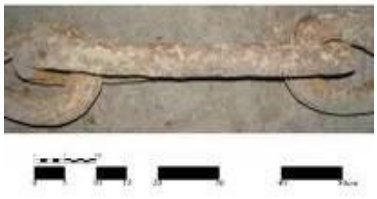
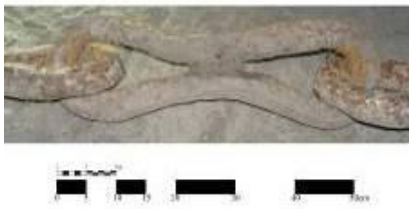
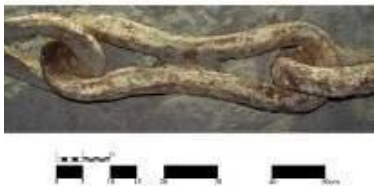
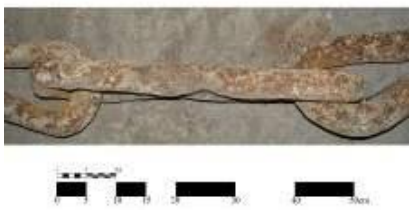
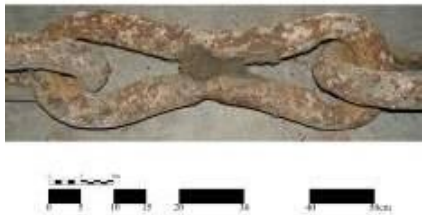


Surface Thickness

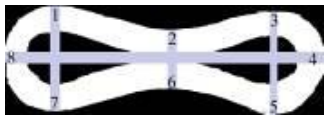


Lateral Thickness

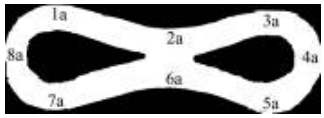


R.z1-34	R.z1-35	R.z1-36
		
		

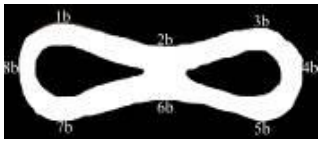
	Link Measurements		
Link	**R.z1-34**	**R.z1-35**	**R.z1-36**
Length			
1-7	17.5 cm	18.5 cm	18.5 cm
2-6	10.8 cm	11.0 cm	10.5 cm
3-5	17.0 cm	18.5 cm	17.0 cm
4-8	56.0 cm	56.5 cm	56.0 cm
Thickness			
1a	4.6 cm	5.1 cm	5.3 cm
1b	5.9 cm	4.8 cm	5.1 cm
2a	--	--	--
2b	5.5 cm	5.4 cm	5.7 cm
3a	4.5 cm	4.8 cm	4.2 cm
3b	5.4 cm	5.0 cm	5.7 cm
4a	4.8 cm	4.8 cm	5.8 cm
4b	5.3 cm	5.2 cm	5.6 cm
5a	4.8 cm	5.1 cm	4.2 cm
5b	4.7 cm	5.8 cm	5.6 cm
6a	--	--	--
6b	5.3 cm	5.6 cm	5.6 cm
7a	5.0 cm	5.6 cm	5.2 cm
7b	5.0 cm	5.5 cm	5.5 cm
8a	5.5 cm	4.6 cm	4.4 cm
8b	5.8 cm	5.4 cm	5.5 cm
Weight	18.77 kg	16.83 kg	21.20 kg

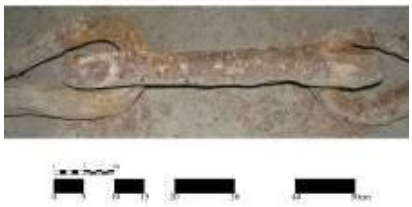
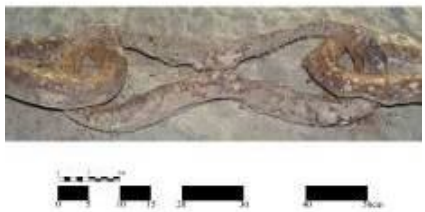
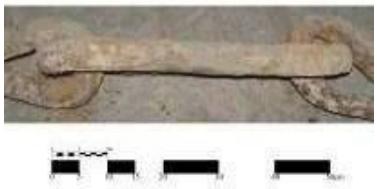
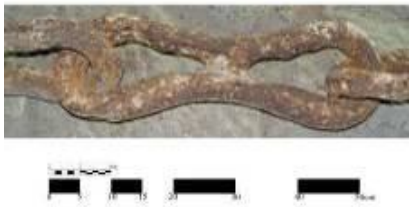
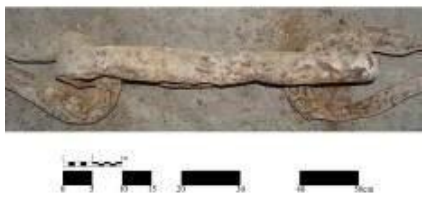


Surface Thickness

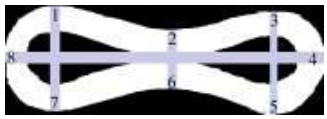


Lateral Thickness

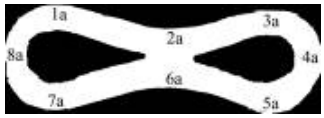


R.z1-37	R.z1-38	R.z1-39
		
		

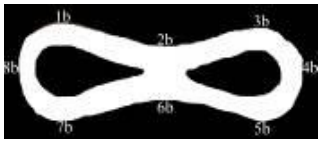
	Link Measurements		
Link	**R.z1-37**	**R.z1-38**	**R.z1-39**
Length			
1-7	16.5 cm	17.0 cm	16.5 cm
2-6	9.6 cm	10.3 cm	8.8 cm
3-5	18.5 cm	17.5 cm	17.0 cm
4-8	57.0 cm	53.0 cm	54.5 cm
Thickness			
1a	4.5 cm	4.2 cm	2.9 cm
1b	4.8 cm	5.2 cm	3.8 cm
2a	--	--	4.0 cm
2b	4.3 cm	4.9 cm	5.4 cm
3a	4.3 cm	4.3 cm	2.6 cm
3b	5.1 cm	5.5 cm	2.8 cm
4a	4.6 cm	4.5 cm	5.1 cm
4b	4.8 cm	4.4 cm	5.2 cm
5a	5.2 cm	5.1 cm	4.9 cm
5b	5.6 cm	5.0 cm	4.8 cm
6a	--	--	4.2 cm
6b	5.5 cm	5.4 cm	5.2 cm
7a	4.4 cm	4.0 cm	3.9 cm
7b	5.5 cm	5.7 cm	5.4 cm
8a	4.5 cm	4.7 cm	4.3 cm
8b	5.0 cm	5.4 cm	4.0 cm
Weight	16.80 kg	16.14 kg	11.84 kg

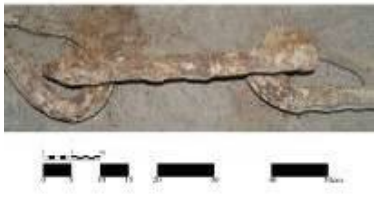
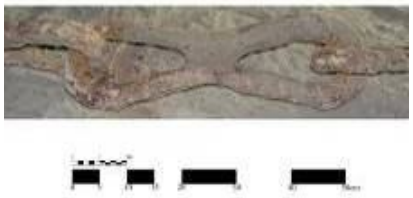
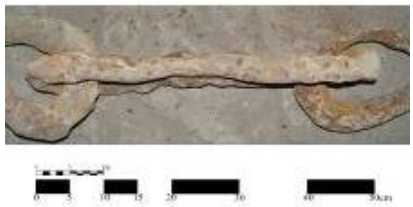
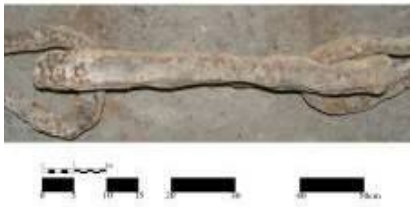


Surface Thickness

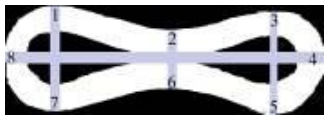


Lateral thickness

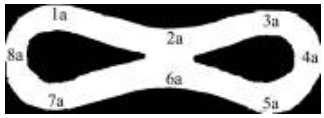


R.z1-40	R.z1-41	R.z1-42
		
		

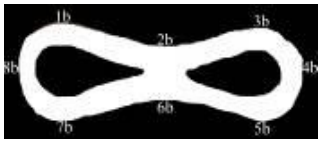
	Link Measurements		
Link	**R.z1-40**	**R.z1-41**	**R.z1-42**
Length			
1-7	18.0 cm	17.0 cm	15.5 cm
2-6	10.7 cm	10.8 cm	9.7 cm
3-5	18.0 cm	17.5 cm	17.0 cm
4-8	49.0 cm	55.5 cm	52.5 cm
Thickness			
1a	4.5 cm	4.0 cm	3.3 cm
1b	3.7 cm	5.0 cm	3.8 cm
2a	2.9 cm	--	--
2b	4.2 cm	4.6 cm	3.8 cm
3a	3.7 cm	5.1 cm	3.8 cm
3b	4.0 cm	5.1 cm	4.0 cm
4a	4.8 cm	5.1 cm	4.8 cm
4b	3.7 cm	5.0 cm	5.0 cm
5a	3.7 cm	4.7 cm	4.2 cm
5b	4.6 cm	4.6 cm	5.4 cm
6a	3.2 cm	--	--
6b	4.4 cm	4.2 cm	4.6 cm
7a	3.3 cm	5.1 cm	4.9 cm
7b	2.9 cm	6.0 cm	3.7 cm
8a	4.7 cm	4.3 cm	4.2 cm
8b	5.1 cm	4.5 cm	4.8 cm
Weight	9.11 kg	17.15 kg	11.00 kg

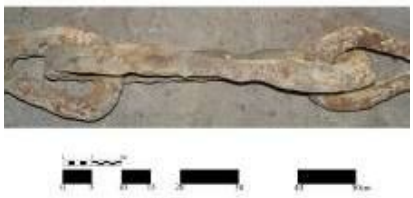
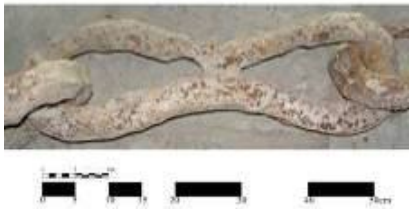
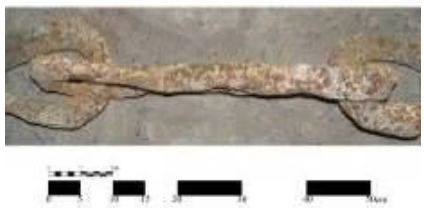


Surface Thickness

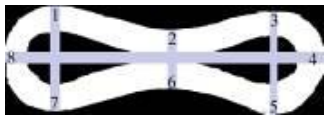


Lateral Thickness

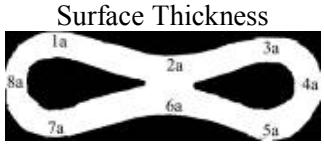


R.z1-43	R.z1-44	R.z1-45
		
		

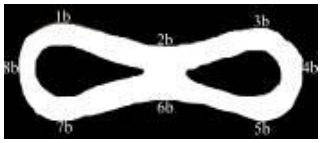
	Link Measurements		
Link	**R.z1-43**	**R.z1-44**	**R.z1-45**
Length			
1-7	16.0 cm	18.5 cm	17.0 cm
2-6	9.6 cm	10.0 cm	9.4 cm
3-5	16.0 cm	19.0 cm	17.0 cm
4-8	50.5 cm	57.0 cm	57.0 cm
Thickness			
1a	4.9 cm	4.6 cm	3.5 cm
1b	4.7 cm	4.4 cm	2.5 cm
2a	--	--	--
2b	5.1 cm	3.0 cm	2.9 cm
3a	4.7 cm	4.4 cm	2.4 cm
3b	5.8 cm	4.5 cm	3.7 cm
4a	5.0 cm	5.4 cm	5.6 cm
4b	5.0 cm	5.0 cm	5.6 cm
5a	4.1 cm	5.2 cm	5.3 cm
5b	4.6 cm	4.2 cm	4.5 cm
6a	--	--	--
6b	5.1 cm	3.1 cm	4.7 cm
7a	1.6 cm	5.0 cm	3.7 cm
7b	1.4 cm	4.9 cm	5.3 cm
8a	5.1 cm	5.1 cm	4.0 cm
8b	4.2 cm	5.0 cm	5.3 cm
Length	11.37 kg	14.73 kg	17.77 kg

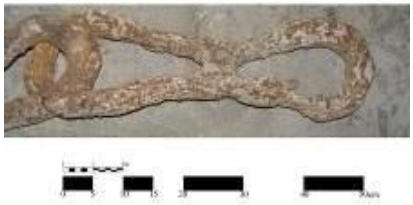
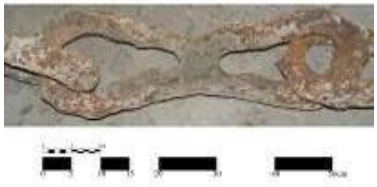


Surface Thickness

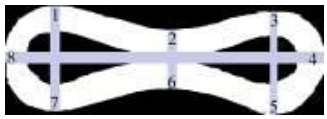


Lateral Thickness

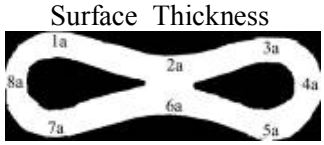


R.z1-46	R.z1-47
	
	

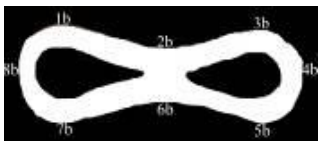
	Link Measurements		
Link	**R.z1-46**	**R.z1-47**	
Length			
1-7	18.5 cm	18.0 cm	
2-6	9.6 cm	9.4 cm	
3-5	17.5 cm	18.0 cm	
4-8	57.5 cm	59.0 cm	
Thickness			
1a	4.2 cm	4.2 cm	
1b	4.5 cm	4.8 cm	
2a	--	--	
2b	4.1 cm	4.4 cm	
3a	4.4 cm	5.1 cm	
3b	4.5 cm	5.3 cm	
4a	5.6 cm	5.3 cm	
4b	5.5 cm	4.1 cm	
5a	5.2 cm	4.4 cm	
5b	4.7 cm	3.9 cm	
6a	--	--	
6b	5.1 cm	4.7 cm	
7a	4.2 cm	3.6 cm	
7b	5.9 cm	4.5 cm	
8a	3.9 cm	4.1 cm	
8b	4.1 cm	5.1 cm	
Weight	13.63 kg	13.18 kg	



Surface Thickness



Lateral Thickness



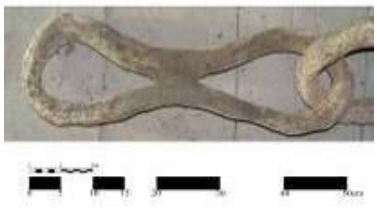
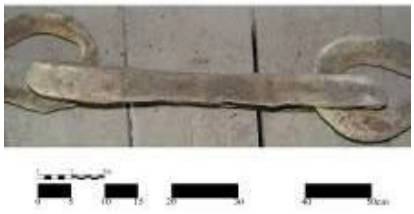
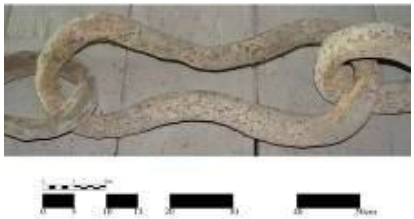
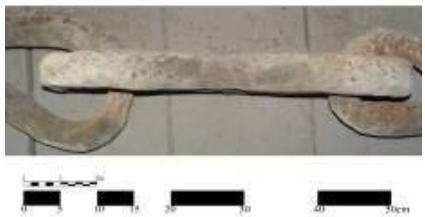

Chain : R.z2
No:of Links : 23

Length : 10.72 m
Weight : 325 kg

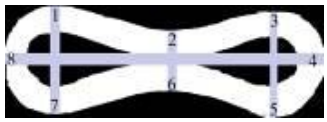
Median length of Link : 53.5 cm
Median Weight : 14.15 kg

Longest Link : 58.5 cm
Shortest Link : 51.0 cm

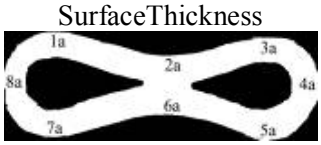
Heaviest Link : 17.03 kg
Lightest Link : 10.44 kg

R.z2-1	R.z2-2	R.z2-3
		
		

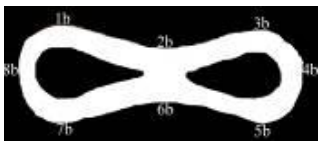
	Link Measurements		
Link	**R.z2-1**	**R.z2-2**	**R.z2-3**
Length			
1-7	18.0 cm	20.5 cm	18.5 cm
2-6	8.6 cm	11.5 cm	10.2 cm
3-5	17.9 cm	20.5 cm	17.5 cm
4-8	52.5 cm	54.0 cm	51.0 cm
Thickness			
1a	4.4 cm	4.1 cm	4.7 cm
1b	4.3 cm	4.9 cm	4.7 cm
2a	--	3.7 cm	--
2b	4.0 cm	4.1 cm	4.6 cm
3a	4.1 cm	4.0 cm	4.7 cm
3b	4.0 cm	4.3 cm	4.9 cm
4a	3.4 cm	3.7 cm	3.9 cm
4b	4.1 cm	4.0 cm	4.6 cm
5a	3.3 cm	4.5 cm	4.5 cm
5b	3.7 cm	5.1 cm	4.8 cm
6a	--	3.2 cm	--
6b	4.3 cm	4.7 cm	4.7 cm
7a	3.5 cm	5.4 cm	4.3 cm
7b	4.2 cm	5.3 cm	4.9 cm
8a	3.6 cm	3.2 cm	5.2 cm
8b	3.8 cm	4.6 cm	4.5 cm
Weight	10.44 kg	14.15 kg	15.73 kg

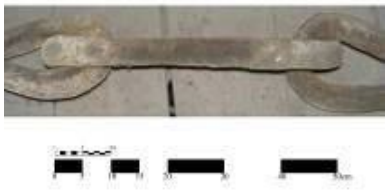
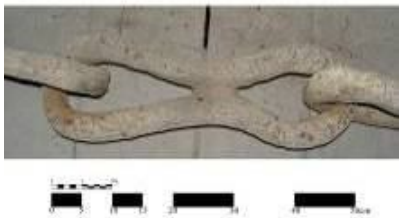
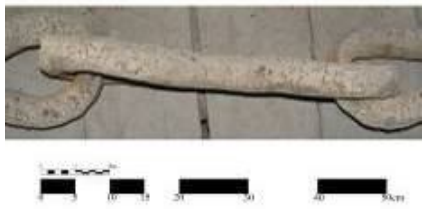
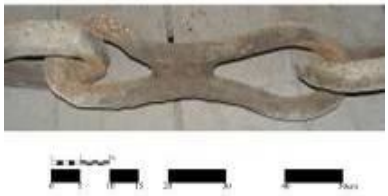


SurfaceThickness

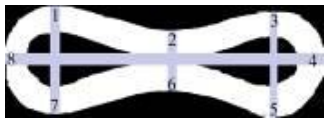


Lateral Thickness

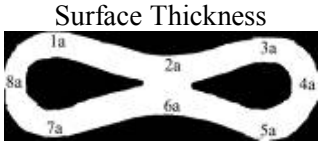


R.z2-4	R.z2-5	R.z2-6
		
		

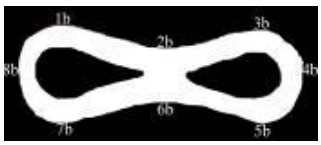
	Link Measurements		
Link	**R.z2-4**	**R.z2-5**	**R.z2-6**
Length			
1-7	16.0 cm	18.0 cm	18.0 cm
2-6	9.3 cm	10.5 cm	10.4 cm
3-5	17.0 cm	17.5 cm	17.0 cm
4-8	53.0 cm	52.0 cm	52.0 cm
Thickness			
1a	4.1 cm	4.7 cm	4.6 cm
1b	4.2 cm	4.6 cm	4.7 cm
2a	--	--	--
2b	4.3 cm	4.7 cm	4.7 cm
3a	4.4 cm	4.9 cm	4.4 cm
3b	4.1 cm	4.9 cm	4.5 cm
4a	3.3 cm	3.5 cm	3.2 cm
4b	4.8 cm	4.9 cm	4.1 cm
5a	4.1 cm	4.8 cm	4.5 cm
5b	4.7 cm	4.8 cm	4.3 cm
6a	--	--	--
6b	4.8 cm	5.0 cm	4.3 cm
7a	4.0 cm	5.2 cm	4.8 cm
7b	5.0 cm	4.7 cm	4.3 cm
8a	4.9 cm	3.9 cm	4.0 cm
8b	4.8 cm	4.3 cm	4.7 cm
Weight	14.02 kg	15.23 kg	13.85 kg

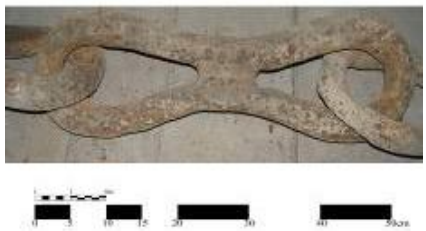


Surface Thickness

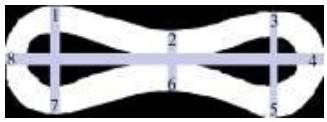


Lateral Thickness

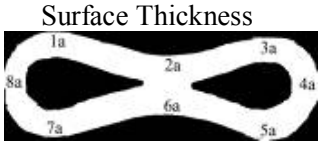


R.z2-7	R.z2-8	R.z2-9
		
		

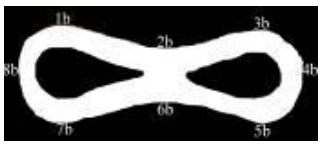
	Link Measurements		
Link	**R.z2-7**	**R.z2-8**	**R.z2-9**
Length			
1-7	17.0 cm	19.0 cm	17.5 cm
2-6	10.3 cm	10.1 cm	10.3 cm
3-5	17.5 cm	17.0 cm	18.5 cm
4-8	58.5 cm	54.0 cm	53.5 cm
Thickness			
1a	4.8 cm	4.9 cm	4.6 cm
1b	4.1 cm	4.6 cm	4.6 cm
2a	--	--	--
2b	4.4 cm	4.9 cm	4.9 cm
3a	4.9 cm	4.6 cm	5.1 cm
3b	4.8 cm	4.5 cm	4.8 cm
4a	4.1 cm	3.1 cm	3.7 cm
4b	5.1 cm	4.7 cm	5.1 cm
5a	5.2 cm	4.8 cm	4.6 cm
5b	5.0 cm	5.0 cm	5.0 cm
6a	--	--	--
6b	4.7 cm	4.4 cm	5.1 cm
7a	4.8 cm	4.5 cm	4.6 cm
7b	4.7 cm	4.4 cm	4.3 cm
8a	3.6 cm	4.6 cm	3.7 cm
8b	4.2 cm	4.9 cm	4.8 cm
Weight	15.63 kg	15.30 kg	15.43 kg

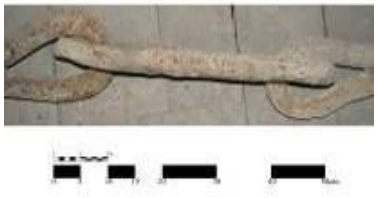
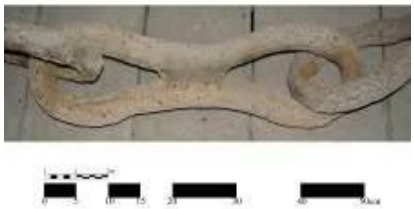


Surface Thickness

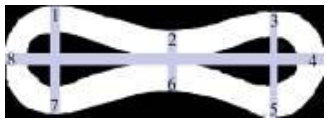


Lateral Thickness

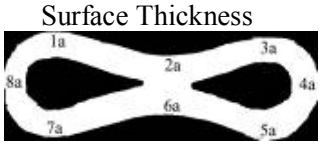


R.z2-10	R.z2-11	R.z2-12
		
		

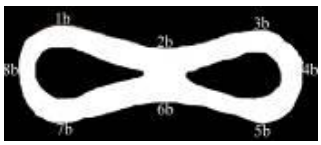
	Link Measurements		
Link	**R.z2-10**	**R.z2-11**	**R.z2-12**
Length			
1-7	18.5 cm	16.5 cm	16.0 cm
2-6	11.3 cm	10.3 cm	9.4 cm
3-5	17.5 cm	17.0 cm	17.0 cm
4-8	51.5 cm	52.5 cm	53.5 cm
Thickness			
1a	4.1 cm	5.0 cm	4.2 cm
1b	4.4 cm	4.2 cm	4.6 cm
2a	4.5 cm	--	--
2b	4.4 cm	4.3 cm	4.3 cm
3a	4.5 cm	4.4 cm	4.1 cm
3b	4.7 cm	4.6 cm	3.7 cm
4a	3.0 cm	3.3 cm	5.1 cm
4b	4.5 cm	4.4 cm	4.5 cm
5a	3.6 cm	4.0 cm	4.6 cm
5b	3.9 cm	4.4 cm	4.8 cm
6a	3.8 cm	--	--
6b	4.7 cm	4.1 cm	3.7 cm
7a	3.5 cm	4.6 cm	3.5 cm
7b	3.8 cm	4.1 cm	3.4 cm
8a	3.6 cm	4.1 cm	3.7 cm
8b	3.8 cm	4.5 cm	4.9 cm
Weight	12.05 kg	13.80 kg	12.87 kg

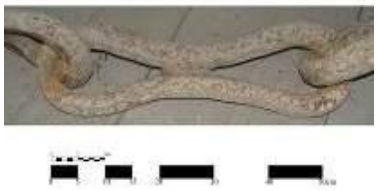
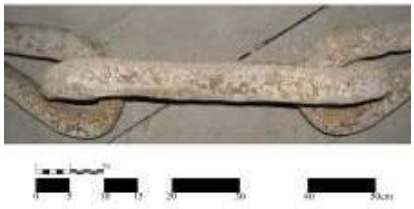
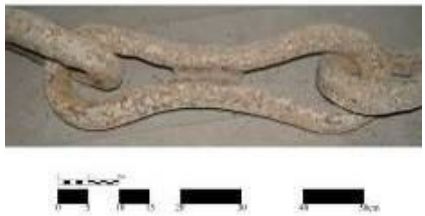
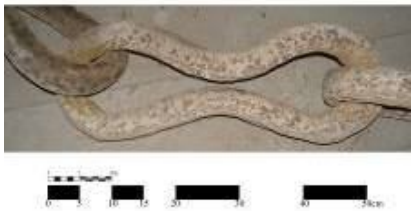
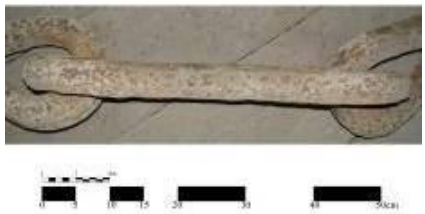


Surface Thickness

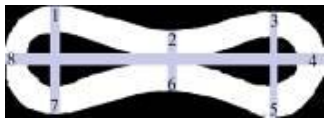


Lateral Thickness

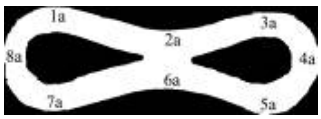


R.z2-13	R.z2-14	R.z2-15
		
		

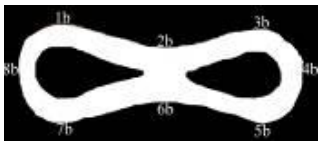
	Link Measurements		
Link	**R.z2-13**	**R.z2-14**	**R.z2-15**
Length			
1-7	17.5 cm	18.5 cm	17.5 cm
2-6	10.2 cm	10.0 cm	10.1 cm
3-5	18.5 cm	18.0 cm	18.0 cm
4-8	58.5 cm	51.0 cm	56.5 cm
Thickness			
1a	4.2 cm	4.5 cm	4.2 cm
1b	4.6 cm	4.5 cm	5.0 cm
2a	--	4.4 cm	--
2b	4.3 cm	4.9 cm	5.2 cm
3a	4.1 cm	4.5 cm	5.2 cm
3b	3.7 cm	4.5 cm	4.4 cm
4a	5.1 cm	4.8 cm	4.6 cm
4b	4.5 cm	4.9 cm	4.4 cm
5a	4.6 cm	4.8 cm	4.6 cm
5b	4.8 cm	5.1 cm	4.4 cm
6a	--	4.2 cm	--
6b	3.7 cm	5.3 cm	5.0 cm
7a	3.5 cm	4.3 cm	4.9 cm
7b	3.4 cm	5.5 cm	5.3 cm
8a	3.7 cm	3.6 cm	4.1 cm
8b	4.9 cm	4.8 cm	5.1 cm
Weight	17.03 kg	15.52 kg	16.93 kg

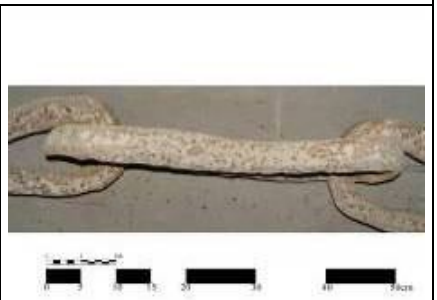
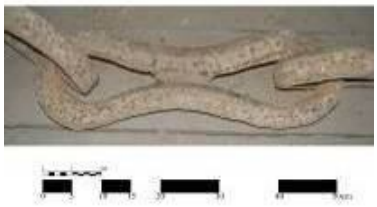
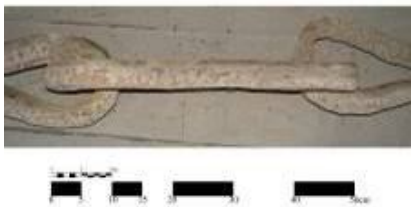


Surface Thickness

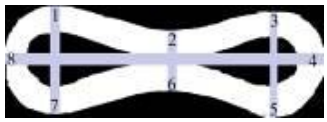


Lateral Thickness

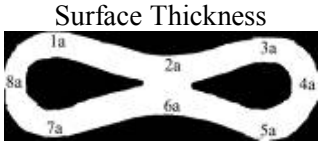


R.z2-16	R.z2-17	R.z2-18
		
		

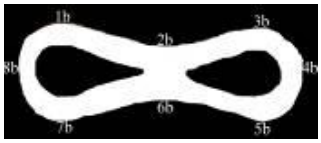
	Link Measurements		
Link	**R.z2-16**	**R.z2-17**	**R.z2-18**
Length			
1-7	17.5 cm	16.5 cm	19.0 cm
2-6	10.7 cm	10.6 cm	10.5 cm
3-5	16.5 cm	16.0 cm	17.5 cm
4-8	52.0 cm	52.0 cm	51.5 cm
Thickness			
1a	4.4 cm	4.4 cm	4.6 cm
1b	4.9 cm	4.6 cm	4.6 cm
2a	--	4.7 cm	4.1 cm
2b	4.9 cm	4.5 cm	4.5 cm
3a	4.9 cm	5.0 cm	4.2 cm
3b	4.9 cm	4.5 cm	4.2 cm
4a	3.8 cm	3.3 cm	2.8 cm
4b	5.0 cm	4.5 cm	4.7 cm
5a	4.5 cm	3.9 cm	4.2 cm
5b	4.8 cm	3.6 cm	4.4 cm
6a	--	4.5 cm	3.8 cm
6b	5.0 cm	4.2 cm	4.7 cm
7a	4.5 cm	4.5 cm	4.2 cm
7b	3.8 cm	3.6 cm	4.7 cm
8a	4.2 cm	3.5 cm	3.2 cm
8b	4.9 cm	4.3 cm	3.4 cm
Weight	15.37 kg	12.66 kg	12.28 kg

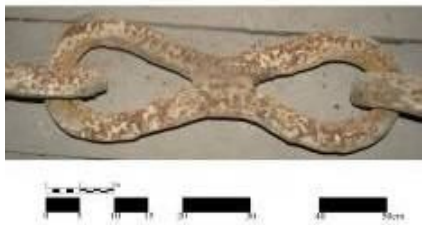


Surface Thickness

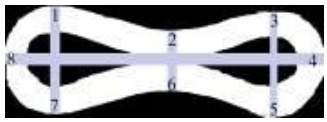


Lateral Thickness

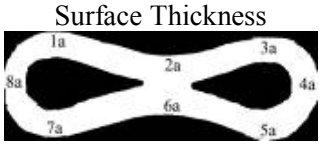


R.z2-19	R.z2-20	R.z2-21
		
		

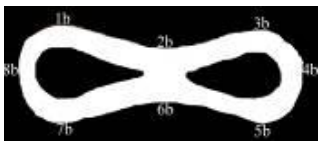
	Link Measurements		
Link	**R.z2-19**	**R.z2-20**	**R.z2-21**
Length			
1-7	16.5 cm	16.5 cm	17.5 cm
2-6	10.1 cm	9.3 cm	9.3 cm
3-5	17.5 cm	16.5 cm	17.5 cm
4-8	57.5 cm	51.0 cm	52.0 cm
Thickness			
1a	4.6 cm	4.2 cm	3.9 cm
1b	4.5 cm	4.1 cm	3.9 cm
2a	--	--	--
2b	5.2 cm	4.2 cm	4.4 cm
3a	4.5 cm	4.1 cm	4.4 cm
3b	5.2 cm	3.6 cm	4.5 cm
4a	2.4 cm	3.1 cm	3.8 cm
4b	4.9 cm	4.0 cm	4.9 cm
5a	4.2 cm	4.2 cm	4.5 cm
5b	4.1 cm	4.9 cm	4.4 cm
6a	--	--	--
6b	4.6 cm	4.5 cm	4.8 cm
7a	3.5 cm	4.5 cm	3.9 cm
7b	3.7 cm	4.9 cm	3.9 cm
8a	2.6 cm	4.1 cm	3.4 cm
8b	4.7 cm	4.1 cm	3.9 cm
Weight	14.46 kg	12.15 kg	13.05 kg

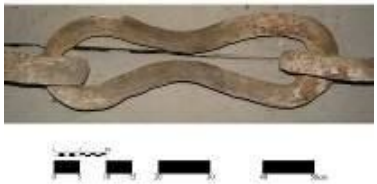


Surface Thickness

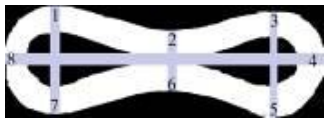


Lateral Thickness

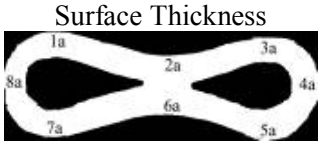


R.z2-22	R.z2-23
	
	

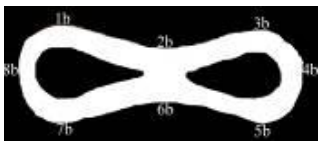
	Link Measurements		
Link	**R.z2-22**	**R.z2-23**	
Length			
1-7	18.0 cm	18.5 cm	
2-6	9.9 cm	9.0 cm	
3-5	18.0 cm	15.5 cm	
4-8	57.0 cm	54.5 cm	
Thickness			
1a	4.1 cm	3.9 cm	
1b	4.9 cm	3.6 cm	
2a	4.0 cm	--	
2b	5.1 cm	4.9 cm	
3a	4.4 cm	4.1 cm	
3b	4.8 cm	4.6 cm	
4a	5.5 cm	2.8 cm	
4b	6.1 cm	4.0 cm	
5a	4.4 cm	4.0 cm	
5b	4.4 cm	4.4 cm	
6a	4.0 cm	--	
6b	4.7 cm	3.8 cm	
7a	4.0 cm	3.9 cm	
7b	4.7 cm	3.8 cm	
8a	3.5 cm	3.3 cm	
8b	5.0 cm	4.2 cm	
Weight	15.83 kg	11.72 kg	



Surface Thickness



Lateral Thickness



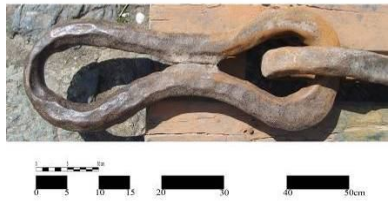
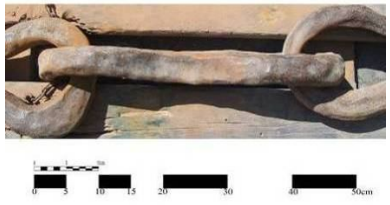
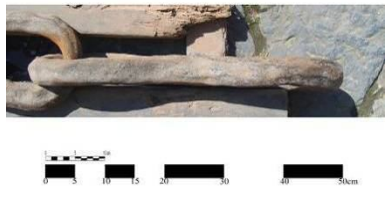
Chain : R.z3
No: of Links : 4

Length : 1.84 m
Weight : 47.30 kg

Median Length of link : 51.5 cm
Median Weight : 11.82 kg

Longest link : 54.5 cm
Shortest link : 48.0 cm

Heaviest Link : 12.20 kg
Lightest Link : 11.30 kg

R.z3-1	R.z3-2	R.z3-3	R.z3-4
			
			

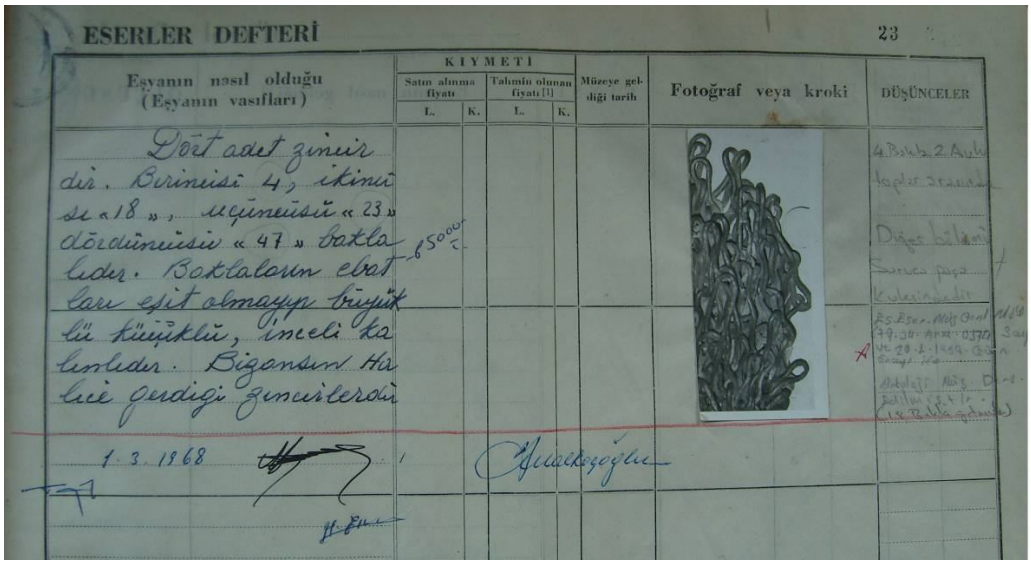
	Link Measurements			
Link	**R.z3-1**	**R.z3-2**	**R.z3-3**	**R.z3-4**
Length				
1-7	18.0 cm	16.0 cm	18.0 cm	16.0 cm
2-6	9.4 cm	8.9 cm	9.4 cm	9.8 cm
3-5	19.5 cm	17.5 cm	16.5 cm	16.5 cm
4-8	50.5 cm	48.0 cm	54.5 cm	53.0 cm
Thickness				
1a	4.2 cm	3.8 cm	3.7 cm	4.2 cm
1b	4.0 cm	4.2 cm	4.2 cm	3.3 cm
2a	--	--	--	--
2b	4.0 cm	4.7 cm	3.7 cm	4.3 cm
3a	4.1 cm	4.8 cm	3.5 cm	4.8 cm
3b	3.7 cm	4.5 cm	3.6 cm	4.9 cm
4a	3.9 cm	4.4 cm	2.7 cm	3.3 cm
4b	4.1 cm	4.9 cm	3.7 cm	5.0 cm
5a	5.0cm - 5.8cm	4.8 cm	4.1 cm	4.4 cm
5b	4.1 cm	4.1 cm	4.5 cm	4.6 cm
6a	--	--	--	--
6b	3.9 cm	4.4 cm	4.3 cm	4.7 cm
7a	4.4 cm	4.1 cm	4.7 cm	4.1 cm
7b	4.4 cm	4.4 cm	4.6 cm	4.1 cm
8a	3.2 cm	2.8 cm	2.6 cm	3.3 cm
8b	4.2 cm	4.5 cm	4.0 cm	4.0 cm
Weight	11.94 Kg	11.30 Kg	11.85 Kg	12.20 Kg

Inspection Results: R.z1-R.z2-R.z3

- The chains are made of wrought iron. Hammer marks were observed.. Though in good condition, as no conservation work has been done on these chains, there is surface corrosion.
- No monogram or marks were found on the links.
- The first and last links of the chain are morticed.
- There are three types of link. The first type is joined in the centre which is therefore morticed (Sketch 2). The second type has an open centre (Sketch 3). The third type is that of the first link in the chain. This link has one narrow and one wider end (Sketch 4). This type of link is observed only in the first link of R.z1.
- Apart from the first link, a definite order is seen to be followed in the arrangement of the links. After the link with an open centre come seven morticed links and then another link with an open centre; the links then continue in this way.
- The total length of the change is 33 metres.

The Military Museum: the Source of the Chains

We learned that the chains at Rumeli Hisar were brought there from the Military Museum. We conclude therefore that the source of the piece in the Archaeological Museum was the Military Museum.



ESERLER DEFTERİ 23

Eşyanın nasıl olduğu (Eşyanın vasıfları)	KIYMETİ: Satın alınma fiyatı L.	K.	Takımın olunan fiyatı [1] L.	K.	Müzeye geldiği tarih	Fotoğraf veya kroki	DÜŞÜNCELER
Dört adet zincir dir. Birincisi 4, ikincisi «18», üçüncüsü «23» dördüncüsü «47» baklalıdır. Baklaların ebatları eşit olmayıp büyüklü küçüklü, inceli kalınlıdır. Bizansın Halice gerdiği zincirlerdir.					1.3.1968		

Photograph 67: *Information from the Inventory of Chains in Rumeli Hisar*

ENVANTER No.....51.....(ellibir)	KAZI No.	MÜZEDEKİ YERİ:Sarucapaşa Kulesi (2 adet),Halilpaşa Kulesi (1 adet)
Adı: ZİNCİR (3 parça)		**Buluntu yeri:**
Malzeme: Demir		**Devri:**
Boyutlar: Boy: cm. Çap: cm.		**Kat No:**
Müzeye giriş tarihi:		**Neg No:**
Müzeye nasıl geldiği: İstanbul Askeri Müze Müdürlüğü		
Durumu:		
Tanım: Dört adet zincirdir. Birincisi "4", ikincisi "18", üçüncüsü "23" dördüncüsü "47" baklalıdır. Baklaların ebatları eşit olmayan büyüklü küçüklü, inceli kalınlıdır. Bizans'ın halice gerdiği zincirlerdir.		

Photograph 68: *Information from the Inventory of Chains at Rumeli Hisar*

Chains in the Military Museum

As the area in which we worked at the Military Museum was open to the public, wee had to work quickly. We started by documenting a different type of link which might be called oval.

Chain : H.z-1

No: of Links : 4

Length : 2.10 m

Weight : 52 kg

Median Length of Link : 60 cm

Median Weight : 13 kg

Longest Link : 65.5 cm

Shortest Link : 56 cm

Heaviest Link : 15.46 kg

Lightest Link : 10.88 kg

H.z1-1	H.z1-2	H.z1-3	H.z1-4
			
			

	Link Measurements			
Link	**H.z1-1**	**H.z1-2**	**H.z1-3**	**H.z1-4**
Length				
1-7	20.0 cm	21.0 cm	20.0 cm	21.5 cm
2-6	21.5 cm	21.0 cm	21.5 cm	22.0 cm
3-5	20.0 cm	21.0 cm	22.0 cm	21.5 cm
4-8	56.0 cm	58.0 cm	65.5 cm	60.0 cm
Thickness				
1a	4.3 cm	5.0 cm	2.7 cm	3.9 cm
1b	3.8 cm	4.8 cm	3.9 cm	4.2 cm
2a	4.2 cm	5.1 cm	3.9 cm	4.1 cm
2b	3.9 cm	5.3 cm	4.4 cm	4.2 cm
3a	4.0 cm	5.1 cm	4.5 cm	3.4 cm
3b	3.3 cm	5.3 cm	4.6 cm	3.7 cm
4a	3.4 cm	5.3 cm	5.8 cm	5.0 cm
4b	2.8 cm	4.9 cm	5.0 cm	5.0 cm
5a	4.0 cm	2.8 cm	4.5 cm	4.4 cm
5b	4.0 cm	4.1 cm	3.5 cm	4.7 cm
6a	3.9 cm	3.1 cm	5.0 cm	4.4 cm
6b	4.5 cm	2.6 cm	5.2 cm	4.4 cm
7a	4.8 cm	3.9 cm	5.0 cm	4.4 cm
7b	4.8 cm	4.9 cm	5.0 cm	4.9 cm
8a	4.3 cm	4.5 cm	3.8 cm	3.2 cm
8b	4.0 cm	4.5 cm	4.7 cm	4.1 cm
Weight	10.88 kg	13.00 kg	15.46 kg	12.66 kg

Chain : H.z-2
No: of Links : 8

Length : 3.65 m
Weight : --

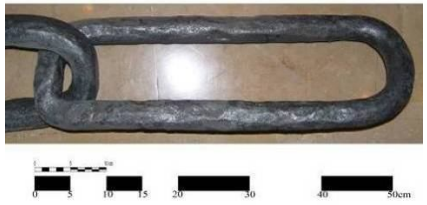
Median Length of Link : 50 cm
Median Weight : --

LinkLongest : 59.5 cm
Shortest Link : 44 cm

Heaviest Link : --
Shortest Link : --

H.z2-1	H.z2-2	H.z2-3	H.z2-4
			

4-8	49.0 cm	44.0 cm	59.5 cm	49.5 cm
2-6	21.0 cm	22.0 cm	23.0 cm	18.5 cm

H.z2-5	H.z2-6	H.z2-7	H.z2-8
			

4-8	44.5 cm	54.0 cm	47.0 cm	53.0 cm
2-6	20.0 cm	20.0 cm	18.5 cm	18.5 cm

Chain : H.z-3

No: of Link : 9

Length : 4.20 m

Weight : 121.55 kg

Median Length of Link : 54 cm

Mwedian Weight : 13.5 kg

Longest Link : 57.5 cm

Shortest Link: 50.5 cm

Heaviest Link : 15.55 kg

Lightest Link : 10.28 kg

H.z3-1	H.z3-2	H.z3-3	H.z3-4	H.z3-5
				
				

Length 4-8	57.5 cm	55.0 cm	53.0 cm	55.0 cm	51.0 cm
Weight	10.28 kg	12.93 kg	14.45 kg	12.64 kg	13.57 kg

H.z3-6	H.z3-7	H.z3-8	H.z3-9
			
			

Length 4-8	55.0 cm	55.0 cm	50.5 cm	55.0 cm
Weight	13.50 kg	15.55 kg	15.50 kg	13.13 kg

Chain : H.z-4
No:of Links : 10

Length : 4.22 m
Weight : --

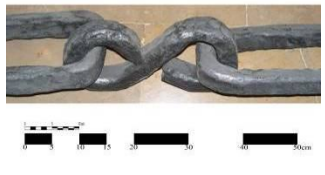
Median Length of Link : 50 cm
Median Weight : --

Longest Link : 58.0 cm
Shortest Link : 32.5 cm

Heaviest link : --
Lightest link : --

H.z4-1	H.z4-2	H.z4-3	H.z4-4	H.z4-5
				

4-8	41.5 cm	54.0 cm	52.0 cm	58.0 cm	52.0 cm
2-6	--	20.0 cm	18.0 cm	19.0 cm	18.5 cm

H.z4-6	H.z4-7	H.z4-8	H.z4-9	H.z4-10
				

4-8	32.5 cm	50.0 cm	50.0 cm	54.5 cm	51.5 cm
2-6	--	16.0 cm	17.0 cm	17.0 cm	17.0 cm

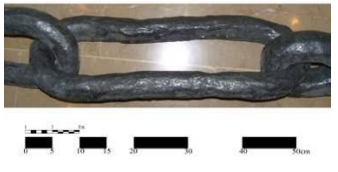
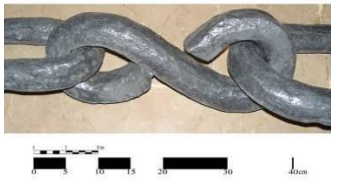
Chain : H.z-5
No: of Links : 19

Length : 7.36 m
Weight : --

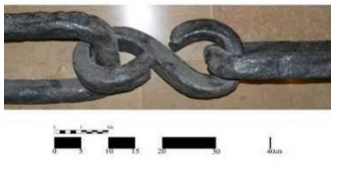
Median Length of Link : 45 cm
Median Weight : --

Longest Link : 56.0 cm
Shortest Link : 32.5 cm

Heaviest Link : --
Lightest Link : --

H.z5-1	H.z5-2	H.z5-3	H.z5-4	H.z5-5
				

4-8	54.5 cm	56.0 cm	50.0 cm	52.0 cm	39.0 cm
2-6	18.0 cm	18.0 cm	16.5 cm	16.5 cm	--

H.z5-6	H.z5-7	H.z5-8	H.z5-9	H.z5-10
				

4-8	46.5 cm	47.5 cm	48.0 cm	48.0 cm	32.5 cm
2-6	21.5 cm	16.5 cm	23.0 cm	20.0 cm	19.5 cm

H.z5-11	H.z5-12	H.z5-13	H.z5-14	H.z5-15
				

4-8	41.5 cm	54.0 cm	52.0 cm	58.0 cm	32.5 cm
2-6	--	20.0 cm	18.0 cm	19.0 cm	18.5 cm

H.z5-16	H.z5-17	H.z5-18	H.z5-19
			

4-8	52.0 cm	50.0 cm	50.0 cm	54.5 cm
2-6	--	16.0 cm	17.0 cm	17.0 cm

Chain : H.z-6

No: of Links : 19

Length : 8.18 m

Weight : --

Median Length of Link : 52.5 cm

Median Weight : --

Longest Link : 70 cm

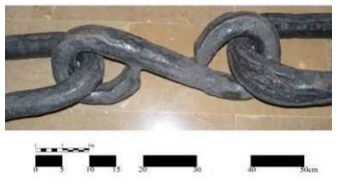
Shortest Link : 37.5 cm

Heaviest Link : --

Lightest Link : --

H.z6-1	H.z6-2	H.z6-3	H.z6-4	H.z6-5
				

4-8	49.0 cm	53.0 cm	70.0 cm	53.0 cm	57.5 cm

H.z6-6	H.z6-7	H.z6-8	H.z6-9	H.z6-10
				

4-8	52.0 cm	50.0 cm	53.5 cm	50.5 cm	42.5 cm

H.z6-11	H.z6-12	H.z6-13	H.z6-14	H.z6-15
				

4-8	59.0 cm	52.5 cm	51.0 cm	52.5 cm	37.5 cm

H.z6-16	H.z6-17	H.z6-18	H.z6-19
			

4-8	52.0 cm	55.0 cm	51.0 cm	54.5 cm

Chain : H.z-7
No: of Links : 29

Length : 12.50 m
Weight : --

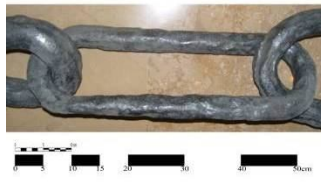
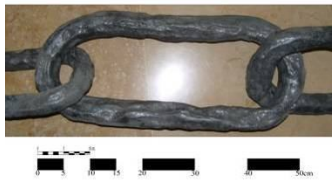
Median Length of Link : 51.5 cm
Median Weight : --

Longest Link : 58.0 cm
Shortest Link : 39.0 cm

Heaviest Link : --
Lightest Link : --

H.z7-1	H.z7-2	H.z7-3	H.z7-4	H.z7-5
				

4-8	50.5 cm	57.0 cm	51.0 cm	53.5 cm	54.0 cm

H.z7-6	H.z7-7	H.z7-8	H.z7-9	H.z7-10
				

4-8	51.5 cm	51.5 cm	53.0 cm	51.0 cm	39.5 cm

H.z7-11	H.z7-12	H.z7-13	H.z7-14	H.z7-15
				
4-8	50.5 cm	52.0 cm	52.0 cm	52.0 cm	58.0 cm

H.z7-16	H.z7-17	H.z7-18	H.z7-19	H.z7-20
				
4-8	53.0 cm	54.0 cm	51.0 cm	48.0 cm	39.0 cm

H.z7-21	H.z7-22	H.z7-23	H.z7-24	H.z7-25
				

4-8	56.0 cm	56.0 cm	52.0 cm	55.0 cm	53.5 cm

H.z7-26	H.z7-27	H.z7-28	H.z7-29
			

4-8	44.0 cm	51.0 cm	54.0 cm	51.5 cm

Church **:** H.z8

No:of Links **:** 4

Length **:** 1.97 m

Weight **:** 52 kg

Median Length of Link **:** 55 cm

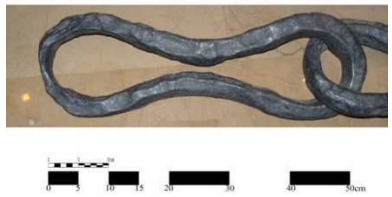
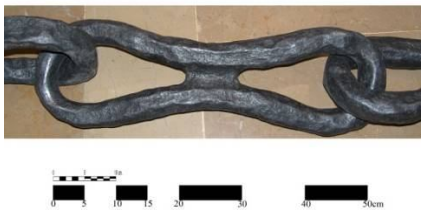
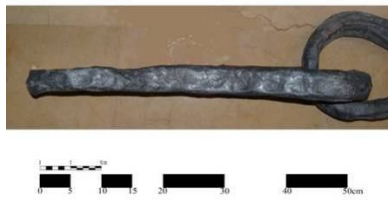
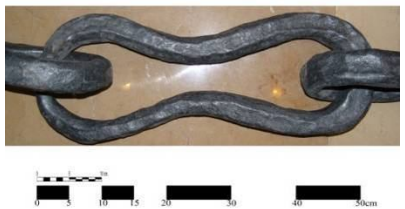
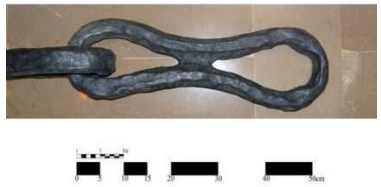
Median Weight **:** 13 kg

Longest Link : 56.5 cm

Shortest Link : 52.5 cm

Heaviest Link : 15.46 kg

Lightest Link : 10.88 kg

H.z8-1	H.z8-2	H.z8-3	H.z8-4
			
			

	Link Measurements			
Link	**H.z8-1**	**H.z8-2**	**H.z8-3**	**H.z8-4**
Length				
1-7	17.5 cm	20.5 cm	18.0 cm	17.5 cm
2-6	9.4 cm	12.0 cm	10.3 cm	10.5 cm
3-5	19.0 cm	19.0 cm	17.5 cm	18.0 cm
4-8	55.0 cm	52.5 cm	56.0 cm	56.5 cm
Thickness				
1a	3.5 cm	4.3 cm	4.1 cm	4.3 cm
1b	3.2 cm	4.6 cm	4.7 cm	4.8 cm
2a	4.3 cm	4.0 cm	---	---
2b	4.4 cm	4.7 cm	5.4 cm	5.4 cm
3a	4.2 cm	3.6 cm	4.0 cm	5.0 cm
3b	4.5 cm	4.5 cm	5.1 cm	4.4 cm
4a	3.9 cm	3.4 cm	4.0 cm	2.8 cm
4b	4.4 cm	3.9 cm	5.0 cm	5.2 cm
5a	3.6 cm	3.6 cm	4.5 cm	3.7 cm
5b	3.9 cm	4.7 cm	5.2 cm	5.1 cm
6a	4.0 cm	4.0 cm	---	---
6b	3.7 cm	4.2 cm	5.0 cm	5.2 cm
7a	3.7 cm	3.9 cm	4.3 cm	4.3 cm
7b	3.6 cm	3.6 cm	4.9 cm	4.9 cm
8a	1.9 cm	2.7 cm	3.5 cm	4.3 cm
8b	3.1 cm	3.6 cm	5.2 cm	5.1 cm
Weight	10.88 kg	13.00 kg	15.46 kg	12.66 kg

Chain : H.z9

No: of Links : 4

Length : 1.83 m

Weight : 49.5 kg

Median Length of Link : 52.5 cm

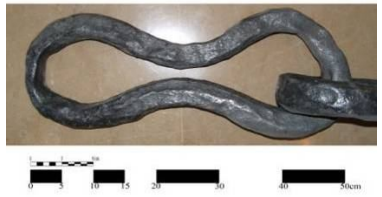
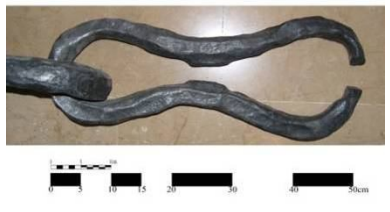
Median Weight : 12.35 kg

Longest Link : 54.0 cm

Shortest Link : 51.5 cm

Heaviest Link : 13.52 kg

Lightest Link : 10.84 kg

H.z9-1	H.z9-2	H.z9-3	H.z9-4
			
			

Length 4-8	52.0 cm	54.0 cm	51.5 cm	52.5 cm
Weight	12.31 kg	12.67 kg	13.52 kg	10.84 kg

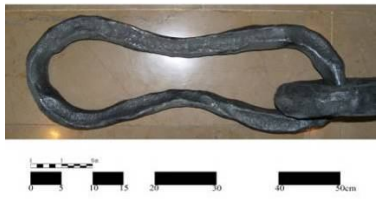
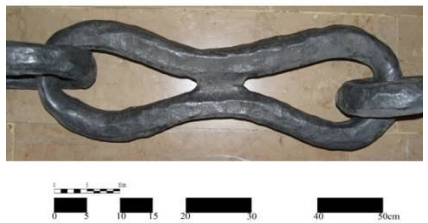
Chain : H.z10
Number of Links : 4

Length : 1.83 m
Weight : 46.40 kg

Median Length of Link : 51.5 cm
Median Weight : 11.6 kg

Longest Link : 55.5 cm
Shortest Link : 48.0 cm

Heaviest Link : 15.03 kg
Lightest Link : 8.66 kg

H.z10-1	H.z10-2	H.z10-3	H.z10-4
			
			

Length 4-8	51.5 cm	50.0 cm	55.5 cm	48.0 cm
Weight	8.66 kg	10.95 kg	15.03 kg	11.75 kg

Chain **:** H.z11
No: of Links : 4

Length **:** 1.88 m
Weight **:** 53.65 kg

Median Length of Link **:** cm
Median Weight **:** 13.40 kg

Longest Link : 57.0 cm
Shortest Link : 49.5 cm

Heaviest Link : 15.57 kg
Lightest Link : 11.75 kg

H.z11-1	H.z11-2	H.z11-3	H.z11-4
			
			

Length 4-8	56.0 cm	49.5 cm	57.0 cm	52.5 cm
Weight	11.95 kg	11.75 kg	14.36 kg	15.57 kg

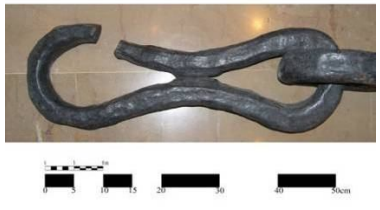
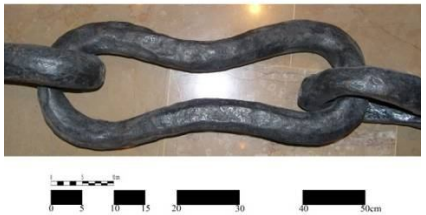
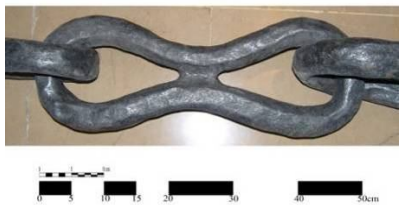
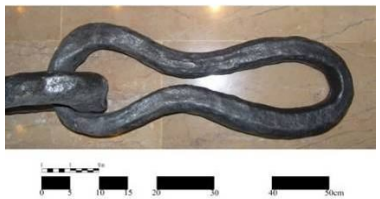
Chain : H.z12
No: of Links : 4

Length : 1.78 m
Weight : 59.50 kg

Median Length of Link : 53.0 cm
Median Weight : 14.90 kg

Longest Link : 54.5 cm
Shortest Link : 53.0 cm

Heaviest Link : 16.13 kg
Lightest Link : 13.17 kg

H.z12-1	H.z12-2	H.z12-3	H.z12-4
			
			

Length 4-8	54.5 cm	51.0 cm	52.5 cm	53.0 cm
Weight	13.17 kg	15.13 kg	16.13 kg	15.03 kg

Chain : H.z13

No: of links : 4

Length : 1.78 m

Weight : 44.85 kg

Median Length of Link : 50.0 cm

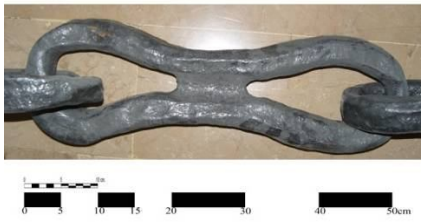
Median Weight : 11.2 kg

Longest Link : 52.0 cm

Shortest Link : 48.5 cm

Heaviest Link : 12.74 kg

Lightest Link : 10.10 kg

H.z13-1	H.z13-2	H.z1-3	H.z13-4
			
			

Length 4-8	48.5 cm	50.5 cm	52.0 cm	49.5 cm
Weight	10.09 kg	10.91 kg	12.74 kg	11.08 kg

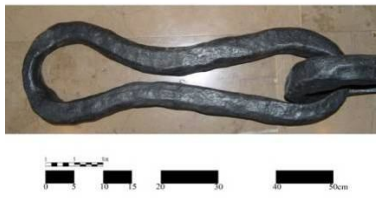
Chain **:** H.z14
No: of Links **:** 4

Length **:** 1.84 m
Weight **:** 45.15 kg

Median Length of Link **:** 53.0 cm
Median Weight **:** 11.3 kg

Longest Link: 57.0 cm
Shortest Link: 50.5 cm

Heaviest Link **:** 12.63 kg
Lightest Link : 8.43 kg

H.z14-1	H.z14-2	H.z14-3	H.z14-4
			
			

Length 4-8	57.0 cm	50.5 cm	52.5 cm	51.0 cm
Weight	12.63 kg	12.25 kg	11.82 kg	8.43 kg

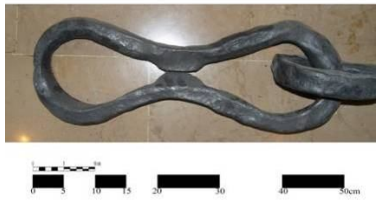
Chain **:** H.z15
No: of Links : 4

Length **:** 1.92 m
Weight **:** 33.5 kg

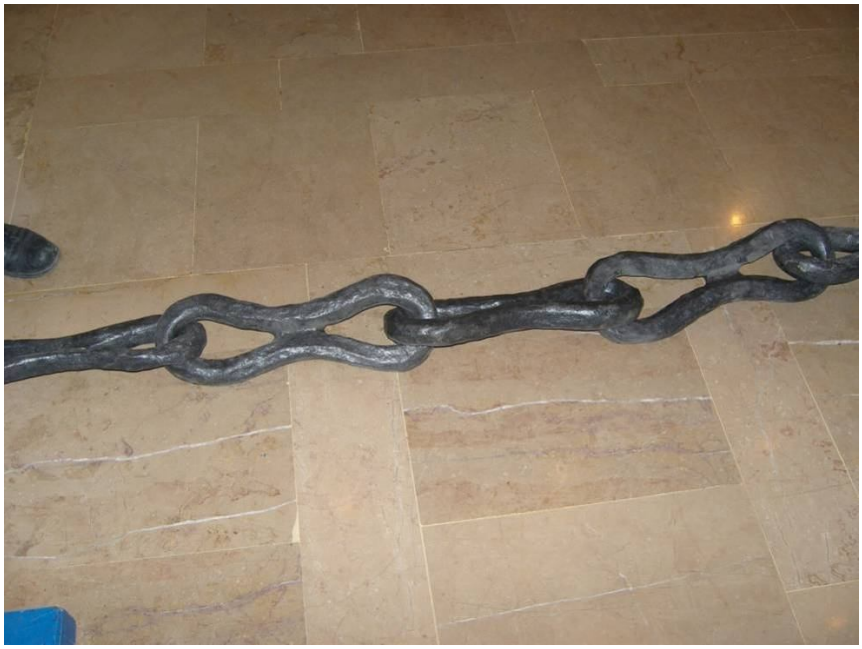
Median Length of Link **:** 53.5 cm
Median Weight **:** 8.40 kg

Longest Link : 59.5 cm
Shortest Link : 50.0 cm

Heaviest Link : 9.00 kg
Lightest Link : 6.88 kg

H.z15-1	H.z15-2	H.z15-3	H.z15-4
			
			

Length 4-8	50.0 cm	59.5 cm	51.0 cm	53.0 cm
Weight	9.00 kg	8.92 kg	8.70 kg	6.88 kg



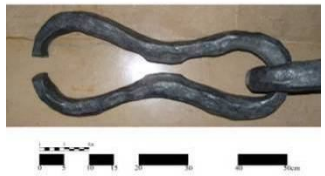
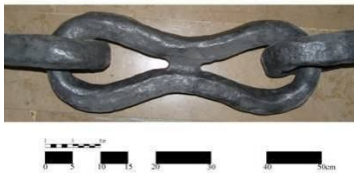
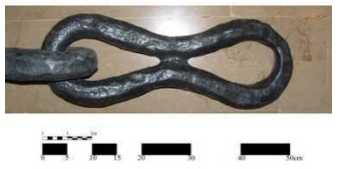
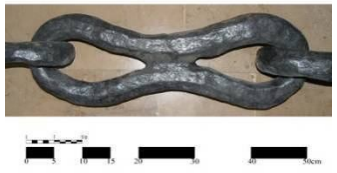
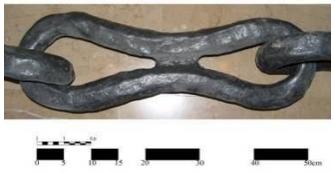
Chain : H.z16
No: of Links : 5

Length : 2.20 m
Weight : 72.87 kg

Median Length of Link : 52 cm
Median Weight : 14.5 kg

Longest Link : 55.0 cm
Shortest Link : 59.5 cm

Heaviest Link : 17.27 kg
Lightest Link : 10.85 kg

H.z16-1	H.z16-2	H.z16-3	H.z16-4	H.z16-5
				
				

Length	52.5 cm	51.5 cm	49.5 cm	55.0 cm	50.5 cm
Weight	10.85 kg	16.43 kg	14.30 kg	17.27 kg	14.02 kg

Chain : H.z17

No: of Links : 5

Length : 2.37 m

Weight : 64.44 kg

Median Length of Link : 54 cm

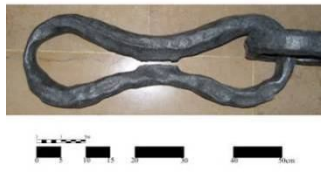
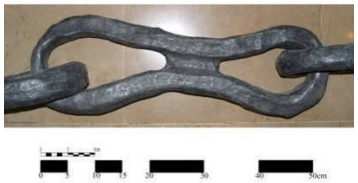
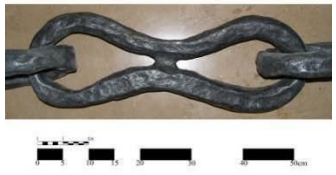
Median Weight : 13 kg

Longest Link : 55.0 cm

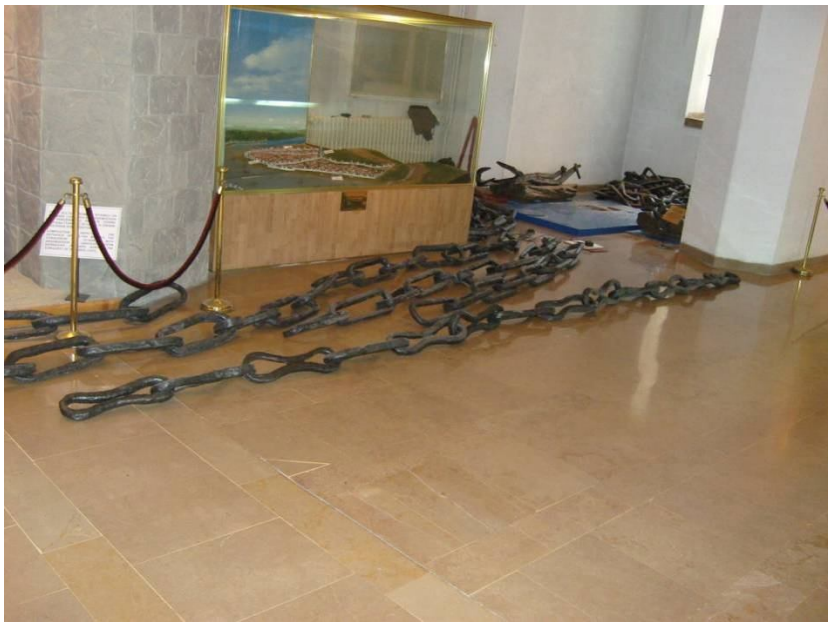
Shortest Link : 51.5 cm

Heaviest Link : 14.19 kg

Lightest Link : 11.23 kg

H.z17-1	H.z17-2	H.z17-3	H.z17-4	H.z1-5
				
				

Length 4-8	55.0 cm	55.0 cm	54.5 cm	51.5 cm	55.0 cm
Weight	12.75 kg	14.19 kg	13.24 kg	13.03 kg	11.23 kg



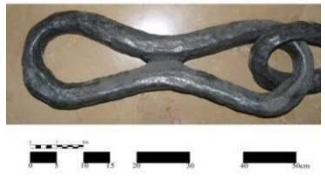
Chain : H.z18
No: of Links : 13

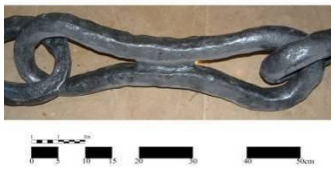
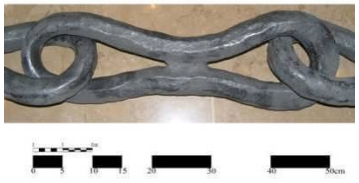
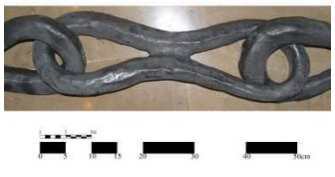
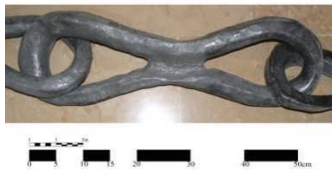
Length : 5.90 m
Weight : --

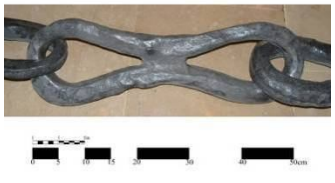
Median Length of Link : 54 cm
Median Weight : --

Longest Link : 58 cm
Shortest Link : 51 cm

Heaviest Link : --
Lightest Link : --

H.z18-1	H.z18-2	H.z18-3	H.z18-4	H.z18-5
				

H.z18-6	H.z18-7	H.z18-8	H.z18-9	H.z18-10
				

H.z18-11	H.z18-12	H.z18-13
		

	Link Measurements			
Link	**H.z18-1**	**H.z18-2**	**H.z18-3**	**H.z18-4**
Length				
4-8	55.0 cm	53.5 cm	56.5 cm	52.0 cm
2-6	9.4 cm	9.8 cm	10.1 cm	9.5 cm

Link	**H.z18-5**	**H.z18-6**	**H.z18-7**	**H.z18-8**
Length				
4-8	53.5 cm	53.0 cm	58.0 cm	54.0 cm
2-6	10.6 cm	11.9 cm	9.3 cm	10.0 cm

Link	**H.z18-9**	**H.z18-10**	**H.z18-11**	**H.z18-12**	**H.z18-13**
Length					
4-8	54.0 cm	56.0 cm	53.0 cm	53.5 cm	51.0 cm
2-6	9.5 cm	8.3 cm	8.4 cm	9.7 cm	10.0 cm

Chain : H.z19

No: of Links : 15

Length : 6.64 m

Weight : 225 kg

Median Length of Link : 52.5 cm

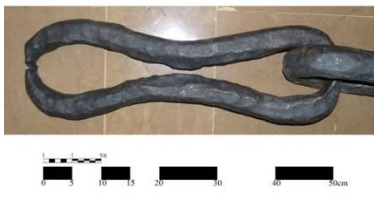
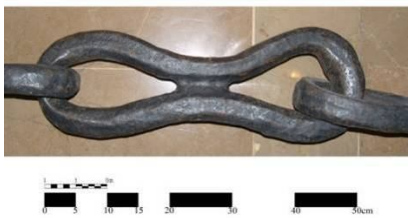
Median Weight : 15 kg

Longest Link : 55.5 cm

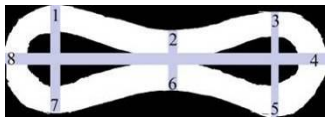
Shortest Link : 46.0 cm

Heaviest Link : 16.67 kg

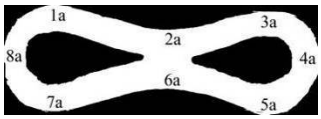
Lightest Link : 12.95 kg

H.z19-1	H.z19-2	H.z19-3
		
		

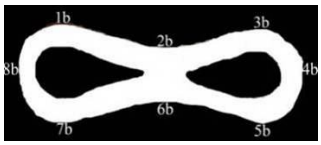
	Link Measurements		
Link	**H.z19-1**	**H.z19-2**	**H.z19-3**
Length			
1-7	17.0 cm	17.0 cm	16.5 cm
2-6	10.4 cm	9.9 cm	10.2 cm
3-5	16.5 cm	18.5 cm	17.0 cm
4-8	54.5 cm	52.5 cm	55.0 cm
Thickness			
1a	4.3 cm	4.6 cm	4.2 cm
1b	4.3 cm	4.7 cm	4.3 cm
2a	--	--	4.0 cm (aşınma)
2b	4.8 cm	4.7 cm	4.4 cm
3a	4.1-4.6 cm	4.1 cm	4.2 cm
3b	4.4 cm	4.7 cm	4.3 cm
4a	2.9 cm	5.0 cm	3.3 cm
4b	4.4 cm	5.6 cm	4.9 cm
5a	4.4 cm	4.9 cm	4.5 cm
5b	4.3 cm	4.9 cm	4.8 cm
6a	--	--	4.9 cm (aşınma)
6b	3.7 cm	5.3 cm	4.0 cm
7a	4.5 cm	4.6 cm	4.9 cm
7b	4.0 cm	4.7 cm	4.9 cm
8a	2.0 cm	3.8 cm	3.8 cm
8b	3.0 cm	5.1 cm	5.2 cm
Weight	12.95 kg	16.05 kg	15.10 kg

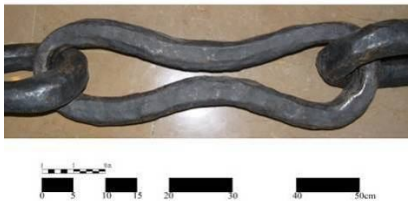
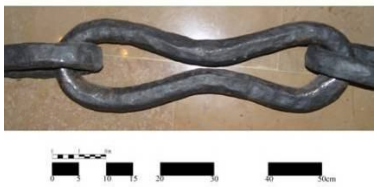


Surface Thickness

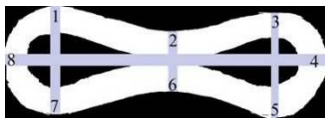


Lateral Thickness

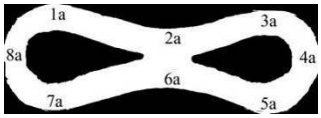


H.z19-4	H.z19-5	H.z19-6
		
		

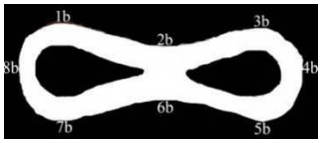
	Link Measurements		
Link	**H.z19-4**	**H.z19-5**	**H.z19-6**
Length			
1-7	17.5 cm	16.5 cm	18.0 cm
2-6	10.2 cm	10.2 cm	13.6 cm
3-5	17.0 cm	17.1 cm	19.0 cm
4-8	55.5 cm	55.0 cm	54.0 cm
Thickness			
1a	4.2 cm	4.4 cm	4.7 cm
1b	4.7 cm	4.4 cm	4.8 cm
2a	4.7 cm (worn)	4.7 cm (worn)	5.3 cm
2b	5.0 cm	4.6 cm	5.1 cm
3a	3.9 cm	3.3-4.1 cm	5.4 cm
3b	4.7 cm	4.1 cm	5.3 cm
4a	4.6 cm	3.8 cm	4.1 cm
4b	5.1 cm	4.6 cm	5.1 cm
5a	4.7 cm	4.4 cm	4.5 cm
5b	4.2 cm	4.5 cm	5.1 cm
6a	4.5 cm (worn)	4.6 cm (worn)	5.0 cm
6b	4.8 cm	4.6 cm	5.1 cm
7a	4.8 cm	4.8 cm	4.4 cm
7b	4.8 cm	4.8 cm	5.5 cm
8a	4.0 cm	3.0 cm	4.4 cm
8b	5.1 cm	4.2 cm	5.2 cm
Ağırlık	15.37 kg	14.05 kg	16.67 kg

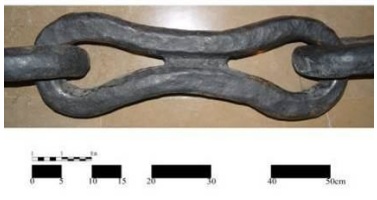
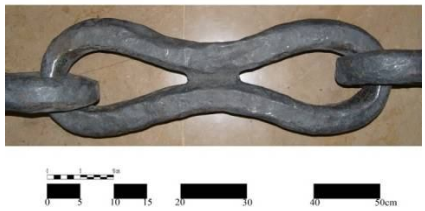
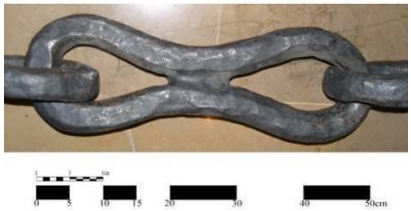


Surface Thickness

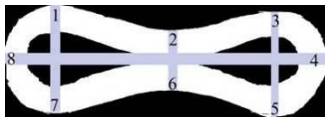


Lateral Thickness

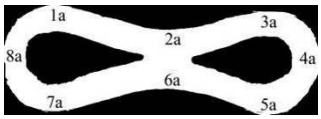


H.z19-7	H.z19-8	H.z19-9
		
		

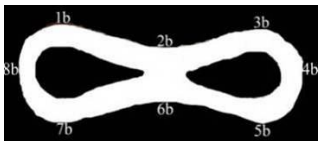
	Link Measurements		
Link	**H.z19-7**	**H.z19-8**	**H.z19-9**
Length			
1-7	17.5 cm	16.5 cm	17.5 cm
2-6	10.2 cm	10.2 cm	10.5 cm
3-5	17.0 cm	17.0 cm	17.0 cm
4-8	53.0 cm	51.5 cm	52.5 cm
Thickness			
1a	4.8 cm	4.7 cm	5.1 cm
1b	4.2 cm	5.0 cm	4.6 cm
2a	--	--	--
2b	4.5 cm	5.0 cm	4.0 cm
3a	4.5 cm	4.8 cm	4.9 cm
3b	4.2 cm	4.7 cm	5.2 cm
4a	4.1 cm	4.0 cm	3.4 cm
4b	4.9 cm	4.3 cm	4.9 cm
5a	4.9 cm	5.3 cm	4.4 cm
5b	4.9 cm	5.2 cm	4.4 cm
6a	--	--	--
6b	4.4 cm	5.0 cm	4.7 cm
7a	4.4 cm	4.6 cm	4.4 cm
7b	4.8 cm	4.7 cm	4.3 cm
8a	4.6 cm	4.7 cm	3.5 cm
8b	4.9 cm	4.8 cm	4.6 cm
Weight	15.24 kg	15.62 kg	15.05 kg

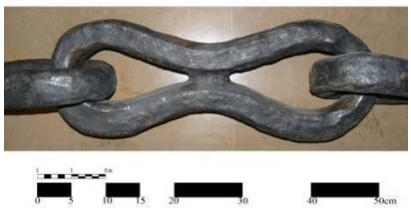
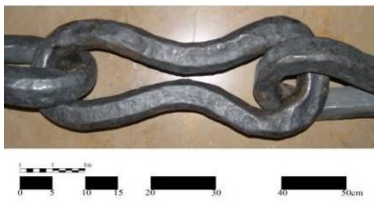
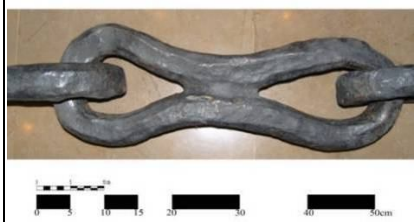


Surface Thickness

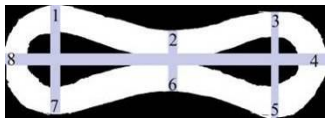


Side Thickness

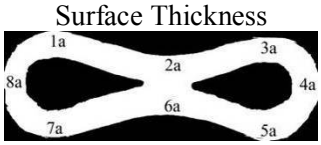


H.z19-10	H.z19-11	H.z19-12
		
		

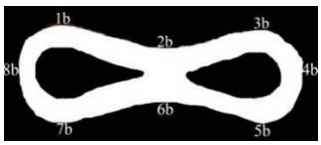
	Link Measurements		
Link	**H.z19-10**	**H.z19-11**	**H.z19-12**
Length			
1-7	16.5 cm	16.5 cm	17.5 cm
2-6	10.1 cm	10.0 cm	10.2 cm
3-5	18.0 cm	17.5 cm	16.5 cm
4-8	46.0 cm	48.0 cm	52.0 cm
Thickness			
1a	4.5 cm	4.5 cm	45 cm
1b	4.8 cm	4.3 cm	44 cm
2a	4.7 cm (worn)	--	--
2b	4.9 cm	4.4 cm	4.0 cm
3a	4.9 cm	4.5 cm	4.7 cm
3b	5.1 cm	4.7 cm	4.8 cm
4a	4.7 cm	4.2 cm	4.4 cm
4b	5.0 cm	4.5 cm	4.7 cm
5a	4.0 cm	4.7 cm	4.4 cm
5b	5.0 cm	4.4 cm	5.0 cm
6a	4.7 cm (worn)	--	--
6b	4.7 cm	4.6 cm	5.4 cm
7a	4.8 cm	5.3 cm	4.4 cm
7b	4.8 cm	4.9 cm	4.8 cm
8a	3.5 cm	3.9 cm	4.5 cm
8b	4.4 cm	5.1 cm	4.7 cm
Weight	13.67 kg	13.87 kg	15.35 kg

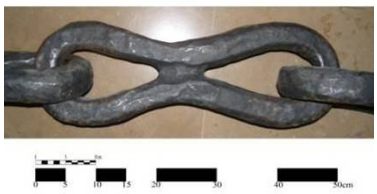
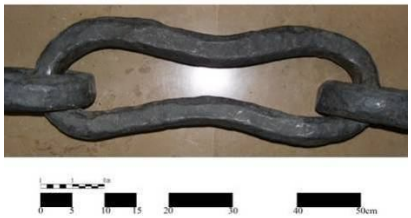


Surface Thickness

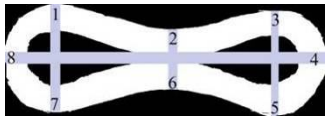


Lateral Thickness

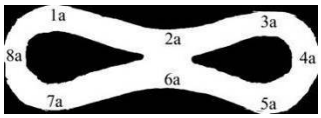


H.z19-13	H.z19-14	H.z19-15
		
		

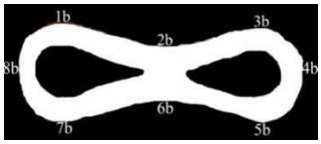
	Link Measurements		
Link	**H.z19-13**	**H.z19-14**	**H.z19-15**
Length			
1-7	16.5 cm	18.0 cm	16.5 cm
2-6	9.9 cm	13.6 cm	10.2 cm
3-5	17.5 cm	18.0 cm	16.5 cm
4-8	50.5 cm	54.0 cm	53.0 cm
Thickness			
1a	5.0 cm	4.6 cm	4.5 cm
1b	4.0 cm	4.8 cm	5.0 cm
2a	--	4.7 cm	--
2b	3.7 cm	5.3 cm	5.5 cm
3a	5.0 cm	5.1 cm	4.3 cm
3b	4.8 cm	4.8 cm	4.5 cm
4a	4.4 cm	3.7 cm	3.0 cm
4b	5.2 cm	4.5 cm	5.0 cm
5a	5.1 cm	4.0 cm	5.0 cm
5b	4.6 cm	4.9 cm	5.3 cm
6a	--	4.2 cm	--
6b	4.3 cm	5.0 cm	5.2 cm
7a	4.5 cm	4.0 cm	4.9 cm
7b	4.5 cm	5.0 cm	5.0 cm
8a	4.5 cm	3.9 cm	4.0 cm
8b	4.8 cm	5.0 cm	5.0 cm
Weight	14.63 kg	14.79 kg	16.25 kg



Surfaickness



Lateral Thickness



Chain : H.z20

No: of Links : 19

Length : 8.10 m

Weight : --

Median Length of Link : 51.5 cm

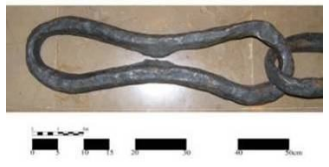
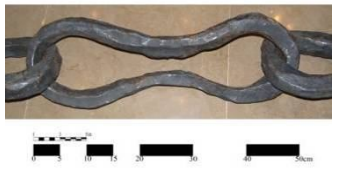
Median Weight : --

Longest Link : 56.0 cm

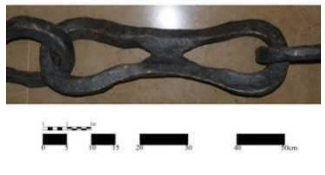
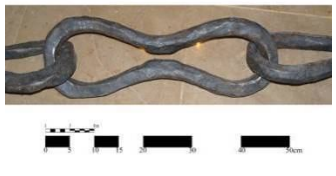
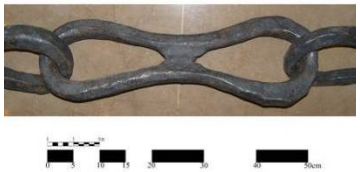
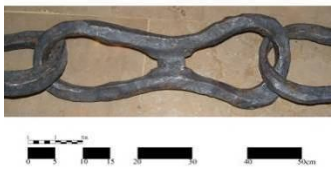
Shortest Link : 47.0 (Link) 24.0 cm (Ring)

Heaviest Link : --

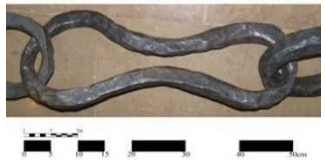
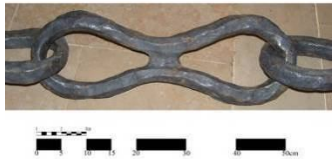
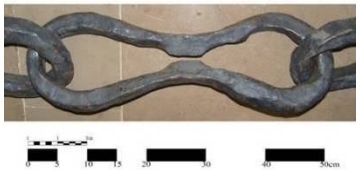
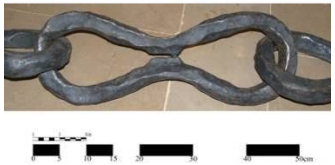
Lightest Link : --

H.z20-1	H.z20-2	H.z20-3-4	H.z20-5	H.z20-6
				

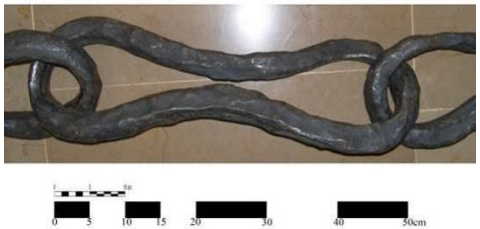
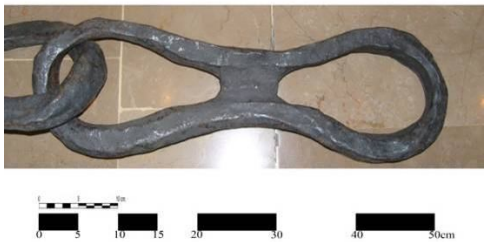
4-8	52.5 cm	50.5 cm	25.0 cm – 22.5 cm	53.0 cm	51.5 cm
2-6	9.4 cm	9.1 cm	25.0 cm - 24.0 cm	10.1 cm	9.7 cm

H.z20-7	H.z20-8	H.z20-9	H.z20-10	H.z20-11
				

4-8	51.0 cm	48.5 cm	53.5 cm	47.0 cm	53.0 cm
2-6	10.1 cm	8.6 cm	9.4 cm	9.7 cm	9.6 cm

H.z20-12	H.z20-13	H.z20-14	H.z20-15	H.z20-16
				

4-8	51.5 cm	53.0 cm	51.5 cm	49.5 cm	51.5 cm
2-6	8.6 cm	8.9 cm	8.2 cm	8.0 cm	8.8 cm

H.z20-17	H.z20-18	H.z20-19
		

4-8	52.5 cm	50.5 cm	25.0 cm – 22.5 cm
2-6	9.4 cm	9.1 cm	25.0 cm - 24.0 cm

Chain : H.z21

No: of Links : 57

Length : Approximately 27 metres

Weight : --

Median Length of Link : --

Median Weight : --

Longest Link : --

Shortest Link : --

Heaviest Link : --

Lightest Link : --

H.z21-1	H.z21-2	H.z21-3	H.z21-4	H.z21-5	H.z21-6
					

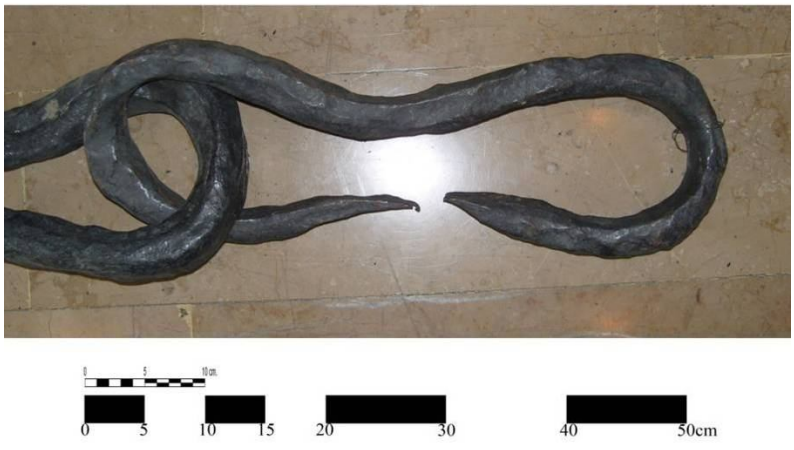
H.z21-7	H.z21-8	H.z21-9	H.z21-10	H.z21-11	H.z21-12
					

H.b1			
			
4-8	55.0 cm	**4a**	4.2 cm
1-7	18.5 cm	**4b**	5.3 cm
2.6	17.0 cm	**8a**	4.3 cm
3-5	17.5 cm	**8b**	4.8 cm
14.53 kg			

H.b2			
			
4-8	51.5 cm	**4a**	4.6 cm
1-7	16.0 cm	**4b**	5.2 cm
2.6	18.5 cm	**8a**	4.0 cm
3-5	16.5 cm	**8b**	5.2 cm
14.53 kg			

H.b3

68.5 cm
12.25 kg

H.b4

54.0 cm
13.76 kg

H.z-Cramp Iron

Length between Cramp and Ring: 2.65 m ve 2.70 m

Greatest Width of Cramp: 58.0 cm

At Joint: 10.7 cm

Largest Ring: 12.6 cm

Smallest Ring: 11.8 cm

Surface Thicknesses from Ring to Cramp : 6.2 cm - 6.9 cm – 7.9 cm

Lateral Thicknesses from Ring to Cramp: 5.6 cm - 5.8 cm – 6.3 cm

Inspection Results: Chains from Military Museum

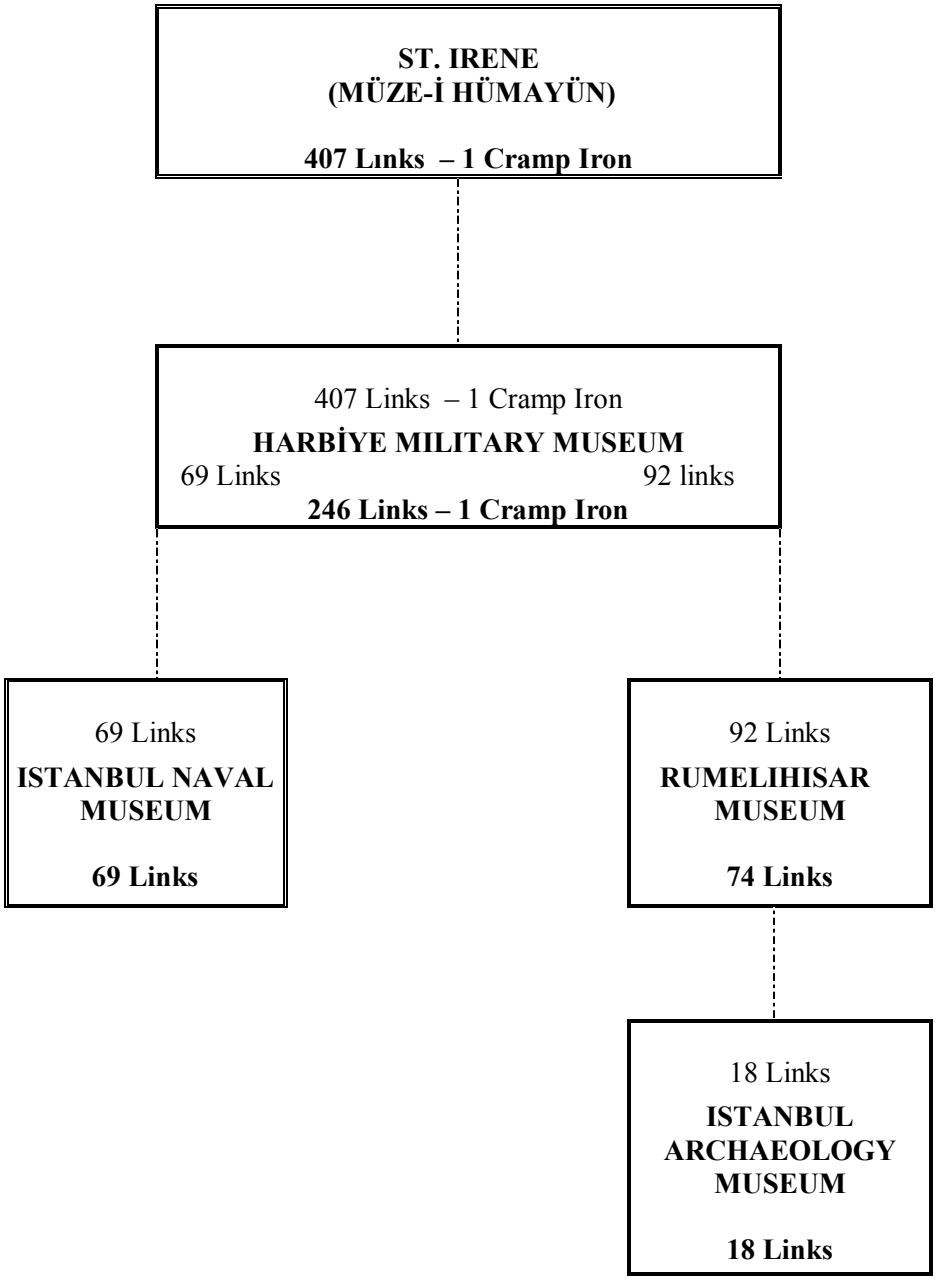
- The chains are made of wrought iron. Hammer marks were observed on the surface.
- No monogram or marks were observed on the links.

  Seven types of link were seen. The first type is joined in the cntre and is morticed (Sketch 2) The second type is open-centered (Sketch 3). The third type has wide, completely open centres. (Sketch 5). The fourth type is oval and is seen at regular intervals; the ends of these links are not morticed to the links (Sketch 6). The fifth type is "B" shaped and is seen in one link only (Sketch 7). The sixth type is similar to the fourth but as one corner of it is straight it resembles a cartridge or shell. (Sketch 8). The seventh type looks like an "S" and is seen at regular intervals among the oval links (Ç 9). H.b3 is "S" shaped whereas H.b4 is of type 2; however, both of these links have a different appearance and seem to have been made for different purposes.
- As can be seen in the 47- link chain from Rumeli Hisar, link R.z-1 at the end of the chain is of a different type from Link Hz-21 at the end of the 57- link chain from The Military Museum. This type of link is found in the chains with rounded links. (Sketch 6).
- A large cramp iron is to be seen among the chains. A reverse pincers mechanism H.ç, closes the ends of the links if they should open (Sketch 10). Reverse pincers also functioned as a means of attaching the the "S" form of link to the chain.
- It was observed that the morticed links follow a particular order along the chain. An open-centered link is followed by seven morticed links, followed by an open centered link and then another seven morticed links, an order which continues throughout the chain. While on circular chains consisting of eight links the same order is followed, on other circular chains 4 links of this type are followed by an "S" shaped link or are joined at the end by a link in the form of a figure of eight. This order is repeated on circular chains: "S" and "8" shaped links follow four rounded links on circular chains but the ends of these are not joined to the body..
- The total length of the chains is approximately 115 metres.

Conclusion

The results of this inspection give us the following information:

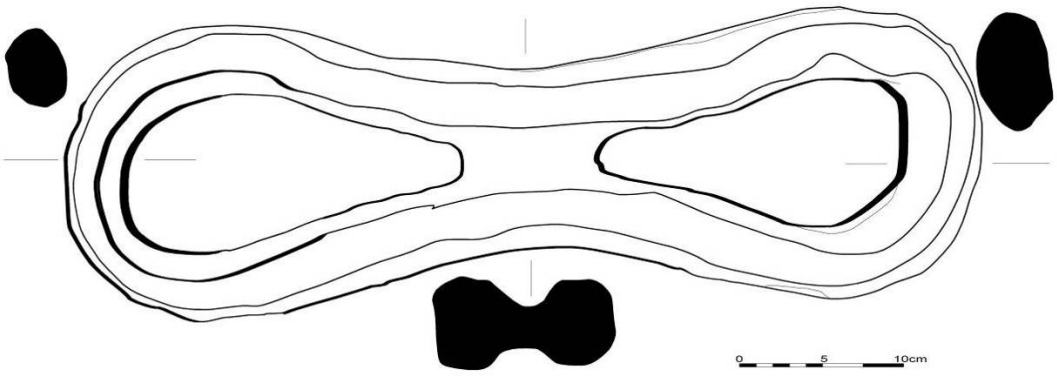
Spread Sheet



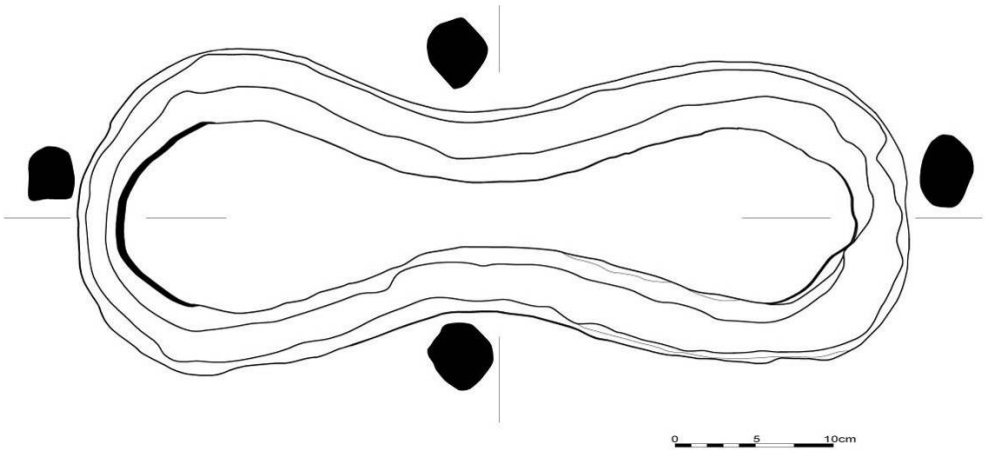
Data on Length and Number

Chains	Links	Cramp Iron
H.z1 : 2.10 m	**H.b1 :** 55.0 cm	**H.ç:** 2.70 m
H.z2 : 3.65 m	**H.b2 :** 51.5 cm	
H.z3 : 4.20 m	**H.b3 :** 68.5 cm	
H.z4 : 4.22 m	**H.b4 :** 54.0 cm	
H.z5 : 7.36 m		
H.z6 : 8.18 m		
H.z7 : 12.50 m		
H.z8 : 1.97 m		
H.z9 : 1.83 m		
H.z10 : 1.83 m		
H.z11 : 1.88 m		
H.z12 : 1.78 m		
H.z13 : 1.78 m		
H.z14 : 1.84 m		
H.z15 : 1.92 m		
H.z16 : 2.20 m		
H.z17 : 2.37 m		
H.z18 : 5.90 m		
H.z19 : 6.64 m		
H.z20 : 8.10 m		
H.z21 : 27.00 m (Approximately)		
D.z1 : 14.32 m		
D.z2 : 10.40 m		
D.z3 : 8.50 m		
R.z1 : 20.90 m		
R.z2 : 10.72 m		
R.z3 : 1.84 m		
A.z1 : 8.21 m		

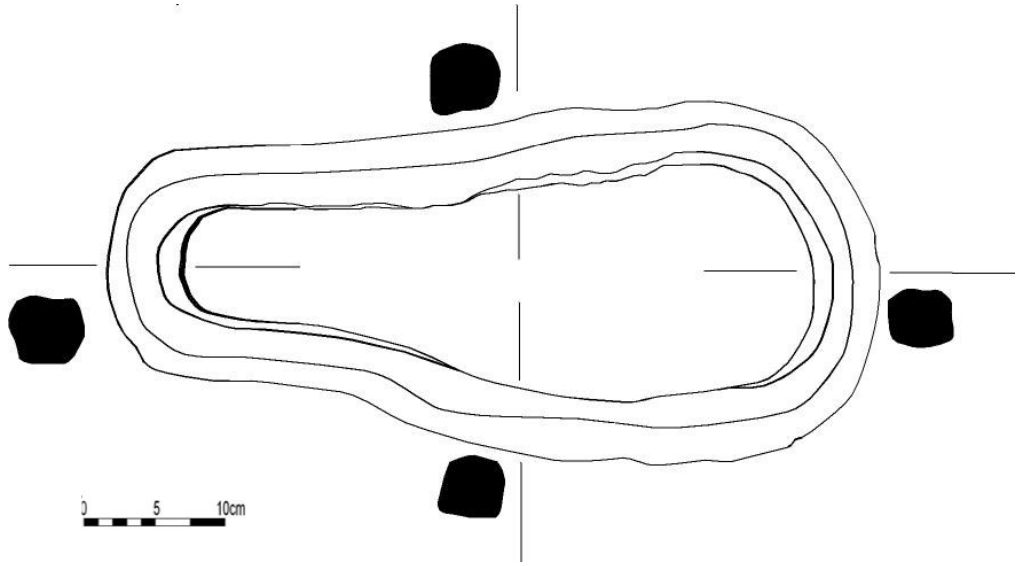
Link Formation



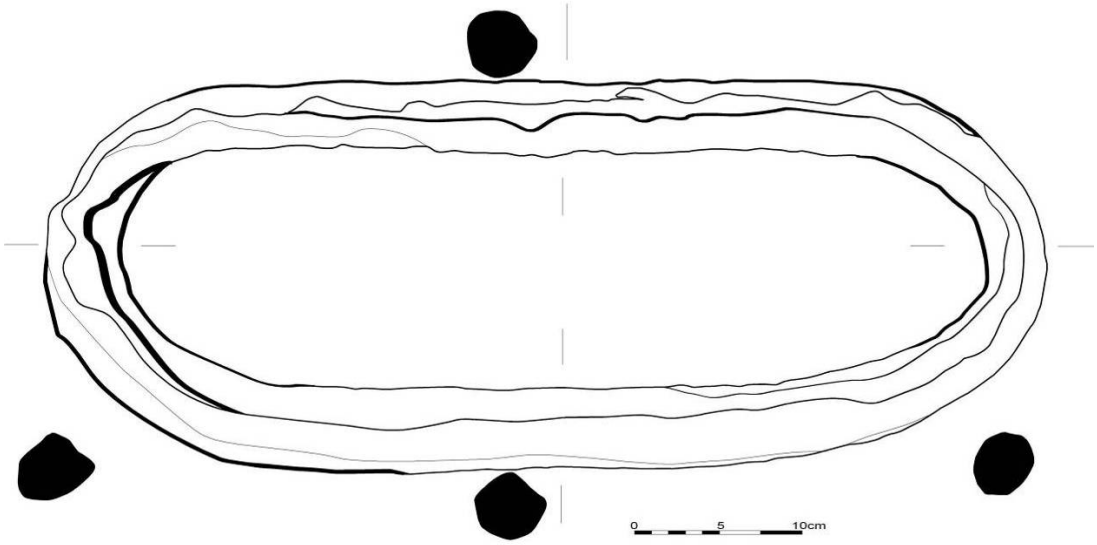
Sketch 2: *Mortized Link*



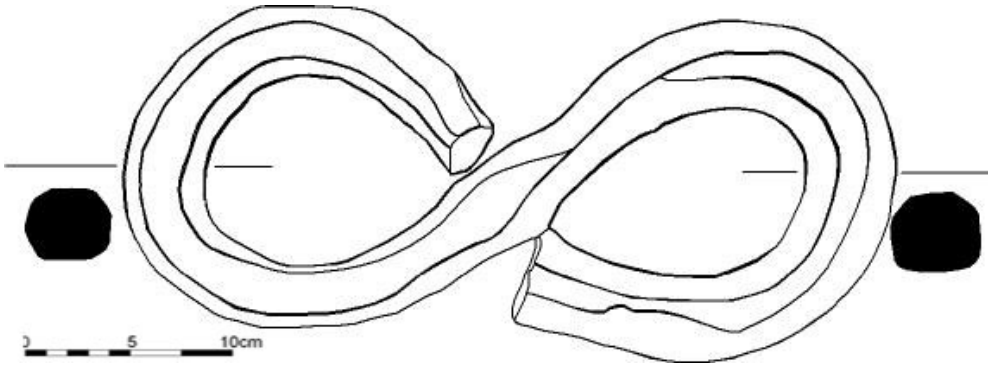
Sketch 3: *Compressed-side, Open- centered Link*



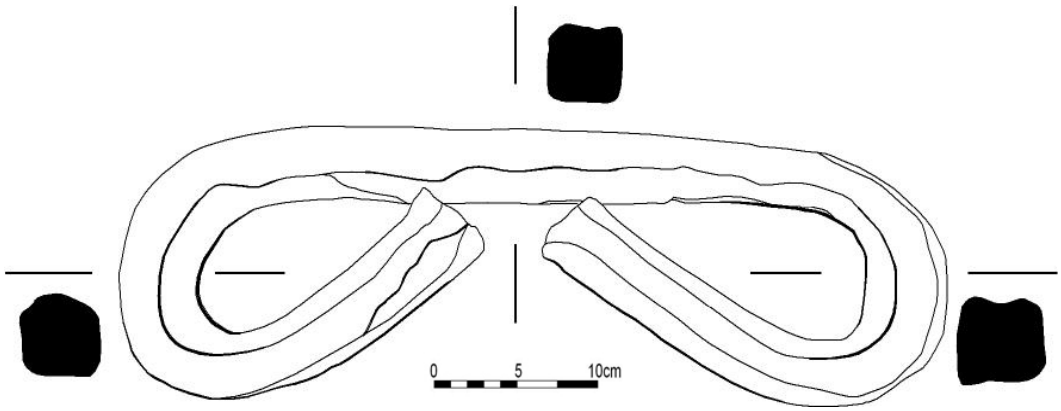
Sketch 4: *Tapering Open- Centered Link (R.z1-1)*



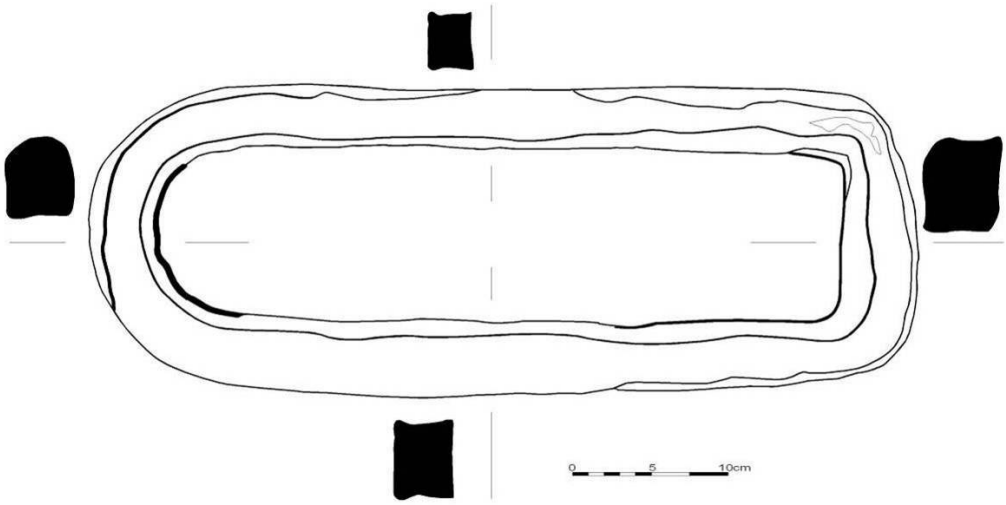
Sketch 5: *Oval Link*



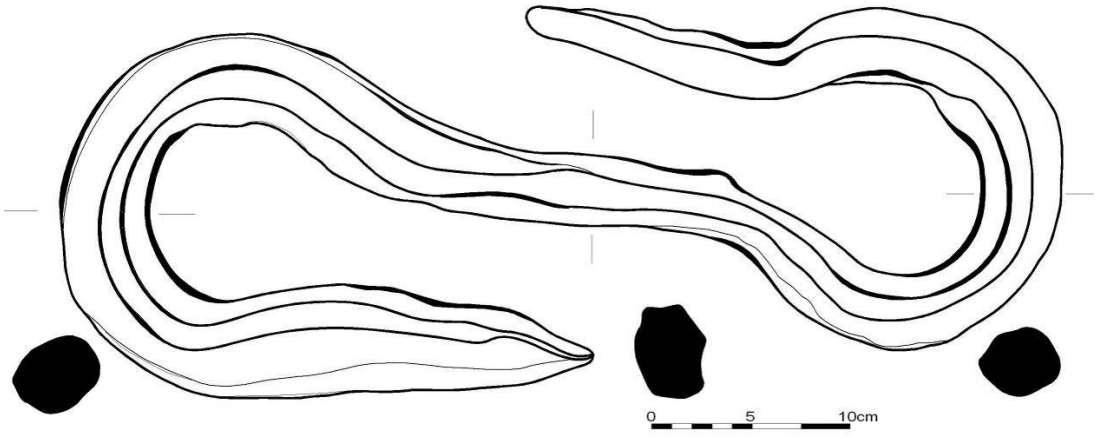
Sketch 6: *Open-ended Figure of Eight Link*



Sketch 7: *"B" Type Link*



Sketch 8: *Marble- morticed type of link, one end squared, one end rounded*



Sketch 9: "*S" shaped link*

Technique

The iron link was hammered ino the shape of a figure of eight and the ends of each joined by welding together one on top of the other horizontally

Photograph 69: *Morticed Link*

Photograph 70: *Upper view*

Photograph 71: *Morticed Link Joint*

Photograph72: *Rounded Link*

Photograph 73: *Upper view*

Photograph 74: *Join on Rounded Link*

On certain links a mistake in the hammering process leading to a physical difference in the homogeny of the iron can be seen

Photograph 75: *Physical difference in a morticed link*

Photograph 76: *Physical difference in a rounded link*

Photograph 77: *Physical Separation in a morticed link*

For the links to be morticed, the mould was pinched towards the centre space and the link forged by pouring the molten iron into the mould. The nearness of the links to standard size width shows that a mould may have been used during the forging process.

Photograph 78: *Separation seen in the morticed area*

"S" Shaped Links

In the chains this type of link can be seen between rounded ones.

Photograph 79: *"S" Type link as used in a chain*

These pieces are similar to morticed links Two examples may be examined.

"S" **Morticed**

Morticed **"S"**

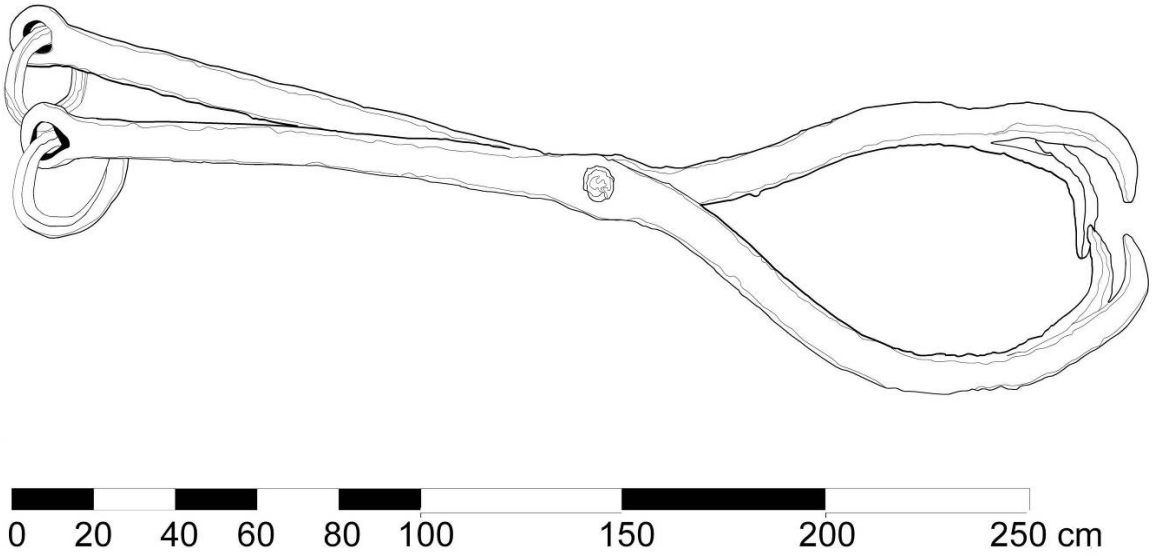
Open centered **"S"**

"S" **Open- centered**

The links seen as forms "S" and "8"were used in the chain to follow four rounded links. That is, though the ends of these links were not joined to the body, they were used to carry something or to be easily hooked on to somewhere. It may also be thought that they were given this shape to make the chain easier to break in the case of an emergency exit.

Photograph 80: *Short "S" Link*

Reverse Pincers



Sketch 10: *Cramp Iron (Reverse Pincers) exhibited at the side of the chain in the Military Museum*

Known as a cramp iron and thought to have been used to fix the chain to the tower, reverse pincers may be part of a winch system. In the 13th chapter of his book, Vitruvius mentions two types of winch. The first winch was developed for use in construction and transport. The second was more suitable for use on the dockside as it was very mobile and capable of revolving easily. A need was felt for trained and skilful people to work these winches successfully. The most important proof of the existence of these winches is Polybius' description of the siege of Syracuse by the Romans in 212 B.C.E. There he descibes two methods whereby the winches devised by Archimedes were used as weapons of war. One was made to throw heavy stones or lead weights at approaching ships and used in castles on the shore. Polybius tells us that another place where they were used was as a deterrent against the approach to the shore of ships equipped with protective shields against arrows. The stone cannonballs forced the soldiers who were on the foredeck about to land to retreat and then a many hooked iron lever was dangled from a chain. The man working the winch would try to hook this onto the prow of the ship. If successful, the other end of the arm of the winch inside the tower would be drawn or pushed downwards. Polybius says that when the thick end of the winch lever was let down the bow of the ship left the water and opened a way for it to stay upright on its stern. Later the mechanism used in the winch became fixed and immovable and with the help of various moving parts the chains were undone. Then the ship would capsize or roll sideways or fill with water. When the soldiers trying to land were forced to retreat from the bows, the ship would first incline towards the stern and then the bows would be raised sifficiently to ensure that water washing over the stern filled the ship. Hydrostac laws meant that there was no need to raise the winch very high to achieve this result. Finally the ship would stand upright on its stern but most of the crew would slip off or jump into the water so that when the bow was a metre or so above the water the wooden hull would find a balance. Then the winch raised the ship higher, before the lever and chains were suddenly released. This would cause the hull to hit the water so violently that even if it righted itself later, the crew would fall into the water and the ship would fill with water and become unusable. For this reason the winch, which was fixed and may have had an arm which could be raised or lowered, is

considered to have been installed on a tower a little higher than the defensive wall. Polybios' report concerning the lowering of the arm at the other end of the part within the wall is a kind of proof of the existence of a mechanism installed as a support between the far end of the winch and the base of the tower and suggets that there was a pulley-and-tackle system to manoevre it.[159]

The cramp iron may have been used in this way to defend the tower in which the chain was found. Moreover, mention of this being used on Byzantine ships suggests the possibility of it having been a part of the pulley system used to propel large Stones.

Photograph 81: *A Repaired Pincer-arm on the Reversed Pincer Mechanism.*

Photograph 82: *Breaks in the Body of the Chain.*

[159]J.G. Landels, **Eski Yunan ve Roma'da Mühendislik**, TÜBİTAK Publicationsı, Ankara 2004,pp.103-107.

A Picture Which Has a Lot to Say

"Every picture tells a story.One picture can explain what a hundred pages cannot tell about the meaning of politics or emotions. For that reason, I prefer to make use of pictures rather than written information." (Sultan Abdülhamit II).

A careful examination of this photograph taken by the Palace photographers, the Abdullah Brothers, shows that it reveals a great deal.

Photograph 83: *The Golden Horn Chain with Cramp Iron and Sarcophagus*.

This sarcophagus of porphyrian marble shown here with the Golden Horn chain in front of it symbolizes the political death of the Byzantine Empire. The use of the chain here emphasizes how the city was taken at the end of the battle.

Looking through a magnifying glass at this picture taken in the former church of St Irene in 1891, one can see details which escape the naked eye and parts of the chain not to be found in the museum today. The first of these is a metal object positioned behind the pile of chains.

It can be seen that thus object is not attached to the chain. It may be that it has no connection with the chain but is simply there as a piece of metal.. However, it should be considered that when this photograph was taken space was given to all the parts required to be seen. An evaluation from this point of view, the object has the size and shape to fasten to the float the open centred inks perhaps used in the chain.

Another object to be seen is a rotating arrangement of double hooks.

This piece may have been used to lift the H.z-20 type links we encountered.

Photograph 84: *Two Links Seen on the Chain*

The type of chain seen in the photograph is the same as the chain we examined.

Moreover, it is possible that the mark resembling a "Z" on the pincer part of the cramp iron seen in the pile of chains may be a monogram. This letter "Z' is not now to be seen on link H.ç. The mark reminds us that the commander of the largest ship defending the Golden Horn was the captain Zorzi Doria.

Photograph 85: *The Surface of the Cramp Iron with the Supposed Seal*

The Expertise of Viçen Abdullah

Another detail on this photograph attracts attention. It should not be forgotten that, of the Abdullah Brothers who served Abdullah Hamit II, Viçen was a real expert in the art of photography. Viçen took photographs with a view to creating an eternal and faultless record of what he wished to photograph. In this photograph he has successfully concealed the broken part of the cramp iron by using a link of chain.

EVALUATION AND CONCLUSIONS

Chains Had Always Been Used

It can be understood from the examples with which this work started that, from ancient times up to the present day, huge, thick chains were of necessity used at the entrance to harbours as part of the defense system. It is not possible to say that the harbours were continually kept closed by a chain. Only when there was a need for defence or to prevent unauthorized passage were chains used. It can be seen that harbours were constructed to allow for this eventuality. Just like the authoroties of cities in ancient times, when the Byzantine Emperors felt the need to defend their city, they would take the precaution of closing the shipping lane with a chain. It was for this reason that a chain was used across the natural harbour of the Golden Horn.

What Happened on the Golden Horn?

The chains used on the Golden Horn show that whenever a new chain was used the lessons learned from the effects of wear were put to good use and counter-measures taken against any former weaknesses in defense. Taking into consideration Halfdan's story of how the Golden Horn was breached, it may be supposed that the chain maintained a straight line close to the surface of the water through the use floats or supports. In the Latin Occupation of 1204 when the tower to which the chain was attached on the Galata side was taken, the chain was lowered to allow entrance. According to this information, when attacks on the chain itself were unsucccessful, it became necessary to take the tower. As there were no walls around the tower at the time of the Latin Occupation, the tower was able to be attacked and taken. Moreover, the weak and unprepared state of the fleet made it easier to enter the Golden Horn. However, in 1453 the city had taken precautions against the expected attack, the navy had been strengthened by increasing the number of auxiliary ships and the walls of Galata gave greater protection to the tower to which the chain was attached. However, as the Bosphorus was under Ottoman control, the Empire had taken no counter measures there.

Chains Newly Forged

As an attack was expected, in February a number of those ships which it had been hoped to keep in the harbour by force escaped, showing that in spite of the threat of war, the harbour had not been closed by a chain but that possibly by the beginning of April the chain had been prepared.

The Chain is Used but..

The chain made by engineer Bartalomeo Soligo[160] according to the Emperor's orders was ready by 2 April when the entrance/ exit to the Golden Horn was closed It is not right to say that the chain itself was stretched across the Golden Horn. The median weight of the links in the chain is 14 kg, the median length 50cm. If one considers that the distance between the towers was 550-600 metres, a chain to cover this would consist of approximately 1200-1300 links. The weight of this would be 17-18 tons. A chain that was

[160] Steven Runciman, **The Fall of Constantinople 1453**, Cambridge University Press, New York 2004, p.86.

not only thick and strong but long enough to cover a long distance would have had to be made. Well, how could such a heavy chain be moved or stretched across the Horn?

The Chain Seems to have been Carried

According to what Nicola Barbaro wrote the chain was made of very heavy, round wooden blocks. These were attached to each other with huge iron hooks and thick chains, again made of iron.

During work on the morticed chains in the Istanbul Archaeological Museum, the Istanbul Naval Museum, Rumeli Hisar Museum and the Military Museum, the details of measurements and type of each part or whole were documented. However, these chains were of a different type from examples used to close the harbours at Famagusta or Antalya..This shows that these morticed chains were specially made for a particular purpose..Examination of the chain supports the idea that the chain was fixed at regular intervals to floats or some other means whereby it could be kept above the surface of the water. A great deal of the harbour entrance could have been closed by fixing a float to the open links which occur after every seventh morticed link. In 2002 Selçuk Mülayim's description of the way the chain was used includes an explanation very similar to this.

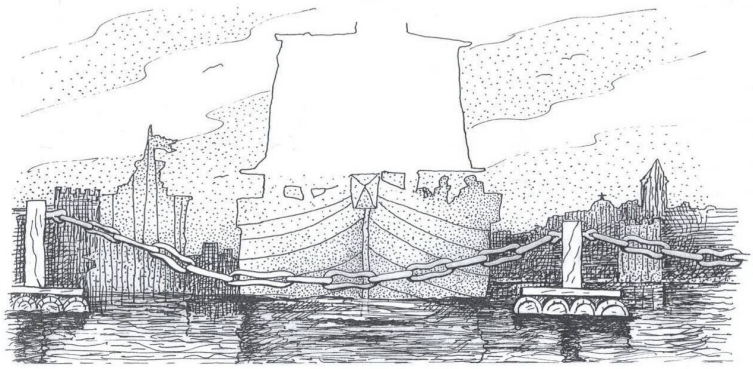


Illustration 36: *The Way the Chain was Used on the Golden Horn*

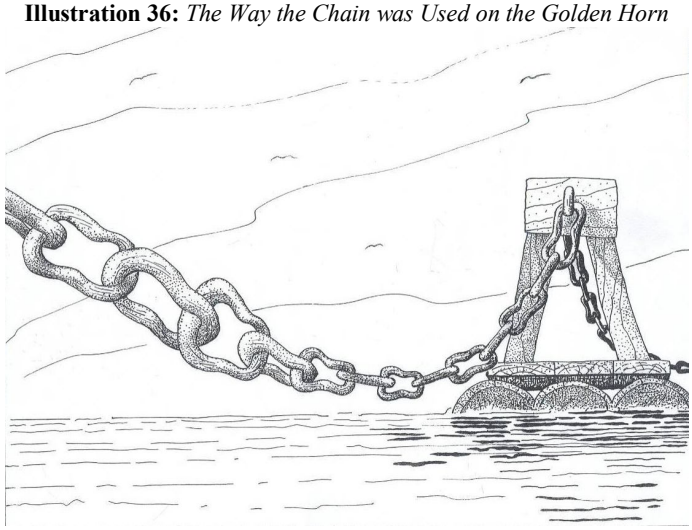


Illustration 37*: The Way the Chain was Used on the Golden Horn*

These links are not worn so it may be a question of how they were attached to the chain.

Photograph 86: *The Question of How Open-centered Links Were Attached*

If the entrance to the Horn was completely closed by a chain of this type, there would be insufficient room to manoeuvre when entering or leaving. I consider that the rounded type of links, such as those in the chain at the Military Museum, which is similar to examples used for harbour closure, may have been used..The most important proof supporting this is the use of "S" shaped links at the ends of the 57- morticed- link chain where the rounded form of link has been widened and opened.

Photograph 87: *Hz.21: "S" Link*

Photograph 88: *"S"Link Seen Together with Oval Link Form in the Chain*

İt is said that some of the chains in the Military Museum were brought here from the island of Rhodes. Our examination of the harbour at Rhodes makes this doubtful. Conmparison with the kinds of chain in the Military Museum suggests that this chain was made immediately before battle in a different workshop. Although the links in this chain are of different types, the standard length and weight of each shows that they were made at the same time with the same expertise. Moreover, these chains were made using the same technique and have the same properties.

Why a Series of Seven Morticed Links?

In the morticed chains seven morticed links come one after the other. As in all divine religions the number seven is considered a sacred number in Christianity, and human life is believed to fall into seven phases. Races in the Hippodrome consisted of seven tours of the arena. Soligo, knowing this belief of the medieval Byzantines, would have used it in the chain for sea battles and moreover known that an odd number of links between the floats was necessary to keep it balanced. The result of suspending seven morticed links meant that the fourth link would be worn on the upper side as a result of movement.. In the inspection of the chain it was seen that the fourth link between the floats was worn in this way. Measurement of the chain showed that there was a difference of between 100-110kg in the weights of the seven links between the floats. In addition when the chain between the floats was at full stretch it must have been approximately 2-5 to 3 metres long.. Because of the weight of the links the chain must have tended to drop towards the water causing this length of 2/.5- 3 metres to decrease. If one considers a galley 3.5 metres wide being rowed at full speed towards the chain, this ship would first have to battle with the current at the mouth of the Horn and then face Greek Fire, followed by a naval battle before finally reaching the narrow entrance guarded by a chain. .

The floats were made of wooden blocks. However, seeing that when detached from the chain they could be washed away by the current, it does not seem likely that any organized engineering work was involved. Even today a buoy is thrown into the water attached to a block as heavy as stone in order to fix it in place. Considering that the Byzantine Empire was preparing to defend the land walls, it can easily be understood that preparations were made to defend the Golden Horn by closing it with a chain.

Could the Chain not have been cut with a Saw?

In an area where day and night every one was on the alert and having in mind a chain formed of shaped links almost 5cm thick, it is impossible to entertain the idea that it could have been secretly cut through with a saw or an axe. These links could only have been cut twice, in the centre (9.5-10 cm) and towards links 1b-7b, 3b-5b where the thickness was 4.5 cm. Even if the chain had been cut in this or some other way, a narrow passage would have been opened in the part of the chain fixed to the floats. It is mathematically impossible that, following a breach in the links, the whole chain together with the floats would have sunk under the water.

A Horizontal Angle to the Chain

The ends of the Golden Horn chain were attached to the towers of Kastellion and Eugenius. The chain was raised or lowered by a capstan on the Kastellion Tower. These two towers were not quite opposite each other and the chain lay in a less than horizontal line. The length of the chain lay along this crossing. The curve may have been used as a deliberat tactic. As in the art of dispatch and management of troops against the enemy, so the main principle behind any tactic is to establish superior strength over the enemy and harrass them on the flanks.[161] The ships in the harbour were drawn up against the chain in the most defensive order with their prows pointing straight towards the expected attack. It would have been easy to threaten the ships from the side in any attack on the chain Had

[161] J.E.A. Whitman, **Tarih Boyu Strateji ve Taktik**, Q-Matris Publications, İstanbul 2003, p.78.

any attempt been made to set fire to the floats, it would not have been hard for these high-sided ships to have put out the blaze. The Ottomans, so successful on land, did not use their guns on board ship in an effective manner. In order to use their small cannons effectively they would have had to come within range of the Byzantine ships and walls and an attack on the Ottoman ships would have been inevitable. Moreover, the sides of their ships had been lowered to increase oar power which had greatly reduced tthe firing ability of the guns.

How Did the Ships in the Harbour Breach the Chain?

The circular chains resemble those in known harbour chains. It is as though in these chains links which gave way more easily were used at points for emergency exits. At the time of ther Conquest, the ships in the harbour started to escape when t two crews broke the chain. Links broken in this way are to be seen in the Military Museum. These breaks are to be seen at on the chain at points of passage. On the chain which actually closed the harbour, the part which, in effect, was as fixed as a wall, they may have been broken when Hamza Bey's fleet entered the harbour. However, if Hamza Bey had been the first to break this chain, it is impossible that he would not have been given the title of Chain-breaker. The nickname "Yavaşça" (Slowly) Şahin Mehmet Ali Paşa, whose complex and grave are in the Tahtakale area, is know to have derived from his command. "Oh, slowly, slowly" at the time when the ships were being lowered into the Golden Horn.

Photograph 89: *Broken Link*

Photograph 90: *View of a whole link*

Photograph 91: *A Second Broken Link*

Why Was the Chain Broken into Many Pieces?

The open ends of the morticed links in the museums were not broken with an axe or other such instrument. The link was cut or the end (D.z3-1) was twisted or (H.z12-1) widened and the chain shortened. The aim of this was to enrich museums by handing over parts of the chain to them. It is said that in 1951 the chain consisted of eight parts. As the chains handed over to the museums are similar in length this shows that attention was given to this factor.

Photograph 92: *Link with end twisted to open*

Photograph 93: *Link Cut to Open*

Pieces May Have Been Used!

The parts of the chain collected after the Conquest, were most likely used later during a campaign in the construction of a bridge. In the Military Museum many parts of chains consisting of four or five links may point to this. Chains used to bind cannons together were very heavy; those used to bind ships together were either very short or very long.

How Have the Chains Remained so Strong?

Photograph 94: *Corroded Links (detail)*

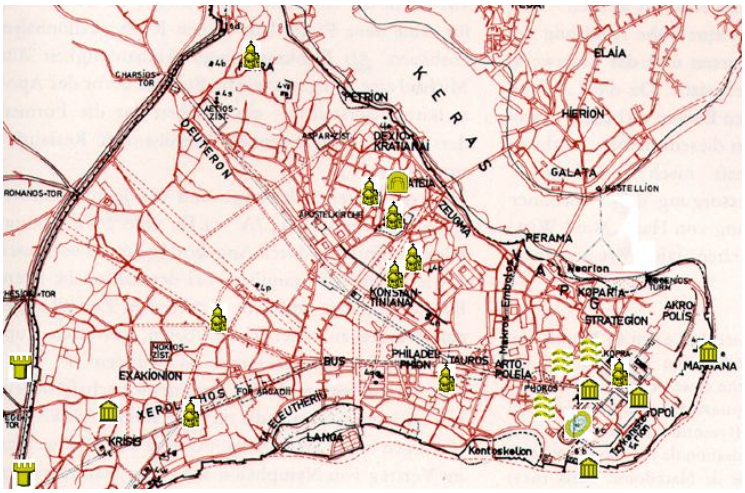
It was seen on exanination that the chains were made of forged iron. Forged iron is stronger and more durable than cast iron. Under favourable conditions it can withstand corrosion for many years. Oxidization of the iron causes patina, a protective black coating between the iron and the atmosphere. As long as it is not faced with destructive or deliberate force, an object made of forged iron retains its shape. The part of the Golden Horn chain on exhibition has retained the shape in which it was made and time has not caused any changes. It has to be accepted that, as a result of work undertaken in past years to remove corrosion, the links have become thinner than they were originally. This happened long before conservation was properly understood and the links were sandpapered to remove corrosion and later were paintedwith anti-rust paint. The chain handed over from the Rumeli Hisar Museum in a corroded state which is in the Archaeological Museum today is thinner than the ones in other museums as a result of cleaning.

The chain handed over to the Rumeli Hisar Müseum in 1968 has not yet been cleaned or preserved in any way and so it is possible that a mark or monogram may be found on its surface. It is, therefore, important that care be taken during the necessary work of conservation on it.

R.z1, to be found on the entrance floor of Sarucapaşa Tower is more corroded than R.z2 on the third floor. The reason whyRz2 is less corroded is that it has a wooden support and the upper floor is wooden. Wood has hygroscopic properties and absorbs humidity.

One Chain, Three Towers?

In Hartmann Schedel's engraving *Constantinople* two broken chains are seen on the walls of the city; maybe these were joined at one place to the main chain on the Horn. The chain at the harbour entrance/exit attached to a second tower (Neorion), which could be raised by a capstan or with the aid of a ship, may have been used to secure the harbour. During our researches in the Military Museum archives we came across a photograph (Photograph 36) which shows a capstan.



Map 15: *Possible Use of Chain and Two Towers in Istanbul*

Photograoh 95: *Possible Use of an Interlocking Link of Chain*

How has the Chain Survived to this Day?

After the Conquest, the chains were collected and taken to the church of St. Irene. There they were looked after in a proper manner by the Cebeci class of janissaries. From a photograph taken in 1891, we can see that the last regular cleaning of the chain was before it arrived in its final state at Rumeli Hisar 40 years ago.

This chain had to be preserved as it was a witness to those who said, "We crossed this chain.". According to a hadith of the Prophet of Islam *"Of course, Istanbul will be conquered. How great wilt the commander who conquers it be, how truly great the soldiers who conquer it."* As well as collecting and keeping the chains as a symbol of the city, this may have had another significance. As this couplet recited by Sultan Mehmet the Conqueror when looking at the chain closing the Golden Horn during the siege says:

Your chain of lovelocks needs a poet's tongue;
A wearied heart requires a hanging noose

Since the poem was written by Sultan Mehme, it is possible that it was written about Istanbul, the city he was obsessed and in love with, and he may have been thinking that the Golden Horn stretching from Istanbul to Galata looked like a curling tress of hair. It is as if the Sultan annoyed at being unable to approach the chain with his fleet wishes to break the chain in some way or else wishes for a noose with which to end the situation he has placed himself in.

Conclusion

The chains in the Istanbul Archaeological Müseum, the Istanbul Naval Museum and Rumeli Hisar Museum, together with the pieces of morticed chain in the Military Museum, are all parts of the same whole. The source of all these pieces is the church of St Irene , that is, the old Armoury. In order to support the data concerning whether the other chains in the Military Museum are parts of a whole, quantative and qualitative analyses need to be carried out on typical examples. It is possible that from this work a small piece of the chain seen and recorded byEvliya Çelebi may be found. Therefore a harmless XRF analysis should be made and the results of a chlorine test evaluated. In addition, an X-ray examination to find out whether there are any monograms on the link or cramp iron should be carried out. During this process, the construction techniques may be documented. Work on data- support from experts at TAEK Nuclear Research and Training Centre at Çekmece has begun to make this analyisis and documentation possible.

Photograph 96: *Examining the X-ray*

As an experiment in the museum proceedings, a panel of informnation was prepared concerning the parts of the Golden Horn chain on exhibition in the museums.[162] A total of 407 links and 2 rings are to be found in the museums. At this time the chain consists of 4 unattached links and 32 pieces. There is one extant cramp iron. The collective length of the chains is 185-190 metres.

Photograph 97: *The Place where the Chain was Broken*

As I explained before, I consider that all the parts of the chain in the different museums are part of the whole Golden Horn chain. However the missing parts lie under the silt of the Horn. After dredging and underwater exploration the other parts of the Golden Horn chain will be found. Preparations for dredging are going on

There is a real possibility that chains may be found in underwater exploration on a line from Kız Kulesi to Sarayburnu and in other historic harbours outside the Golden Horn.

Under administrational direcion, experimental archaeologial work aimed at following up our cultural heritage, is being planned to find out exactly how the Golden Horn Chain was used.

The cartoon films and Fetih 3D animation give either faulty or insufficient explanation of the working mechanism of the chain. These pictures and scenes only feed on the myths about the Golden Horn chain.

Photograph 98: *A`Panel on the wall of the narthex to St Sophia museum (detail)*

Illustration 38: *A view of the Chain in the Fetih Animation*

Photograph 99: *A view of the Chain in the Fetih Salon*

[162] Uğur Genç, *"Müzelerde Bütüncül Yaklaşım Denemesi: Aynı Bütünün Parçalarını Sergileyen Müzeler İçin Bir Uygulama Örneği",* **Masrop e-Dergi**, Haziran 2010, S.5, http://www.masrop.com/.

Illustration 39: *Working the Capstan*

Illustration 40: *Stretching the Chain across the Horn*

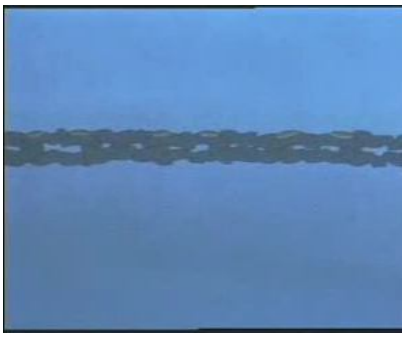


Illustration 41: *Raising the Chain to the Surface*

Illustration 42: *Closing the HarbourEntrance*

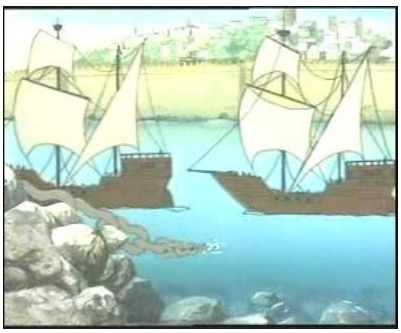


Illustration 43: *The Genoese Fleet enters Harbour*

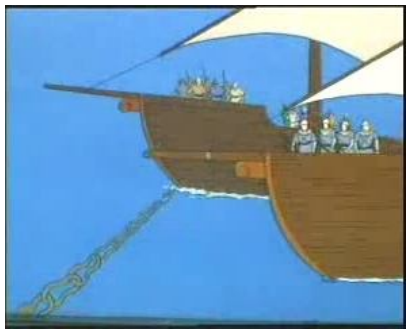


Illustration 44: *Pursuit of the Ottoman Fleet*

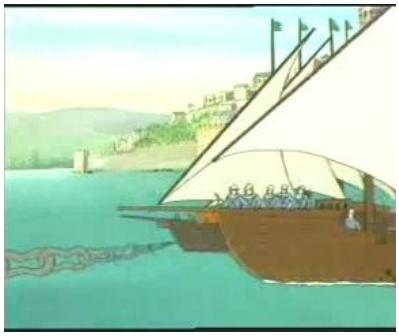


Illustration 45: *Re-closing the Entrance*

Illustration 46: *The Golden Horn Chain*

The chain was not a single entity but was held up on the surface at certain intervals by wooden blocks and was protected by a strong fleet. Keeping in mind the fact that the transported ships were of medium size, if all the facts could be brought to life and perceived by the viewer, ideas about the transportation of the ships overland and views on the Golden Horn would be represented in this way.

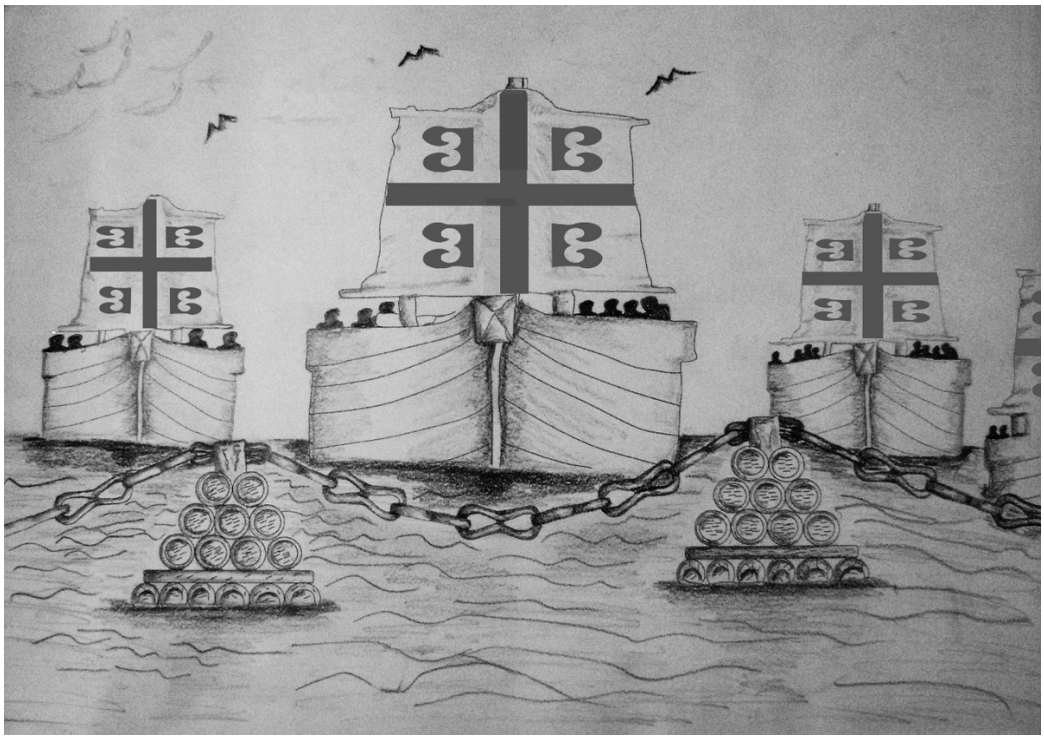


Illustration 47: *A Possible Way in which the Golden Horn Chain Composed of Morticed Links Was Used*

SOURCES

AKSİN, Emrah., "İstanbul'un Üç Kulesi", News bulletin of the **TMMOB Izmir branch of the Chamber Of Construction Engineers**, 20 Feb.2005.

AKŞİT, İlhan., **İstanbul**, Sandoz Publications , İstanbul 1981.

ATİS, İbrahim., "Haliç'i Kapayan Zincir",Publications **Tarih Hazinesi**, Ülkü Kitap Yurdu Publications p.8 İstanbul 1951.

AYDIN, Erdoğan., **Fatih ve Fetih: Mitler ve Gerçekler**, Cumhuriyet K., İstanbul 2000.

AYDIN, Erdoğan., **Fatih ve Fetih: Mitler ve Gerçekler**, Doruk Publcations , Ankara 1997.

AYDIN, Erdoğan., "Fetihte Gemiler Nerden Geldi?", **Cumhuriyet Newspaperr**, 02.06.2007.

BABİNGER, Franz., **Fatih Sultan Mehmet ve Zamanı**, Oğlak Publications, İstanbul 2002.

BAİLLY, Auguste., **Bizans İmparatorluğu Tarihi,** Nokta Kitap Publishers , İstanbul 2006.

BARBARO, Nicola., **Konstantıniyye Muhâsarası Ruznâmesi 1453**, İstanbul Fetih Cemiyeti Publications, İstanbul 1976.

BİLGİ, Coşkun., **Antik Kartaca Limanı**, Selçuk University S.B.E., Konya 2006.

BÜYÜKKOLANCI, Mustafa., Persoanl Interview, 18.05.2009.

CASSON, Lionel., **Antik Çağda Denizcilik ve Gemiler**, Homer Publications, İstanbul 2002.

CLARİ, Robert De., **İstanbul'un Zaptı (1204)**, Türkis Historical Association Ankara 1994.

CLAVİJO, Ruy Gonzales De., **Timur Devrinde Kadis'ten Semerkand'a Seyahat**, Kesit Printing House, İstanbul 2007.

CROWLEY, Roger., **Son Büyük Kuşatma 1453**, A.P.R.I.L Publications , Ankara 2008.

ÇİMRİN, Hüseyin., **Bir Zamanlar Antalya**, Antalya Chamber of Industry and Trade Publications , vol.1, Antalya 2007.

DEMİRCANLI, Y. Yoldaş., **İstanbul Mimarisi İçin Kaynak Olarak Evliya Çelebi Seyahatnamesi**, Vakıflar Genel Müdürlüğü, İstanbul 1989.

"Dev Zincir Roma'da Görüldü", **Cumhuriyet Gazetesi**, Published 01.05.2006.

DİKİCİ, Radi., **Şu Bizim Bizans**, Remzi Bookstore , İstanbul 2008.

DİRİMTEKİN, Feridun., **İstanbul'un Fethi**, Türkiye Touring and Automobile Club, İstanbul 1976.

DÖRTLÜK, Kayhan., Personal Interview, 20.02.2009.

DUKAS., **Bizans Tarihi**, İstanbul Fetih Derneği, İstanbul 1956.

EMECAN, Feridun M., "Büyük Türk'e Pannonia Düzlüklerini Açan Savaş Mohaç 1526", **Muhteşem Süleyman,** Kitap Publications i, İstanbul 2007, p.74.

EMİROĞLU, Burhan., **Askeri Müze**, Ak Publications, Art Series No. 6, İstanbul 1983.

ERGİL, Tülay., **İstanbul Müzeleri,** İstanbul Education and Cultural Foundation Publications , İstanbul 1993.

ERKOÇ, Yeliz., "Boğaz'ın Son Durağı Rumeli Kavağı", **The Gate Journal**, TAV Publications, Sayı 4, Nisan 2007.

EYİCE, Semavi., "Yoros Kalesi", **Istanbul Encyclopaedia: Past and Present** vol.7, Tarih Vakfı Publications, İstanbul 1994.

EYİCE, Semavi., **Tarih Boyunca İstanbul,** Etkileşim Publications , İstanbul 2006.

EYİCE, Semavi., "Arkeoloji Müzesi ve Kuruluşu"**, Tanzimat'tan Cumhuriyete Türkiye Ansiklopedisi**, İletişim Publications, İstanbul 1985.

EYİCE, Semavi., "Arap Camii", **Istanbul Encyclopaedia: Past and Present** , vol.1.

Fatih ve Fetih Albümü, Tarih ve Tabiat Vakfı Publicationsı, İstanbul 2003.

GİBBİNS, David., **Bizans Altınları**, Altın Kitap Publihing House , İstanbul 2007.

GÜLERSOY, Çelik., "Kız Kulesi", **Istanbul Encyclopaedia: Past and Present** vol.5, Tarih Vakfı Publications, İstanbul 1994.
GÜRAN, Ceyhan., **Bir Dünya İmparatorluklar Merkezi İstanbul**, Akis Publishing House,İstanbul 2007.
GREAVES, Alan M., **Miletos Bir Tarih**, Homer Bookstore, İstanbul 2003.
GREGORY, Timothy E., **Bizans Tarihi**, Yapı Kredi Publications , İstanbul 2008.
HOCA SADETTİN EFENDİ., **Tacüt-Tevarih**, Ministry of Culture Publications, Ankara 1992.
İNALCIK, Halil., "Fetih", **Istanbul Encyclopaedia: Past and Present** , vol.3, Tarih Vakfı Publications, İstanbul 1994.
"İstanbul Efsaneleri", **Focus Dergisi**, July 2005.
KABACALI, Alpay., **Osmanlı Devletini Avrasya İmparatorluğu'na Dönüştüren Hükümdar Fatih Sultan Mehmed**, Deniz Kültür Publications., İstanbul 2006.
KANDEMİR, Hüseyin., "Rus Edebiyatında İstanbul", **Selçuk Üni. Edebiyat Dergisi**, p. 19, Konya 2008.
KAŞLIOĞLU, Şahap., **Rodos'ta Saklı Zamanlar**, Doğu Bookstorei İstanbul 2007.
KILIÇ, Abdullah.., "Vikingler Meğer İyi Kalpli Korsanlar Değilmiş!", **Zaman Newspaper**, Published 11.11.2002.
KIRIKKANAT, Mine G., "Salla Salla Salla", **Radikal Newspaper**, Published 29.05.2002
KORUK, İsmet. **İstanbul**, Cömertiş Press, İstanbul 2000.
KOZAK, Mustafa., "Ganimet Zincirin Beş Asırlık Sırrı Çözüldü", **Akşam Newspaper**, Published 11.03.2006.
KRİTOVULOS., **İstanbul'un Fethi**, Kaknüs Publications, İstanbul 2005.
KRİTOVULOS.**, İstanbul'un Fethi**, Akşam Publications, İstanbul 1967.
KUBAN, Doğan., "Süleymaniye Külliyesi", **Istanbul Encyclopaedia: Past and Present** vol.7 İstanbul 1994.
KUNAR, Serhat., **Myra,** Net Touristic Publications , İstanbul 1995.
LANDELS, J.G., **Eski Yunan ve Roma'da Mühendislik**, TÜBİTAK, Ankara 2004.
NEFTÇİ, Aras., "Kubbe ve Örtüde Dolaşım", **Bir Şaheser Süleymaniye Külliyesi,** Minister for Culture and Tourism Publications, Ankara 2007.
NİCOL, Donalt M., **Bizans ve Venedik (Diplomatik ve Kültürel İlişkiler Üzerine Bir Araştırma)**, Sabancı University Publications, İstanbul 2000.
NİCOL, Donald M., **Bizans'ın Son Yüzyılları (1261-1453)**, Tarih Vakfı Yurt Publications, İstanbul 2003.
OSTROGORSKY, George., **Bizans Devleti Tarihi,** Türk Tarih Kurumu, Ankara 1991.
ÖZBAYOĞLU, Erendiz., "Bizans ve Batı Kaynakları", **550. Yılında Fetih ve İstanbul**, Türk Tarih Kurumu Publications, Ankara 2007.
ÖZDENİZ, Haluk., **İstanbul Deniz Müzesi**, Ak Publications Art Books Series 4, İstanbul 1978.
ÖZTUNA, Yılmaz., **Kanuni Sultan Süleyman**, Ministry of Culture Publications, Ankara 1989.
ÖZTUNCAY, Bahattin., **Photographers of Dersaadet (Palace)**
PALA, İskender., "*Haliç'e Gerilen Zincir"*, **İstanbul Bir Rüya,** İ.B.B. Y., İstanbul 2000.
PASİNLİ, Alpay., **Arkeoloji Müzesi**, Akbank Publications, İstanbul 2003.
PİRİ REİS., **Kitab-ı Bahriye**, Ministry for the Navy, Council for Research, Planning and Co-ordination, Ankara 2002.
RUNCIMAN, Steven., **The Fall of Constantinople 1453**, Cambridge University Press, New York 2004.
SARIÇAM, İbrahim., "Arapların İstanbul Kuşatmaları", **550. Yılında Fetih ve İstanbul**, Türk Tarih Kurumu Publications, Ankara 2007.

SHAW, Wendy M. K., **Osmanlı Müzeciliği,** İletişim Yayınları, İstanbul 2004.
SÖYLEMEZ, Haşim., **"**..Ve Zincir Gemileri Karadan Yürüttü"**, Aksiyon Dergisi**, Sayı 390, Yayın Tarihi 27.05.2002.
ŞAHSUVAROĞLU, Haluk Y., **Asırlar Boyunca İstanbul**, Cumhuriyet Gazetesi Yayınları
TURAN, Refik., "Efsanelerle İstanbul'un Fethi", **7th Eyüp Sultan Symposium**, İstanbul 2003.
TURSUN BEY., **Tarih-i Ebul Feth**, İstanbul Fetih Cemiyeti Publications
TÜLEK**,** Vehbi., "Selim Han'ın Dehası ve Çaldıran Zaferi", **1001 Osmanlı Hikâyesi,** Türkiye Newspaper, published 01.07.2005.
TÜLEK**,** Vehbi., "Mercidabık Meydan Muharebesi"**, 1001 Osmanlı Hikâyesi**, Türkiye Newspaper, published 01.10.2003.
TÜLEK**,** Vehbi., "Mohaç Meydan Muharebesi" **1001 Osmanlı Hikâyesi,** Türkiye Newspaper, published 16.08.2003.
Türkiye Müzeleri., Publications of T.C. Minstry for Culture, General Directorate for Monuments and Museums, Ankara 2002.
Türk Silahlı Kuvvetleri Tarihi: İstanbul'un Fethi 1453., General Staff Headquarters Press. 1979,vol.3
Türk Silahlı Kuvvetleri Tarihi: **(1451-1566).,** Ankara 1977, vol3 part 2.
ULUCA, Ege., **Gazimağusa Kaleiçi'nin Tarihsel Süreç İçindeki Kentsel Gelişimi ve Değişimi,** İTÜ Dergisi/a Mimarlık Planlama Tasarım, İstanbul 2008, vol.7, p.1.
UZUNÇARŞILI, İsmail Hakkı., **Osmanlı Tarihi**, Türk Tarih Kurumu, Ankara 1959.
ÜNLÜ, A.Özcan., **İstanbul Aşkı**, Parıltı Yayıncılık, İstanbul 2005.
"Vikingler Buradaydı", **Radikal Newspaper**, published 10.11.2002.
"Vikingler, Koç Müzesi'nde Diriliyor"**, Yeni Şafak Newspape**r, published 08.12.2002.
VİTRUVİUS., **Mimarlık Üzerine On Kitap**, Yem Publications, İstanbul 1998.
WHİTMAN, J.E.A., **Tarih Boyu Strateji ve Taktik**, Q-Matris Publications,İstanbul,2003.
YILMAZ, Hayri Fehmi.,"Yedikule Hisarı",**Istanbul Encyclopaedia: Past and Present**,vol.7
YÜCEL, Erdem., "Aya İrini Kilisesi", **Istanbul Encyclopaedia: Past and Present** ,vol.1, Kültür Bakanlığı ve Tarih Vakfı joint publications.
ZİFLİOĞLU, Vercihan., "İstanbul'un Tek Bizans Kalesi...", **Referans Newspaper**, published 28 Ağustos 2007.

Web Sites

http://forum.divxplanet.com/index.php?showtopic=86490, 06.05.2008.
http://groups.yahoo.com/group/YelkencilerLokali/message/719, 06.02.2010.
http://forum.donanimhaber.com/m_26810411/printable.htm, 06.02.2010.
http://www.cnnturk.com/2009/tarihte.bugun/04/13/tarihte.bugun.13.nisan/521990.0/index.html, 30.07.2009.
http://www.e-tarih.org/sayfa.php?sayfa=1252797.1228026.4284315.0.0.php, 30.07.2009.
http://www.arapcamii.org/tarih.html, 12.02.2010.
http://www.denizce.com/cakabey2.asp, 12.02.2010.
http://www.e-tarih.org/sayfa.php?sayfa=351351.600137.1713726.0.0.php, 12.02.2010.
http://www.e-tarih.org/sayfa.php?sfid=434, 12.02.2010.
http://www.e-tarih.org/sayfa.php?sayfa=1252797.1228026.4166127.0.0.php, 12.02.2010.
http://www.yedikulezindanlari.com/tarihce.asp, 12.02.2010.
http://www.kenthaber.com/akdeniz/antalya/merkez/Rehber/turbeler/zicirkiran-mehmet-bey-turbesi, 12.02.2010.
http://www.magusa.org/kentrehberi/gmtarihiyerler.htm, 06.02.2010.

http://www.kibristkd.org.tr/kktc_magosa.php, 06.02.2010.
http://www.ntvmsnbc.com/id/24942648/, 12.02.2010.
http://www.yeralticami.com/yeralticami.html, 12.02.2010.
http://www.gelibolukaymakamligi.com/pages/sarucapasa.htm, 12.02.2010.

Illustrations Used

Illustration Introduction: http://www.resimresimler.net.
Illustration 1: Coşkun Bilgi, ibid., p.71.
Illustration 2: Coşkun Bilgi, ibid., p.68.
Illustration 3: Emel Akalın, **Antik Çağda Batı Anadolu Limanları**, İstanbul Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul 1991.
Illustration 4-5: http://tr.wikipedia.org/wiki/I._Manuel_Komnenos.
Illustration 6: http://tr.wikipedia.org/wiki/Evliya_Çelebi.
Illustration 7: http://en.wikipedia.org/wiki/Ruy_Gonzáles_de_Clavijo.
Illustration 8: http://www.ataatun.com/magusa-kaleicinde-gun-isigina-cikamamis-st-dominik-kilisesi/.
Illustration 9: Ahmet Türker, *Piri Reis'in Hayatı*, **Piri Reis Sempozyumu**, Askeri Müze, 2004.
Illustration 10: Ahmet Türker, ibid.
Illustration 11: http://tr.wikipedia.org/wiki/I._Selim.
Illustration 12: http://tr.wikipedia.org/wiki/I._İsmail.
Illustration 13: http://it.wikipedia.org/wiki/Corno_d'Oro.
Illustration 14-15: http://tr.wikipedia.org/wiki/Doğu_Roma_İmparatorluğu.
Illustration 16: http://tr.wikipedia.org/wiki/Varegler.
Illustration 17: http://vikingships.tripod.com/.
Illustration 18-19-20-21: http://tr.wikipedia.org/wiki/Dördüncü_Haçlı_Seferi.
Illustration 22: Fausto Zonaro'nun Yağlı Boya Tablosu.
Illustration 23: http://tr.wikipedia.org/wiki/II._Mehmed.
Illustration 24: 500. Fetih Yılında İstanbul 1953, p.23.
Illustration 25: http://it.wikipedia.org/wiki/Costantino_XI_di_Bisanzio.
Illustration 26: Sercan Özgencil Yıldırım, **Kentin Anlam Haritaları: Gravürlerde İstanbul**, İstanbul 2008, p.30.
Illustration 27: http://tr.wikipedia.org/wiki/Yunan_Ateşi.
Illustration 28: Can Atilla, **Sultanlar Aşkına**, Video Clip.
Illustration 29: http://wowturkey.com/forum/viewtopic.php?t=46938&start=120.
Illustration 30: Fatih ve Fetih Albümü, Tarih ve Tabiat Vakfı, İstanbul 2003, s.49.
Illustration 31: www.ttk.org.tr/index. php?Page=Sayfa&No=232.
Illustration 32: 500. Fetih Yılında İstanbul 1953, p.21.
Illustration 33: http://tr.wikipedia.org/wiki/Fausto_Zonaro.
Illustration 34: Fatih ve Fetih Albümü, Tarih ve Tabiat Vakfı, İstanbul 2003, s.49.
Illustration 35: http://tr.wikipedia.org/wiki/Fausto_Zonaro.
Illustration 36-37: Prof. Dr. Selçum Mülayim (2002).
Illustration 38: Can Atilla, **Sultanlar Aşkına**, Video Clip.
Illustration 39-40: İstanbul'un Fethi ve Fatih Sultan Mehmet Çizgi Filmi, Ella Yapım, 1994.
Illustration 41-42: İstanbul'un Fethi ve Fatih Sultan Mehmet Çizgi Filmi, Ella Yapım, 1994.
Illustration 43-44: İstanbul'un Fethi ve Fatih Sultan Mehmet Çizgi Filmi, Ella Yapım, 1994.
Illustration 45-46: İstanbul'un Fethi ve Fatih Sultan Mehmet Çizgi Filmi, Ella Yapım, 1994.
Illustration 47: Deniz Varmaz, **National Geographic Türkiye**, Mayıs 2010, p.38.

Photographs Used

Photograph 4: http://www.kibristkd.org.tr/kktc_magosa.php.
Photograph 5-6: http://www.magusa.org/Arsiv/EskiResimler/eskiresimler.htm.
Photograph 7: Hüseyin Çimrin Arşivi.
Photograph 8: http://www.asirproje.net/zincirkiran-mehmet-bey-turbesi.html.
Photograph 9-10: Hasan Tekel - Gazimağusa Eski Eserler Şube Müdürlüğü.
Photograph 11: http://tr.wikipedia.org/wiki/Vatikan.
Photograph 12: Kayhan Dörtlük - AKMED Arşivi.
Photograph 15: Ahmet Türker, ibid.
Photograph 16: Şahap Kaşlıoğlu, ibid., p.11.
Photograph 17: http://tr.wikipedia.org/wiki/Rodos_Adası.
Photograph 18: http://www.denizce.com/cakabey2.asp.
Photograph 19: Aras Nefçi, ibid., p.119.
Photograph 28: http://www.flickr.com/photos/99166986@N00/2331880810/.
Photograph 31: Oktay Açar, http://www.fotokritik.com/1287789.
Photograph 33: http://www.tsk.tr.
Photograph 34: Leon Gustave Schlumberger, **İstanbul'un Muhasarası ve Zaptı 1453.**
Photograph 36-37: Askeri Müze Arşivi.
Photograph 38-39: Askeri Müze Arşivi.
Photograph 40-41: Askeri Müze Arşivi.
Photograph 48: Haluk Özdeniz, **İstanbul Deniz Müzesi**, p.63.
Photograph 83: Bahattin Öztuncay, **Dersaadet'in Photograph çıları**, p.214.
Photograph 96: www.taek.gov.tr/cnaem/html/uygulama.html.

Engravings Used

Engraving 1: Ege Uluca, ibid., p.71.
Engraving 2: Hüseyin Çimrin, ibid., p.58.
Engraving 3: http://historiccities.huji.ac.il/greece/modon/maps/beauvau_1615_modon.html.
Engraving 4: Şahap Kaşlıoğlu, ibid., p.20.
Engraving 5: Şahap Kaşlıoğlu, ibid., p.17.
Engraving 6: Woodcut from Hartmann Schedel's Weltchronik (Nürnberg 1493), fol. xxvi verso. http://tr.wikipedia.org/wiki/Dosya:Rhodos1493.png.
Engraving 7: Şahap Kaşlıoğlu, ibid., p.20.
Engraving 8: http://sehristanbul.wordpress.com/2008/09/12/suleymaniye-kulliyesi/.
Engraving 9: http://galeri.istanbul.gov.tr.
Engraving 10: http://galeri.istanbul.gov.tr.
Engraving 11: http://commons.wikimedia.org/wiki/Nuremberg_Chronicle.
Engraving 12: http://commons.wikimedia.org/wiki/Schedelsche_Weltchronik.
Engraving 13: http://erkancelebikoleksiyonu.com/schedel.htm.

Miniatures Used

Miniature 1: Feridun M.Emecan, "Büyük Türk'e Pannonia Düzlüklerini Açan Savaş Mohaç 1526", **Muhteşem Süleyman,** Kitap Yayınevi, İstanbul 2007, p.74.
Miniature 2: Hünername c.2.
Miniature 3: Dr. Feridun Özgümüş Arşivi.
Miniature 4: Bertrandon de la Broquiere, **Denizaşırı Seyâhat**, Eren Yayıncılık, İstanbul 2000, s. Arka Kapak.

Charts and Plans Used

Chart Entry: http://tr.wikipedia.org/wiki/Dosya:Istanbul_by_Piri_Reis.jpg.
Chart 1: Emel Akalın, ibid.
Chart 2: http://site.mynet.com/avgg/antikkentler/id5.htm.
Chart 3: Ege Uluca ibid., p.65.
Chart 4: http://tr.wikipedia.org/wiki/Dosya:Cyprus_by_Piri_Reis.jpg.
Chart 5: http://tr.wikipedia.org/wiki/Dosya:Antalya_by_Piri_Reis.jpg.
Chart 6: http://tr.wikipedia.org/wiki/Dosya:Sicily_by_Piri_Reis.jpg.
Chart 7: http://tr.wikipedia.org/wiki/Dosya:Majorca_and_Minorca_by_Piri_Reis.jpg.
Chart 8: http://tr.wikipedia.org/wiki/Dosya:Brindisi_by_Piri_Reis.jpg.
Chart 9: http://tr.wikipedia.org/wiki/Dosya:Marseilles_by_Piri_Reis.jpg.
Chart 10: Riri Reis, ibid.,p.559.
Chart 11: Riri Reis, ibid.,p.295.
Chart 12: Riri Reis, ibid.,p.240.
Chart 13: Florentine Cartographer Cristoforo Buondelmonte, *Map Of Constantinople* http://en.wikipedia.org/wiki/Constantinople.
Chart 14: Richard Natkiel,1988.
Chart 15: http://en.wikipedia.org/wiki/Constantinople.

Plan 1: Prof. Dr. Selçuk Mülayim Arşivi.

Sketches Used

Sketch 1 **:** http://vikingships.tripod.com/.
Sketch 2-3-4 **:** Archaeologist Deniz Varmaz.
Sketch 5-6-7 **:** Archaeologist Deniz Varmaz.
Sketch 8-9 **:** Archaeologist Şeniz Varmaz.
Sketch 10 **:** Archaeologist Deniz Varmaz.

Angela Roome was born in England. After obtaning a B.A. (Hons) in English Language and Literature from Durham University, she then went to Bristol University to take a fiuther degree in Education. After teaching in England for a while, she went to Turkey to teach first at Ankara College, with classes at Ankara and Hacettepe Universities, before moving to Robert College in Istanbul. She has lived In Turkey ever since, apart from an exchange year at Northfield- Mount Hermon School in Massachusetts, U.S.A. A.fter retiring from teaching, she took up translation from Turkish into English and now works as a free-lance translator and editor. She lives in Istanbul, Turkey. magroome@hotmail.com

APPENDICES

Annex-1: Subsequent Studies

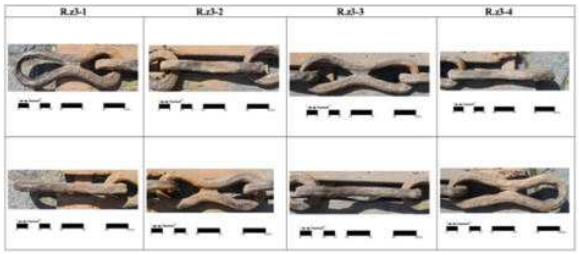
Annex-2: SEM-EDX Analysis of the Iron Sample from the Chain.

Annex-3: Final Thoughts on the Authenticity of the Chain Parts

Annex-4: Newly Added Pictures

ANNEX-1

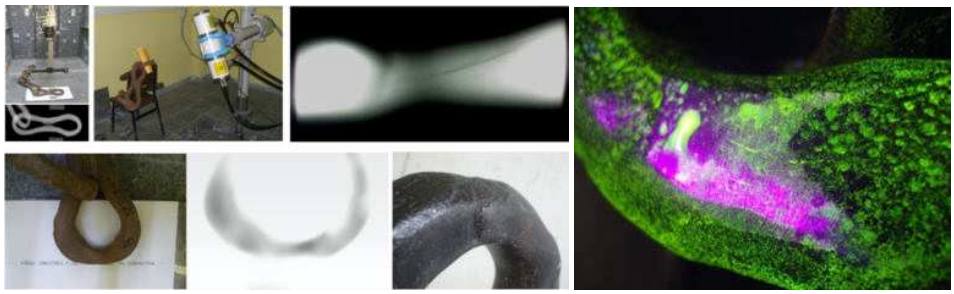
Part of the Golden Horn Chain From the Rumeli Fortress Museum (2010)



Conservation in our metal laboratory department in 2010 one of the completed works is exhibited in the Rumeli Fortress Museum and It is a four-link piece belonging to the Golden Horn Chain.

Within the scope of my master's thesis, the transportable part of the Golden Horn Chain, which I conducted historical research in the museum, was transferred to our laboratory on 13.09.2010 and the necessary examinations for the conservation study were started. During the conservation process, besides the mechanical and chemical applications on the work, a museology practice was also tried, which enables the visual restoration of the chain, which has been divided into different museums by dispersing it into pieces.

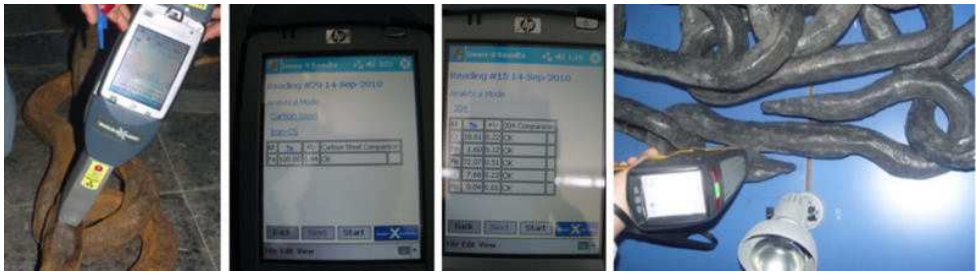
Some remains were observed in certain parts of the iron surface during the visual inspection. When the taken sample was examined in detail with a microscope, it was understood that it was a polymer-structured surface coating and this resin was applied on the iron, which was cleaned in the past years to provide protection.

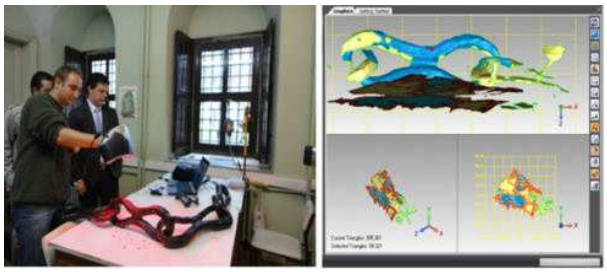


The chains of Golden Horn from the Byzantine period have been produced from carbon steel by shaping with hot forging process. These chains have examined in the NDT laboratories of Çekmece Nuclear research and Training Center by using x-ray radiography to investigate the joining shape of forging and the discontinuities inside the material. Radiography of the chains was performed by using an X-ray tube of 320 kV and 30 mA capacity. The exposure time was selected in order to obtain a film density of about 2. This condition of radiographic imaging required 35 seconds exposure time at 240 kV energy and 16 mA intensity from 700 mm source to film distance. The radiographs show clearly the joining area and shape of the chains and

forging defects. There are gaps, forging tears and cracks in the material. Surface cracks were also determined by the magnetic particle method. An AC hand yoke and fluorescent wet particles were used in the surface examination of the chains. The radiograf shows the surface crack of a chain. This crack may originate from the forging process or from the environmental conditions during the use.

Turkish Atomic Energy Authority and restoration-conservation laboratory has been able to take advantage of advanced analysis techniques at the site thanks to this cooperation initiated by the Authority. The cooperation that started with this research continued in the following years. The metal has been found to be carbon steel. Especially as a result of this first meeting with the portable XRF device, successful results were experienced and then bought to our laboratory.



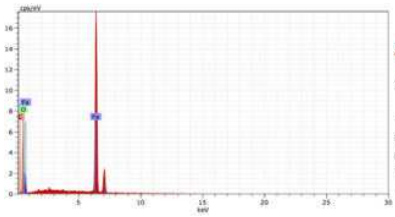


The 3D scanning process, which we have frequently used in the documentation and copying of metal works has been experienced for the first time with this study. We did not have a 3D printer, so after 3D modeling with Creaform, a plaster replica was made with a silicone mold.

The mold of the chain consisting of four linked is taken in two parts. First, the mixture prepared by adding the mold release agent to the pod surface and then the RTV-2 Silicon are Tixo are applied to the entire surface equally. The second silicone layer was prepared and applied in green to be distinctive. Since the links are not independent from the chain, the applied silicone coating is cut in two horizontal parts. Later, these pieces were covered with a plaster jacket. Since we wanted a mold that can be made with a single link or a chain by adding them to each other when desired, the link joint is left with silicon. Plaster was cast into the full mold formed by combining two half-link molds with plaster. The plaster cast removed from the mold is strengthened with 5% Paraloid B-72 diluted in toluene. Painted with black acrylic paint, the gypsum cast consists of two parts with a joint that can be separated if desired.

The corrosion layer formed on the work in our metal laboratory was removed by using a toothed motor, with stone and wire-tipped brushes. After cleaning of the rust layer, 3% Paroloid B-72 acrylic preservative diluted in acetone is applied to the magnesite surface of the work of which salt is removed by a simple washing process. With this application, it has been tried to prevent oxidation that may occur under atmospheric conditions.

Following this..



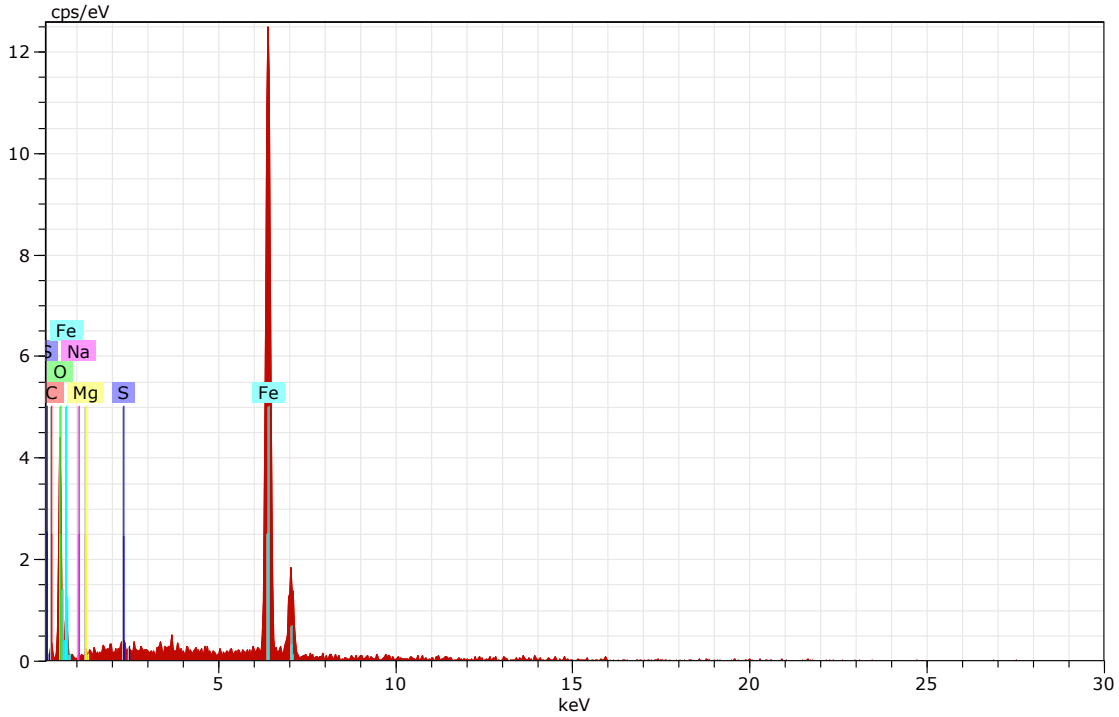
Acquisition Date:3/25/2013 3:12:58 PM HV:30.0kV Puls th.:7.64kcps

El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
C	6	K-series	22.08	18.93	32.43	7.51
O	8	K-series	47.92	41.08	52.84	7.18
Fe	26	K-series	46.64	39.99	14.73	1.23
		Total:	116.64	100.00	100.00	

After the delivery of the chain piece, some studies were carried out in the following years. SEM-EDX analysis of a corroded metal part was performed in 2013. In 2016, with the purchase of a 3-dimensional scan and a 3-dimensional printer to the laboratory, the plaster copy was scanned and replicas of various sizes were produced to make a small model. After this experimental study, it was thought that small-scale replicas of very special metal objects brought to the laboratory with the need for conservation could be produced and displayed in a showcase. However, this idea could not be realized due to various problems. While 3D scanning and 3D printer are available in the laboratory in Istanbul with the personal efforts of a staff member, it is not possible to have this thecnology in other laboratories at that time.

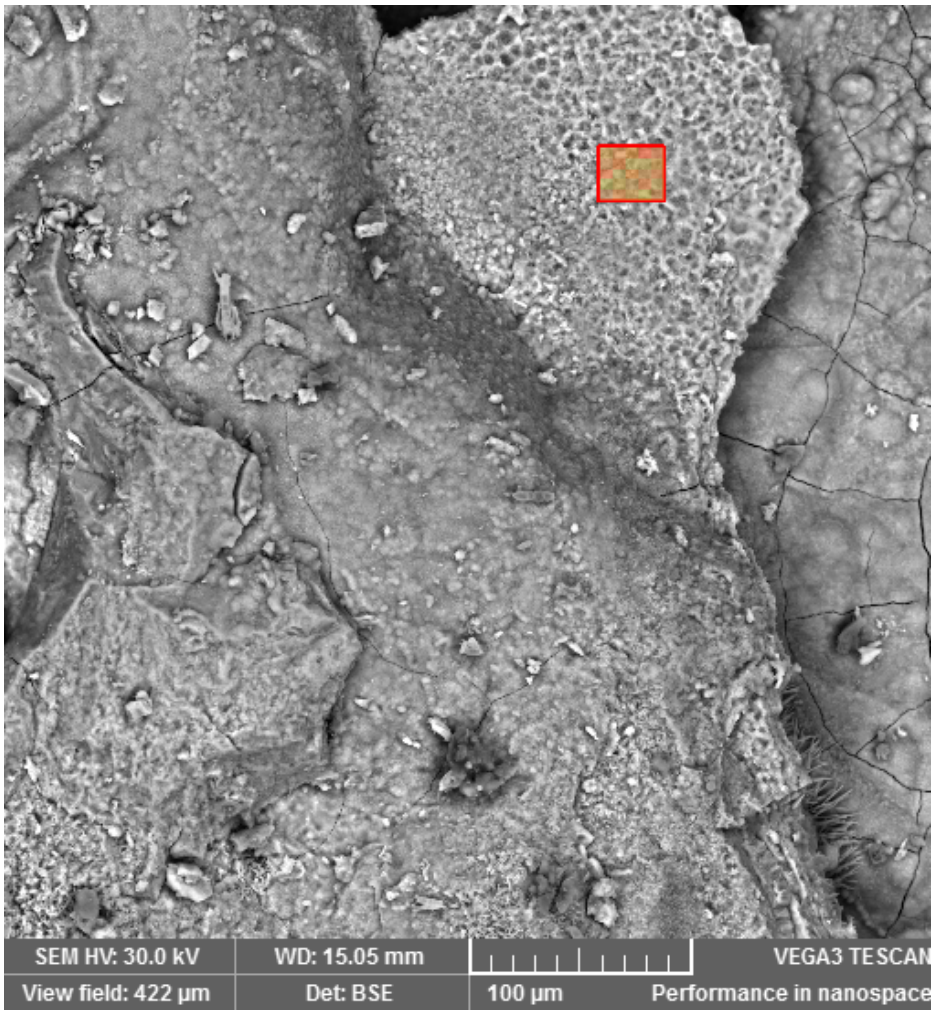
In 2017, the conservation work of all chains in the museum was completed with a team of 4 trainees. Corrosion cleaning was carried out when the part, which was cleaned and protected before, was re-oxidized. This time, after the rust layer was cleaned, tannic acid was applied and acrylic resin was applied. It is very important for the continuity of conservation procedures to have a conservator on duty in the museum. Regional laboratories have to make periodic controls.

ANNEX-2



Spectrum: Acquisition

Element	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
Carbon	K-series	27.99	23.50	39.37	20.51
Oxygen	K-series	43.40	36.43	45.82	11.50
Sulfur	K-series	0.18	0.15	0.10	0.06
Iron	K-series	46.75	39.25	14.14	1.48
Sodium	K-series	0.46	0.38	0.34	0.19
Magnesium	K-series	0.34	0.28	0.23	0.13
	Total:	119.12	100.00	100.00	


SEM HV: 30.0 kV
WD: 15.05 mm
VEGA3 TESCAN
View field: 422 µm
Det: BSE
100 µm
Performance in nanospace

ANNEX-3

Uğur Genç, Pier Gabriele Molari

The chain parts must be holder: a new interpretation of the authenticity of the Golden Horn chain

Gli anelli della catena devono essere più antichi: una nuova interpretazione della autenticità della catena del Corno d'Oro

Abstract

In ancient times it was a widespread practice to protect ports or places through which ships were forced to pass, such as the mouths of rivers, by barring them with iron chains to prevent the entry of enemy ships. Once overstepped, parts of that chain were usually demonstrated by the in the symbolic places of their city to assert their military power. In the Middle Ages and the Renaissance, the chain closure that aroused the most curiosity with the length of the defended section was undoubtedly the one placed at the entrance to the Golden Horn of Istanbul. Various parts of a chain from this period are exhibited in Istanbul's museums and have drawn attention to catalog and examine them and ask questions to date them with greater precision and to understand where they were located [1]. The present research on the original sources of the mentioned periods has made it possible to conclude that over time there had been two chains, with completely different characteristics, operating in 1203 and 1453 and that therefore the pieces found belong to the one built by the order of Manuel Komnenos, overstepped by Enrico Dandolo on 7 July 1203 and they are the chain parts siplited by Bonifacio I degli Aleramici as a war trophy for the factions participating in the IV Crusade. Some simple calculations confirmed that it was impossible for Dandolo to break the chain barring the port with his ship's energy, even hit to the chain at maximum speed.

Riassunto

Anticamente era pratica diffusa la protezione dei porti o dei luoghi attraverso i quali le navi erano costrette a passare, come le foci dei fiumi, chiudendoli con catene di ferro per impedire l'ingresso di navi nemiche. La barriera che questa catena presentava nelle incursioni portava il vincitore, che fosse riuscito ad oltrepassarla, a ostentarne parti nei luoghi simbolo della propria città per affermare la propria potenza militare. Nel Medioevo e nel Rinascimento, la chiusura a catena che destava più meraviglia

per la lunghezza del tratto difeso era senza dubbio quella posta all'ingresso del Corno d'Oro di Istanbul. Varie parti di una catena sono esposte nei musei di Istanbul e hanno richiamato l'attenzione per catalogarle ed esaminarle e porre domande per datarle con maggiore precisione e per capire dove fossero collocate [1]. La presente ricerca sulle fonti originali dei periodi in questione ha permesso di determinare che nel tempo si sono succedute due catene, dalle caratteristiche completamente diverse, operanti nel 1203 e nel 1453 e che quindi gli spezzoni ritrovati appartengano a quella costruita da Manuel Komnenos, superata da Enrico Dandolo il 7 luglio 1203 e divisa poi da Bonifacio I degli Aleramici come trofeo di guerra per i gruppi partecipanti nella alla IV Crociata. Alcuni semplici calcoli hanno confermato come fosse impossibile che il Doge Dandolo potesse aver spezzato la catena con l'energia della sua nave, anche se lanciata alla massima velocità.

Introduction: the chain pieces conserved in the museums of Istanbul

The chain pieces (Fig. 1) exhibited in Istanbul museums with the definition of the chain that "closed the Golden Horn harbor in 1453" have been the subject of discussion for many years.

The question that occupied the public was: "Why did the ships have to be driven by land in 1453 when there was a chance to cut this chain?" Entering the Golden Horn harbor by running the ships from the land was a very important feat that changed the course of that siege and marked the end of the Roman Empire. Research on the surviving links and chains started to classify, analyze them and to collect literature [1, 2]. Currently, there are sections of the chain in four museums in Istanbul, namely in Military Museum, Istanbul Naval Museum, Rumeli Fortress Museum and Istanbul Archeology Museum. The actual distribution of the chains is reported in Tab 1.

When the forms (Fig. 2) and dimensions of the pieces defined as the Golden Horn Chain in the museums were compared, it was understood that they belonged to the same whole and was found a particular sequence: 7 links with a closed center

Fig. 1 – Chain pieces exhibited in three Istanbul Museums [1].

Tab. 1 – The actual distribution of the chain in Istanbul Museums

Museum	*Chain pieces*	*Chain links*
Istanbul Archeology Museum	1	18
Istanbul Naval Museum	3	30-27-17 (69)
Rumeli Fortress Museum	3	47-23-4 (74)
Military Museum	21	55+2 rings (57), 29, 19, 19, 19, 15, 13, 10, 9, 8, 5, 5, 9x4 (248) 2x1, 1(S shape), 1 (C-shape)
Total	32	409 + 4 single

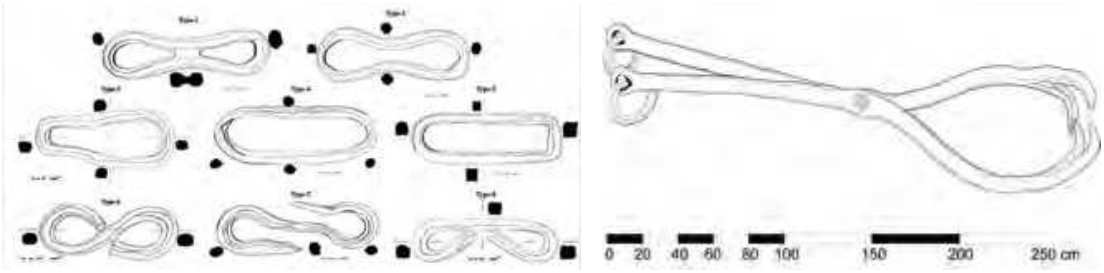


Fig. 2 – All chain link types that are understood to be deliberately produced. On the left in the top links type1 and type 2; on the right a big clamp [1,2].

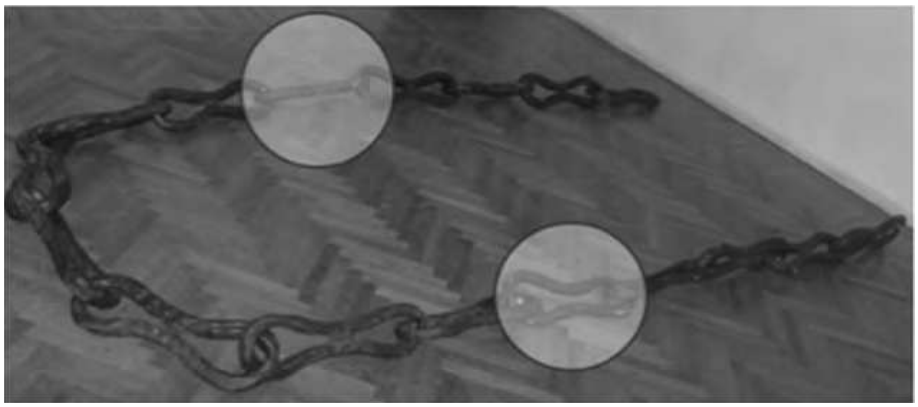


Fig. 3 – The typical sequence of links [1].

(type-1) and one link with an open center (type-2). Links with a closed center have an average length of 50 cm, a width of 18 cm, a thickness of 40 mm and a weight of 14 kg and set a standard with these features. The dimensions of all the survived links are reported in [2].

Fig. 4 – The Golden Horn chain close to a sarcophagus of porphyrian marble (on the left); a detail of a connection (not survived) (at the center); connection rings (on the right) [1].

The Military Museum has the largest number of chain pieces: 21 chain pieces and 4 single links. The first source of the chains was the Hagia Irene Church.

A photo (Fig. 4) by Abdullah Brothers in 1891 shows where the chain was stored. Someone thought the position of the chain to symbolize the political death of the Byzantine Empire, how the city was taken off and broken at the end of the battle, so, dating so the chain to 1453. The chains and the large iron clamp were moved firstly to Military Museum, and some parts to other museums. A not survived hook is shown in the center of Fig. 4, which seems related to connect two rings (right of the same figure) to put up or submerge the main chain, so to permit the passage of ships (probably from the tower).

Chain closure of entrances of ports

As seen in many examples from ancient times to our recent history. The defense of ports, barring access with chains, has long been a practice specially in times of war, but also in times of peace to put a stop to piracy (bloking waterways with chains in also called “boom”).

It should be immediately noted that chains and walls are not impassable obstacles, but obstacles that must be guarded. They are essentially defensive lines on which to concentrate the defenses. In times of war, there are defensive ships aligned along the chain. While the city walls are equipped with fixed positions, the chains must be flanked by ships or boats or platforms with barrier and defense capabilities. In this case arrows or incendiary missiles, petroleum-based flamethrowers or vessels containing Greek fire are used to ignite the enemy ship or at least the sails and rigging in order to prevent or reduce the maneuvering capacity. The naval battle is thus transformed into a pitched battle with possible boarding after anchoring the enemy ships to the chain or defense ships. The famous beaks used by the Romans in the Punic wars to obtain a similar effect are of school memory.

To cite some cases, at the time of Rome, Appiano di Alessandria (Appiano, 2001: 656-657) reports that Publius Cornelius Lentulus Spinter in Lycia in 42 BC broke the

chains placed at the mouth of the Andriake river and went up to Myra where seized a large booty in favor of Brutus (Stillwell et al., 1976).

In Vitruvius we find indications on how to build defenses, especially for ports, it gives us the certainty of how this practice was widespread, stating that the designer must plan to close the entrance of ships, whether they are ports or rivers. o coastal places, with dams ending in towers from which to pull a chain by means of winches: «Circum enim porticus sive navalia sunt facienda sive ex porticibusaditis [ad] emporia turresque ex utraque parte conlocandae, ex quibus catenae traduci per machinas possint» [3]. In the Middle Ages we have evidence of this practice.

In the 1163 *Annales Pisani* we read: «A.D. MCLXIII, in mense Augusti incepta fuit magna domus, iuxta litus maris, portus Magnalis, pro utilitate marinariorum. Magnum fondacum cum turre et porta ferrea inceptum fuit post annos XII» and«A.D. MCLXIII. Soarsa, qui guardie Sancti Viti et Magnalis portus preerat, posuit magnam catenam que porrigebatur et extendebatur ab una turri usque ad aliam, et serrabat portum pro guardia marinariorum et reserrabat, et turres bene munivit et ordinavit pro Ianuensium guerra. Iterum fecit magnum puteum pro utilitate navigantium, prope domum portus Magnalis» (Ceccarelli Lemut, 1977).

In the 1290 Chronicles of Livorno it is said that the Genoese, after being repulsed in the assault of the port of Pisa by an iron chain, stretched out in its defense, later embarked the blacksmith Carlo Noceti (also called Noceto Chiarli) who managed to break it after putting it in the forge. The Genoese thus managed to attack the port and the city. In memory of the fact, a stone was carved (Fig. 5) and it is conserved in Genoa at the Sant'Agostino Museum. The chain was brought as a trophy to Genoa, divided into parts, exhibited in the various districts of the city (Ceccarelli Lemut, 1977). These links have a shape quite similar to those conserved in Istanbul Museums.

Fig. 5 – Genoa: Museo Sant'Agostino: the Genoese stone recalls the taking of the port of Pisa (on the top), detail (on the bottom).

During the Fifth Crusade the Crusaders attacked the Egyptian port city of Damietta closed by a chain. The city, under the control of the Ayyubid sultan al-Kamil, was besieged in 1218 and taken by the Crusaders in 1219. On August 24, the Crusaders captured the defensive river tower that protected the fortress to which was anchored one end of a chain, paving the way for the fleet to attack the main castle (Sterling, 2003). Later in

painting celebrating the event, the detail of the chain broken by the boat is emphasized by Cornelis Claesz. van Wieringen, (before 1628) or by Jan Luyken (1683) sailing on the chain [1]. Many other examples of the use of chains to close ports are listed in [2], a few of them are just mentioned here; many continued from ancient times to recent naval history:

– in 1296, at Magusa on the island of Cyprus;
– in 1472, in Anatolia, a port chain was broken in the port of Antalya, taken to the Vatican by the crusaders and still exhibited there;
– some port with chains are visible in Kitab-ı Bahriye, a book of navy or maritime chart, completed in 1521 by the Ottoman Admiral Piri Reis. These ports are located in Sicily, Majorca, Cyprus, Antalya, Brindisi, Marseille, Lazkai, Zara, Modon and Rhodes (Piri, 1513);
– a fine use of double line to close Havana harbor with iron chain and with boats was done by Antonelli in 1521 (Reyes, 2016).

Historical introduction to the Golden Horn chain

In history, there were several incidences when it was reported that the Golden Horn port of Constantinople was barred with chains. These testimonies were recorded during the Arab siege in 716, the siege of the Russian prince Oleg in 907 (Kandemir, 2008), the Crusade siege in 1203 and the Ottoman siege of the city in 1453. In Istanbul there has always been the need to connect Pera, at the Asian side, with the European side of the Bosphorus or at least to avoid the whole circumnavigation of the Black Sea or even just that of the Golden Horn. Similarly Xerxes's Pontoon Bridges were constructed in 480 BC during the Persia for the purpose of Xerxes' army to traverse the Hellespont from Asia into Thrace, then controlled by Persia. The enterprise was described by Herodotus in book VII, 36 of his *Historiae* in great detail 360 vessels from one side and 314 from the other were used, then were laid ropes of linen and papyrus and, today we would say, the deck was built from logs placed orthogonally to the ropes (Herodotus, 1559). Given the great distance between the two shores of the stretch of sea (Fig. 6), it was not in fact possible to lay a hanging chain as was the practice at the mouths of ports.

Faced with the continuous threat of raids by Muslims and pirates along the coasts of the Golden Horn in 1200, Emperor Manuel Komnenos felt the need to build a real closure that would prevent enemy ships from entering this stretch of sea with its ports and therefore to avoid piracy and enemy raids or invasions. The chosen position is described by various authors with small variations (Koniates, 2021) and connects the Galata tower, in the Pera district, to the city walls now incorporated in the church of San Giorgio at *mangana*. The place is obviously so called because there were placed mangles that are machines equipped with long-range projectiles capable of hitting boats in transit in this arm of the sea, as military art teaches.

Fig. 6 – Costantinople: the position of the chain/bridge at the time of the IV Crusade (Queller e Madden, 1997).

The chain of 1203

We know the existence of a chain at the time of the Fourth Crusade from the documents. It was built and put into operation by the Emperor Kommenos (who reigned from 1143 to 1180) together with the terminal towers from which to lay the chain itself: «A work of this emperor was the tower standing not far from the sea whose waves washed the dry land called Damalis; another tower was built on the opposite side of the straits right next to the Monastery of Mangana. The emperor constructed these towers in order to block the occasional attacks by barbarian ships by stretching an iron chain from one shore to the other, thus rendering impenetrable both the regions in the vicinity of the City's acropolis and the channel whose waters coursed all the way to the palace complex in Blachernai» (Koniates, 2021).

The breaking of the chain (boom) blocking access to the Golden Horn is described in two different ways. One of these is that a Venetian ship from the Crusader fleet first rammed the chain at speed and then soldier hacked at the chain with axes and broke it allowing the Crusaders' ships to enter the Golden Horn [2]. We have a precise description of this chain by the *Chroniqıre d'Ernoul et de Bernard le Tresorier* (de Mas Latrie, 1871: 32, 362) written in 1227-1231 [4] which says three arches long, therefore about 750-1000 meters, with links as long as a human arm. From the history of the Doges, we know that it was magna and that also a magnum bridge ran over it.

«Or vous dirai combien celle kaine estoit longe. Elle avoit bien plus de .III. traities de lonc d'arc, et si estoit bien aussi grosse comme li bras d'un home. Li uns des ciés estoit à une des tours de Coustantinoble, li autres si estoit à une ville d'autre part c'on apiele Peire .... Au cief de celle rue [ville] avoit une tour, là où lí ciés de la caine

estoit qui de Coustantinoble venoit; ... Or vous dirai comment celle tours avoit non. [Ele avoit à non] lí Tors de Galatas.» (de Mas Latrie, 1871).

We have the description of how the Venetians forced the chain and entered the Golden Horn: «Serenissimus vero dux et comites memorati cum suo felici exercitu Costantinopolim applicantes, pervenerunt ad locum qui dicitur Mangana et invenerunt ibi cathenam magnam firmatam ab uno capite ipsi civitati Costantinopoli et sic tranverso ab alio capite firmatam ad Galathas, Super ipsam vero cathenam pons magnus paratus erat, per quem ibant et redibant homines a civitate Costantinopolitana ad dictum locum. Dux igitur et comites paraverunt ad bellum, et tunc una navis magna Venetorum que Aquila vocabatur venit cum magno impetu elevatis velis et percusit in ponte et cathena et sine lesione pertransiit, rupto ponte et cathena, et unanimiter intraverunt» [5].

On that matter, some scholars argue that the chain was not broken but the passage was opened, since the Galata tower was conquered first. However, the thing remains uncertain given that, as we later know for the chain of 1453, there were four keys, to open the chain. So even if the traction chain connected to the winches had been lowered, the actual chain which is always at sea level, should also have been released. The position of these secondary chains can be clearly seen in the drawing by Francesco di Giorgio (Fig. 7).

From the chronicle of the conquest: «Some were slain or taken alive, and others slid down the chain as though it were a rope and boarded the Roman triremes, while many others lost their grip and fell headlong into the deep. Afterwards, the chain was broken, and the entire fleet streamed through. As for our triremes, some were overpowered on the spot, and those forced to shore suffered damage after they were emptied of their men. The evil took many forms, such as has never entered the heart of man. It was the month of July of the year 6711 [July 1203 (Berto, 1999)]» (Koniates, 2021).

This chronicle tells us that the chain was broken in some pieces and that a piece was sent to Cypro as a real messenger to confirm the fall of the city in 1203: «Certain others, who had high hopes of having Ikonion assigned to them by lot, contended hotly. They sent gates of the City to their fellow countrymen in Syria, as well as pieces of the chain that had been stretched across the harbor blocking its entrance, and they dispatched messengers everywhere to announce the City's fall» (Koniates, 2021).

The fact that are so many pieces in the museums may be explained by the knowledge that they were cut into pieces just in 1204-1205 and the place where they are found: the church was where Bonifacio I degli Aleramici collected the spoils and distributed them among the Crusaders.

This remarkable device was about 750 m long and consisted of a massive iron chain supported by large floating timbers with a flexible walkway on top. A number of Byzantine ships were also moored along its inner side to serve as defensive positions (Nicolle, 2011).

Fig. 7 – Constantinople, the chain for the closure of ports: the shape (left) (Francesco di Giorgio Martini, 1967: Tav. 114 T 61v), *(right)* (Münster, 1598: 1325).

Thanks to the chain pieces encountered in museums, we can interpret how the port was closed. As explained in an evaluation about the chain; it was a real "chain" that supported the lateral thrusts of single trusses and that these were articulated (Takeno, 2012) each other. When the chains in the museums were examined the sequence of the links: seven of type-1 and one of type-2 marks the length of the span (3-3.5 m). The chain could thus have the necessary tension to support fixed and mobile loads, to be supported by the floating deck [1] and to be anchored at the bottom of the sea in some points (Avilia, 2007).

The Byzantine troops inside the fortress put up a heroic resistance but the fortress was captured, and Crusader troops worked the capstain and lowered the chain. After the fortress had been taken and the chain breached, the Crusader fleet entered harbor and thus brought their ships to safety (De Clari, 2005). There are evaluation emphasizing that the misconception that the chain breaks with the speed of a ship is common (Pryor and Wilson, 2007; Queller and Madden, 1997; AA.VV., 1859).

In Appendix some numerical expressions to fix that it was impossible to break the chain with the energy of Dandolo's boat are reported.

The chain of 1453

From the Diary of Nicolò Barbaro who were in Constantinople during the days of the conquest by Mehmed II in 1453 there is a precise description of the then existing chain that connected Pera with the city walls: «A dì do april, el serenissimo imperador si comandò a ser Bortolamio Soligo, che dovesse destender la cadena a traverso del porto, zoè da Costantinopoli fina in Pera; el dito ser Bartolamio Soligo per comandamento de l'imperador si destexe la cadena a traverso del porto, e questa tal cadena si iera de legnami grossissimi e redondi, e innarpexadi uno cun l'altro cun feri grossi, e cun cadene grosse de fero, e li cavi de la cadena, uno cavo si era dentro

da le mure de Costantinopoli, e l'altro cavo si era dentro da le mura de Pera per più segurtade de la dita cadena. Habiando destexa questa cadena a traverso del porto, l'achade a far provixion da la banda da tera ferma, e però tuti i nobeli de Veniexia si andò da l'imperador, e aricordari che se dovesse far quatro chavi de le quatro porte de la tera, zoè de quele da la banda da tera. — In quela fiada el serenissimo imperador si respoxe humanamente: che Costantinopoli si iera sta più e iera de quegli da Veniexia, cha de Griexi, e perchè el volea ben a Venitiani el volse dar le quatro porte de la tera con tute le chiave in varda, e cusì felo, e cusì le ave quatro nobeli da Veniexia; e i nobeli da Veniexia si chiamò el cunseio di dodexe, e fo dade per el dito cunseio queste quatro porte in varda a quatro nostri zentilhomeni. La prima porta che sun la Cresca fo dada a misser Catarin Contarini fo de misser Zuane; la segunda porta si fo dada a misser Fabruzi Corner fo de misser Zuane; la terza porta si fo dada a ser Nicolò Mozenigo fo de misser Lunardo el primo; la qual porta se chiama Elpigi; la quarta porta e ultima che son el palazzo del serenissimo imperador si fo dada a ser Dolfin fo de ser Domenego; i quali nobeli avea le chiave de queste quatro porte, e tegnivele cun bona varda.» (Barbaro, 1856).

To have a representation of the shape of this chain, we can refer to the description and drawings shown in the Treatises of Francesco di Giorgio (Fig. 7) illustrating just a type of self-floating chain to be used for long stretches, as needed in the Istanbul barrage. Note the terminal part which consists of two branches: one anchored at sea level and the other, having smaller rings, which serves both to stretch the main chain and to keep it hooked even when the gate is opened.

The description of the Table 114 - [T 61v] is: «Quando alcuno porto tanto di latitudine fusse che la catena tirar non si potesse, ed anco per la longhezza sua debile fusse, faccisi le incatenate travi di legno di pino o quercia, correggiate di ferro e bene legate con perni, commesse con alcune sotto poste e diritte travi che un ponderoso sasso per diritto sotto a sostener venghi. E infra la torre della fortezza e'l travito l'entrata è da lassare con una catena atta a sostenere, la quale con una piccola calare intanto che alla nave l'entrata si dia, di poi su ritirando a la sua chiave e chiavarda si commetta. E così el porto sicuro star porrà» (Francesco di Giorgio Martini, 1967).

The same self-floating type of chain is drawn by Münster (1598) (Fig. 7). The conqueror did not undertake to break it so as not to have to face the barrage, instead, they transported the ships by land in great secrecy, thus going beyond the chain itself. With this very daring operation they managed to encircle the ships present to defend the chain, thus avoiding colliding with ships armed with flamethrowers and incendiary bombards. Once the city was conquered, Mehmed II had therefore no interest in destroying this important obstacle at the entrance to the Golden Horn; in the engraving of Constantinople made by Hardtman Schedel in 1493 (Fig. 8) the chain is clearly visible, at least for its terminal.

Fig. 8 – Constantinople: the "upper" coupling branch of the chain that survived the conquest of Constantinople in 1453 in an engraving of 1493 by H. Schedel (Schedel, 1943).

Remarks and Conclusions

It is understood that the chains were preserved as a symbol of victory, they were exhibited and even their parts were distributed to various places so that this image of victory could be seen by more people. The triumphant who captured the city of Constantinople also benefited from the same propaganda tool.

There is no record that the Ottoman state preserved the chain after the conquest. The first document on the chain in the place is the photo in Fig. 4, taken at the time when the Hagia Irene church was used as the first museum of the empire for war tools and equipment. It is possible that the chain pieces here will be exhibited as propaganda tool for the empire which entered a period of decline and loss, to serve as a reminder of its former strength.

The pieces currently present in the museums of Istanbul have a shape and size quite like the description reported by Ernoul-Bernard (de Mas Latrie, 1871) and are similar to the chain used for the closure of the port of Pisa, shown in the bas-relief in Fig. 5. We also have the description of how all the pieces were brought with the huge booty accumulated by the Crusaders in the Hagia Irene church so that they could then be divided among the various groups of Crusaders by Bonifacio I degli Aleramici of Monferrato. It can be thought that these pieces of little value, when compared with the huge booty coming from the sacking of Constantinople, were left right in the place where they were transported for division and found here after many centuries. The chronicles say that only part of the chain was transported to Crete, perhaps to be brought to the Pope as evidence of the taking of the city. It can

therefore be deduced that these links belong to the broken chain opened in 1203 and divided in 1204-1205.

After a description of the chains that were placed to block the entrance to the Golden Horn, it is argued with documents of the time that the pieces of chain visible today in the Istanbul Museums belong to the chain built and put into operation by Emperor Manuel Komnenos and passed by Dandolo on 1203 July 7, having this shape quite similar to that described by Ernoul in his Chronicle.

The chain, described by Barbaro and used in the defense of Constantinople in 1453, has a very different shape from the other beeing self-floating. It is recalled that this last chain was not broken by Mehmed II during the capture of Constantinople, since the ships are transported with a memorable and unpredictable feat by land, thus avoiding the attack on this well-manned line of defense and therefore considered impossible to overcome. It therefore does not seem conceivable that segments of the latter chain have been kept in many different places for evident celebratory episodes of the victory, while this takes on completely different values in the case of the chain divided in 1204 when the different groups of Croisades, each would like to have a trophy to exibit in its own village. In Appendix are reported some calculations to set that the chain could not be broken by Enrico Dandolo by his boat named *Aquila*, but Dandolo could have passed the gate after the Crusiades captured the Galata tower and moved the chain away from its supports.

Bibliography

AA.VV. 1859. *Recueil des historiens des croisades. Historiens occidentaux.* III. Paris: Imprimerie Impériale,

Appiano di Alessandria. 2001. *Storia Romana*. Libro IV. Torino: UTET.

Avilia F.2007. *La storia delle ancore*. Roma: Ireco.

Barbaro N. 1856. *Giornale dell'assedio di Costantinopoli 1453 – 2 (aprile 1453)* (a cura di E. Cornet). Vienna: Libreria Tender & Comp.

Berto L.A.. 1999. *Testi storici Veneziani: (XI-XIII secolo). Historia ducum Venetorum, Annales Venetici breves, Domenico Tino, Relatio de electione Dominici Silvi Venetorum ducis*. Padova: CLEUP.

Bondioli M. 2000. L'arte della progettazione e della costruzione delle galee veneziane dal XV al XVI secolo. *Proceedings of IX International Symposium on Boat and Ship Archaeology (IX ISBSA), Boats, ships and shipyards* Venezia, 4-8 dicembre

Ceccarelli Lemut M.L. 1977. Repertorio delle fonti documentarie edite del Medioevo. In: *Collana storica della. Biblioteca del Bollettino storico Pisano.* Pisa: Pacini

De Clari, R. 2005.*The conquest of Costantinple*. New York: Columbia University Press

De Villehardouin, J. 1938. *De la Conquête de Constantinople* (M. Paulin Ed.). Paris: Renouard Jules.

de Mas Latrie M.L. 1871. *Chronique d'Ernoul et de Bernard le Trésorier publiée pour la première fois d'après les manuscrits de Bruxelles, de Paris et de Berne, avec un Essai de classification des continuateurs de Guillaume de Tyr, pour la Société de l'histoire de France*. Paris: Chez M.me V.e Jules Renouard.

Francesco di Giorgio Martini F.. 1967. *Trattati di architettura ingegneria e arte militare* (a cura di G. Maltese). Milano: Polifilo.
Herodotus. 1559. *Herodoti Halicarnassei Historiae libri IX*. Basileae: Ex officina Hieronymi Curionis, impensis Henrici Petri
Koniates N.. 2021. *City of Byzantium, Annals of Niketas Koniates* (Translation by H.J. Magoulias), Detroit: Wayne State University Press.
Millingen A. 1899. *Byzantine Constantinople*. London: Murray.
Münster S. 1598 *Cosmog*raphia. Basilea: stampato a spese di Henrigo Pietro Basiliense
Nicolle D. 2011.The Fourth Crusade 1202-04: The betrayal of Bizantium. Bloomsbury Publishing
Piri R.. 1513. *Kitab-Ä Bahriye (Book of Navigation)*.
Pryor J., Wilson P.. 2007. The Chain of the Golden Horn, 5-7 July 1203. In: *In Laudem Hierosolymitani: Studies in Crusades and Medieval Culture in Honour of Benjamin Z. Kedar* (I. Shagrir, R. Ellenblum, J. Riley-Smith Eds.), 369-384). HampshireAshgate
Queller D.E., Madden T.F. 1997. *The Fourth Crusade: The Conquest of Constantinople.* Philadelphia: University of Pennsylvania Press.
Reyes L. P. 2016. Indios en la defensa marítima del territorio cubano (s. VXI-XVII). Revista Hispanoamericana, 6, 2-23.
Schedel Hardtman. 1493. *Liber Chronicarum cum figuris et ymaginibus ab initio mundi*. Norimberga: Antonius Koberger.
Sterling D. 2003. The Siege of Damietta: Seapower in the Fifth Crusade 1217-1221 A.D. In: *Crusaders, Condottieri, and Cannon: Medieval Warfare in Societies around the Mediterranean* (D.J. Kagay and L.J.A.Villalon Eds.). 101-131. Boston: Brill
Stillwell R.,. 1976. *The Princeton Encyclopedia of Classical Sites* (W.L. MacDonald and M. Holland McAllister Eds.). Princeton: Princeton University Press.
Takeno J., Takeno Y. 2012. The mistery of the defence chain mechanism of Costantinople. In: Explorations in the History of Machines and Mechanism. Proceedings of HMM2012 (T. Koetsier and M. Ceccarelli Eds.). 199-211. Berlin: Springer.
Tyrensi W. 1611. *Historia rerum in partibus transmarinis gestarum a tempore successorum Mahumet, usque ad annum Christi 1184.* XIV, 982, Hanoviae: Edita a venerabili Willermo Tyrensi Archipiscopo, in Gesta Dei per Francos.

Webgraphy

[1] Genç U. 2009.
https://www.academia.edu/2225541/Haliç_Zinciri_Problemi
[2] Genç U. 2010.
https://www.academia.edu/38876476/Haliç_Zinciri_Tamamı_
[3] Vitruvius. De Architectura. (English translation)
https://resources.warburg.sas.ac.uk/pdf/kfh125b2128022.pdf
[4] Gaggero M. 2012.
http://peme.revues.org/1608 ; DOI : 10.4000/peme.1608
[5] Fiori L. 2013-14.
http://amsdottorato.unibo.it/6574/1/Fiori_L._Il_codice_autografo_di_Piero_Giustinian_un_esempio_di_genesi_ed_evoluzione_della_cronachistica_medievale.pdf

Appendix: Was a galley like Dandolo's capable of breaking the chain?

From a document dated 27/2/1276, quoted in (Bondioli, 2000), we read that Charles I of Anjou ordered a certain number of galleys from the Venice arsenal with these characteristics: total length 39.50 m, waterline length 28.20 m, maximum width of 3.70 m, immersion of 2.08 m. From the shape of the hull shown in (Bondioli, 2000) we can assume a fineness coefficient of 0.7÷0.8. The mass of the ship can then be calculated from the volume of its topside:

$$28.20 \cdot 3.70 \cdot 2.08 \cdot 0.7 = 152 \text{ m}^3$$

Considering a seawater density of 1025 kg/m^3, the mass was 156000 kg. We also know that the maximum speed of the ship could reach 7÷8 marine knots per hour (for no more than 15 minutes of rowing) corresponding to 3.6÷4 m/s. The ship could therefore have a maximum kinetic energy of:

$$\frac{1}{2}m \cdot v^2 = \frac{1}{2}156.000 \cdot 3.6^2 \cong 1 \text{ MJ}$$

Considering the breaking tension of the chain material of 300 N/mm^2 with an elongation of 20%, the chain initially in an orthogonal position in respect to the direction of the ship, is possible to calculate the angle α between the line connecting anchor points and the branches at break

$$\cos \alpha = \frac{L}{L+0,2L}$$

from which α = 33° and therefore if the length of the chain from side to side was 900 m between the initial position and the one in which the chain it should have broken, we calculate a run:

$$\frac{450}{2} sin\, \alpha = 110\ m$$

With the section of the chain of about 40 ·100 = 4000 mm^2 and a breaking tension of 300 N/mm^2 the force exerted by the vessel for balance of forces should have been:

$$4000 \cdot 300 \cdot 2 \cdot \sin \alpha \sim 133 \text{ ton}$$

Therefore, assuming a linear law of increase in the chain pull between the initial position and the break, it is calculated that the energy needed was

$$\frac{1}{2}\ 1330000 \cdot 110 = 72\ \text{MJ}\ >>\ 1\ \text{MJ}$$

where 1330000 is in N.

From these simple calculations it can be deduced that, unless the links were not perfectly welded, Dandolo could not have broken the chain but that the chain had been opened by the fix point placed at sea level below the Galata tower. The required force to break the chain would also have been 133 tons, which does not seem compatible with the structure of a thin galley, even if rostral: «*Erant sane in præfato exercitu, naves longæ, rostratæ, gemini remorum instructæ ordinibus, bellicis usibus habiliores, quæ vulgo galæ dicuntur, centum quinquaginta*» (Tyrensi, 1611).

ANNEX-4

Where the chain parts are exhibited:

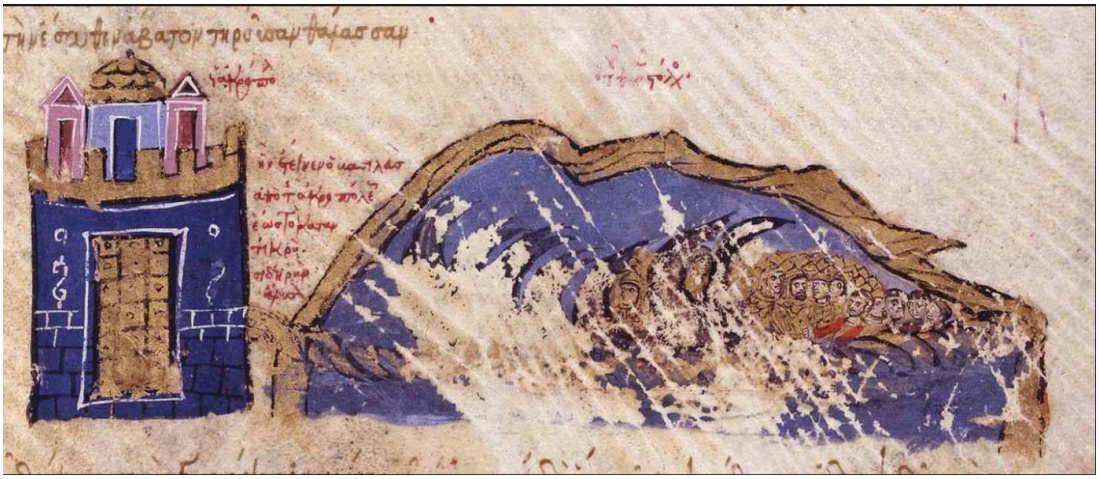
1- Harbiye Military Museum
2- Istanbul Naval Museum
3- Rumeli Fortress Museum
4- Istanbul Archeology Museum

5- Galata Tower Museum

6- Turkish-Islamic Arts Museum

https://kulturenvanteri.com/tr/yer/halic-zinciri/#16/41.019638/28.979597

Unknown, 13th-century author 1176 The iron chain prevents the fleet of Thomas from entering the Golden Horn.

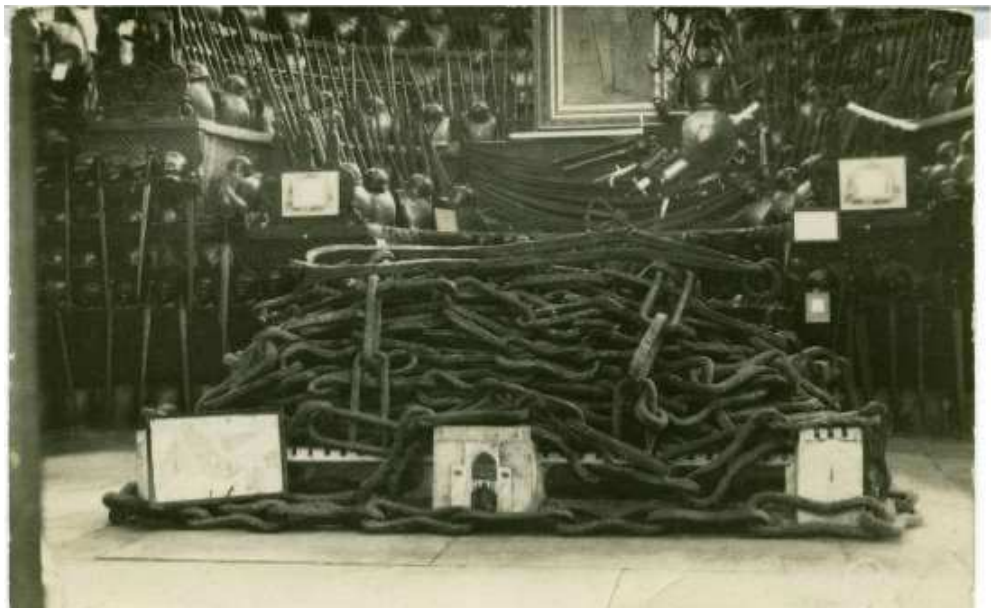


https://pt.wikipedia.org/wiki/Tomás,_o_Eslavo#/media/Ficheiro:The_iron_chain_prevents_the_fleet_of_Thomas_from_entering_the_Golden_Horn.jpg

A representation of the Golden Horn chain, the ships waiting in front of the chain and the connection point in the "Eugenios Bastion".

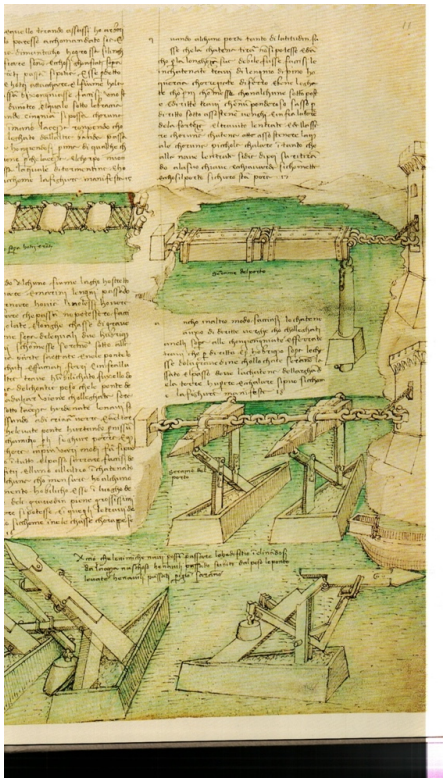
https://sessizdunya.wordpress.com/2014/11/07/13antik-istanbulun-unluleri/halic-zinciri-temsili-resim/

Golden Horn Chain in Hagia Irene (After 1920).



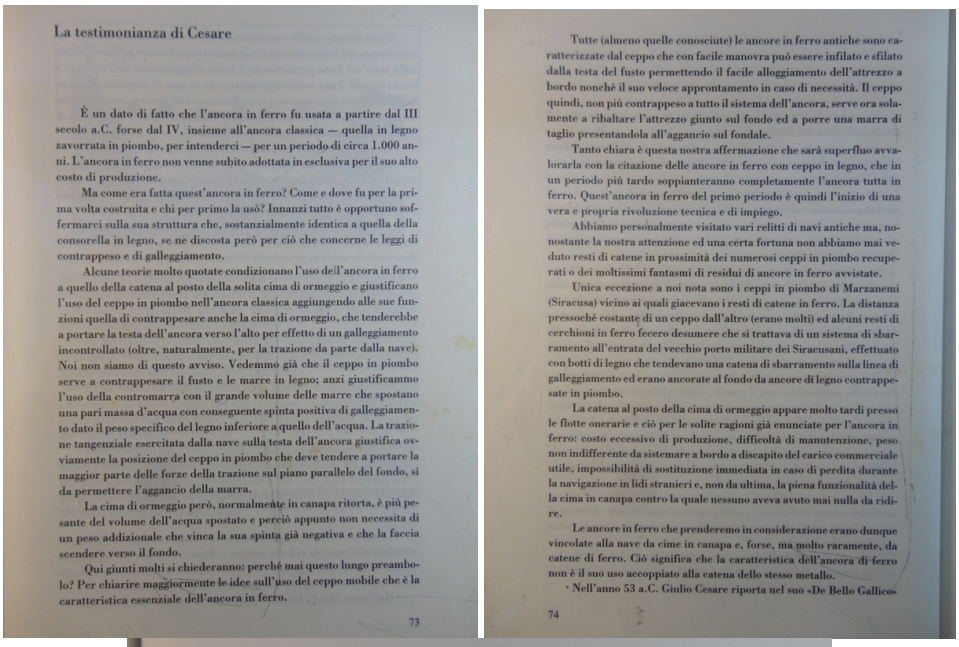
Ataturk Library, Rare Works Collection

The shape of the chain for the closure of ports (a), Tratado de Architectura civile e militare, *Francesco di Giorgio Martini(b).*

A  B 

A- The *Trattati* by Francesco di Giorgio (Trattati tav. 114 - (T 61v))
B- http://librerialibropasion.blogspot.com/2018/07/miradas-leonardo-da-vinci.html

La testimonianza di Cesare



La testimonianza di Cesare

È un dato di fatto che l'ancora in ferro fu usata a partire dal III secolo a.C. forse dal IV, insieme all'ancora classica — quella in legno zavorrata in piombo, per intenderci — per un periodo di circa 1.000 anni. L'ancora in ferro non venne subito adottata in esclusiva per il suo alto costo di produzione.

Ma come era fatta quest'ancora in ferro? Come e dove fu per la prima volta costruita e chi per primo la usò? Innanzi tutto è opportuno soffermarci sulla sua struttura che, sostanzialmente identica a quella della consorella in legno, se ne discosta però per ciò che concerne le leggi di contrappeso e di galleggiamento.

Alcune teorie molto quotate condizionano l'uso dell'ancora in ferro a quello della catena al posto della solita cima di ormeggio e giustificano l'uso del ceppo in piombo nell'ancora classica aggiungendo alle sue funzioni quella di contrappesare anche la cima di ormeggio, che tenderebbe a portare la testa dell'ancora verso l'alto per effetto di un galleggiamento incontrollato (oltre, naturalmente, per la trazione da parte dalla nave). Noi non siamo di questo avviso. Vedemmo già che il ceppo in piombo serve a contrappesare il fusto e le marre in legno; anzi giustificammo l'uso della contromarra con il grande volume delle marre che spostano una pari massa d'acqua con conseguente spinta positiva di galleggiamento dato il peso specifico del legno inferiore a quello dell'acqua. La trazione tangenziale esercitata dalla nave sulla testa dell'ancora giustifica ovviamente la posizione del ceppo in piombo che deve tendere a portare la maggior parte delle forze della trazione sul piano parallelo del fondo, si da permettere l'aggancio della marra.

La cima di ormeggio però, normalmente in canapa ritorta, è più pesante del volume dell'acqua spostato e perciò appunto non necessita di un peso addizionale che vinca la sua spinta già negativa e che la faccia scendere verso il fondo.

Qui giunti molti si chiederanno: perché mai questo lungo preambolo? Per chiarire maggiormente le idee sull'uso del ceppo mobile che è la caratteristica essenziale dell'ancora in ferro.

73

Tutte (almeno quelle conosciute) le ancore in ferro antiche sono caratterizzate dal ceppo che con facile manovra può essere infilato e sfilato dalla testa del fusto permettendo il facile alloggiamento dell'attrezzo a bordo nonché il suo veloce approntamento in caso di necessità. Il ceppo quindi, non più contrappeso a tutto il sistema dell'ancora, serve ora solamente a ribaltare l'attrezzo giunto sul fondo ed a porre una marra di taglio presentandola all'aggancio sul fondale.

Tanto chiara è questa nostra affermazione che sarà superfluo avvalorarla con la citazione delle ancore in ferro con ceppo in legno, che in un periodo più tardo soppianteranno completamente l'ancora tutta in ferro. Quest'ancora in ferro del primo periodo è quindi l'inizio di una vera e propria rivoluzione tecnica e di impiego.

Abbiamo personalmente visitato vari relitti di navi antiche ma, nonostante la nostra attenzione ed una certa fortuna non abbiamo mai veduto resti di catene in prossimità dei numerosi ceppi in piombo recuperati o dei moltissimi fantasmi di residui di ancore in ferro avvistate.

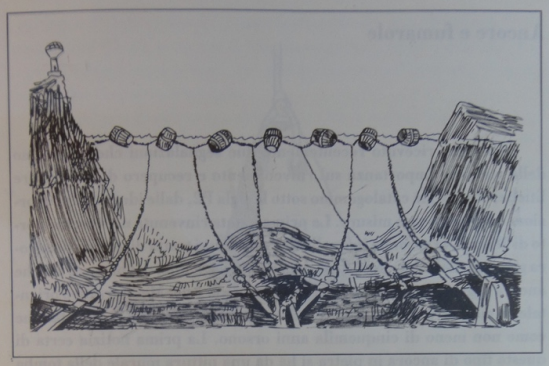
Unica eccezione a noi nota sono i ceppi in piombo di Marzanemi (Siracusa) vicino ai quali giacevano i resti di catene in ferro. La distanza pressoché costante di un ceppo dall'altro (erano molti) ed alcuni resti di cerchioni in ferro fecero desumere che si trattava di un sistema di sbarramento all'entrata del vecchio porto militare dei Siracusani, effettuato con botti di legno che tendevano una catena di sbarramento sulla linea di galleggiamento ed erano ancorate al fondo da ancore di legno contrappesate in piombo.

La catena al posto della cima di ormeggio appare molto tardi presso le flotte onerarie e ciò per le solite ragioni già enunciate per l'ancora in ferro: costo eccessivo di produzione, difficoltà di manutenzione, peso non indifferente da sistemare a bordo a discapito del carico commerciale utile, impossibilità di sostituzione immediata in caso di perdita durante la navigazione in lidi stranieri e, non da ultima, la piena funzionalità della cima in canapa contro la quale nessuno aveva avuto mai nulla da ridire.

Le ancore in ferro che prenderemo in considerazione erano dunque vincolate alla nave da cime in canapa e, forse, ma molto raramente, da catene di ferro. Ciò significa che la caratteristica dell'ancora di ferro non è il suo uso accoppiato alla catena dello stesso metallo.

Nell'anno 53 a.C. Giulio Cesare riporta nel suo «De Bello Gallico»

74



(III-13) che i Veneti di Bretagna usavano le catene per le loro ancore in ferro; non dobbiamo però dimenticare che le navi di Roma erano sicuramente molto differenti da quelle dei Veneti e ciò per la chiara ragione dell'adattabilità del vascello all'ambiente.

La navigazione mediterranea differisce senz'altro da quella oceanica la quale, in particolare per le navi dell'epoca, imponeva sostanziali differenze anche nell'uso degli attrezzi di bordo.

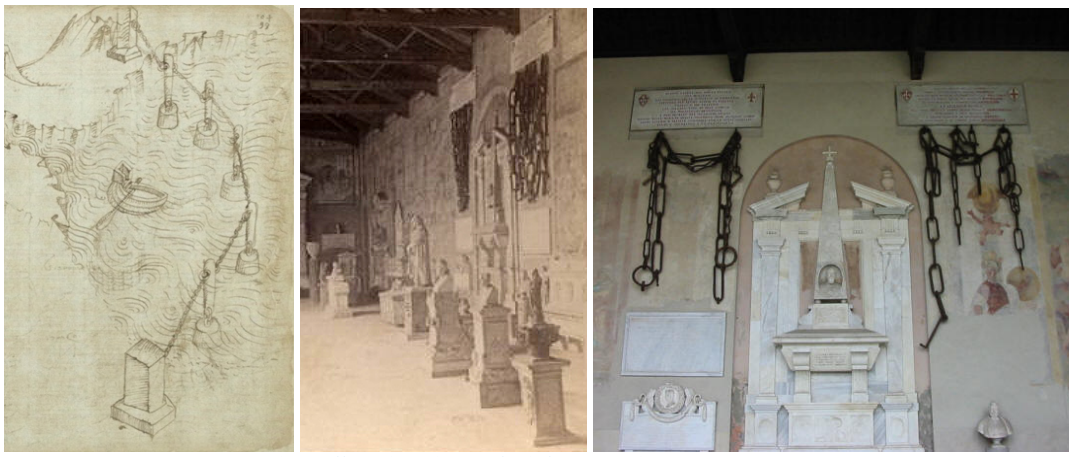
La particolarità delle catene in ferro presso i Veneti colpì talmente l'attenzione di Giulio Cesare che egli la annotò nei suoi scritti e da ciò desumiamo che nell'anno 53 a.C. la flotta romana ignorava ancora l'uso del vincolo metallico.

Molti credono che i Veneti furono i primi ad adoperare queste catene per l'uso sopra descritto e potrebbe anche essere così ma noi reputiamo, e già varie volte lo abbiamo accennato, che l'uso di un attrezzo marinaro deriva da una somma di esperienze comuni fatte lungo le non sempre facili rotte di quei tempi lontani.

75

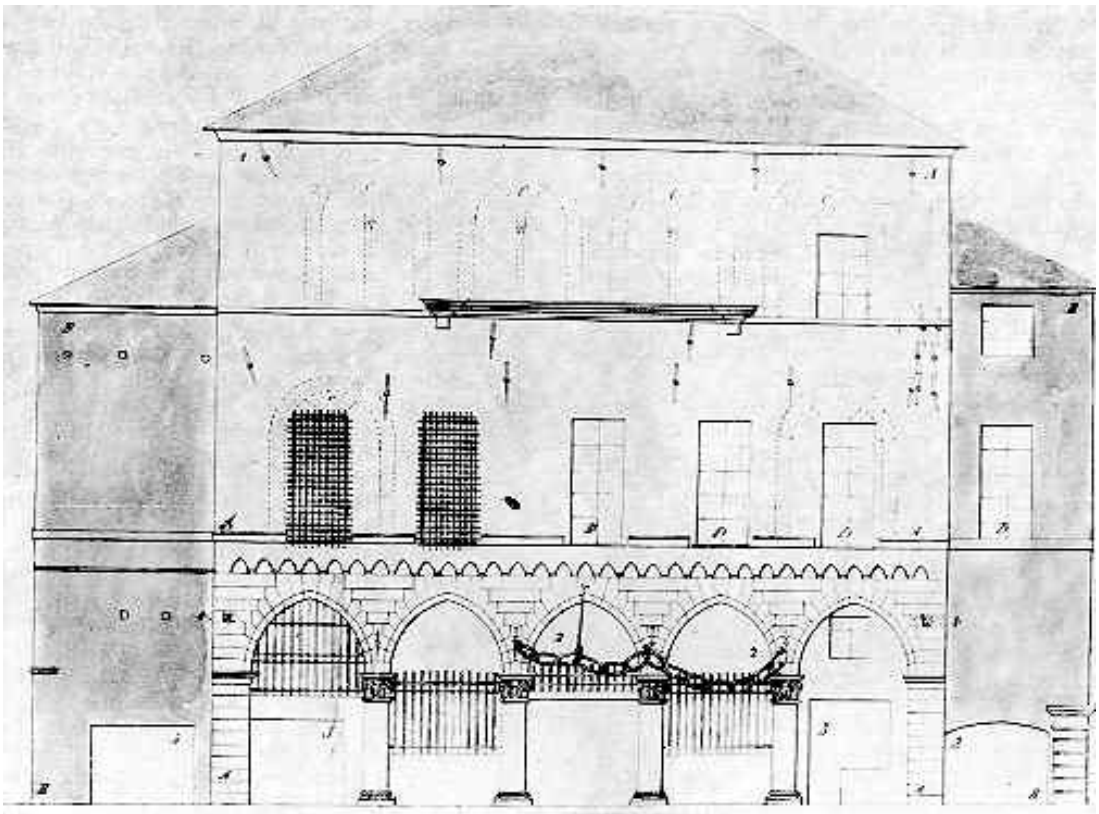
Franco Papo, Mare Antico, 1989

Chains of Porto Pisano are now preserved in the monumental Pisa Cemetery.



https://it.wikipedia.org/wiki/Catene_di_Porto_Pisano,
http://www.francobampi.it/liguria/pezzi/catene/catene_oggi.htm

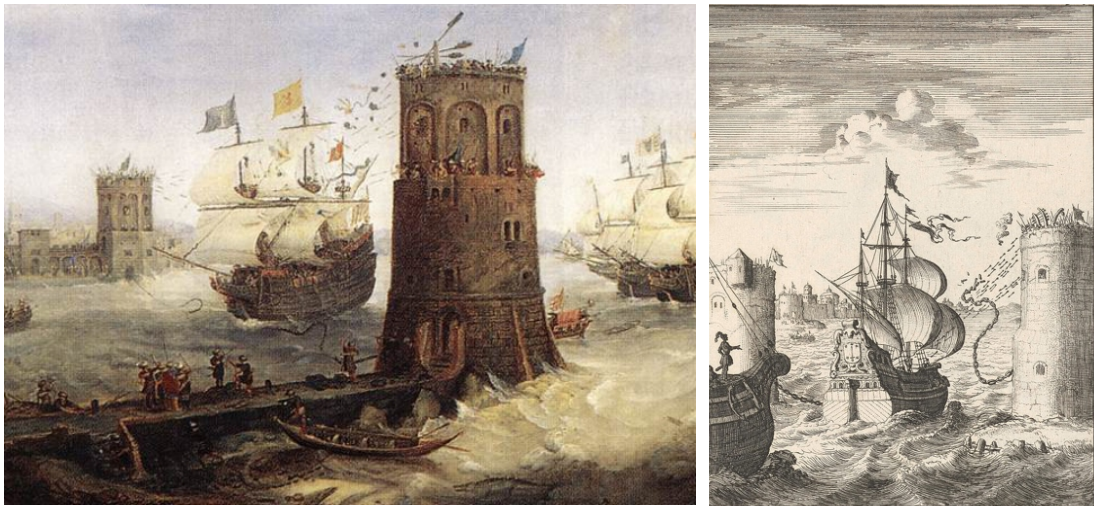
Chains dangling from Palazzo del Capitano del Popolo (Palace of San Giorgio).



http://www.francobampi.it/liguria/pezzi/catene/catene_genova.htm

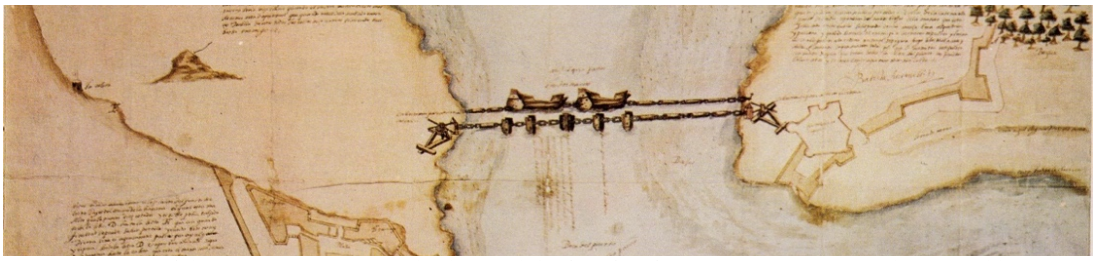
The siege of Damietta of 1218–1219 was part of the Fifth Crusade in which the Crusaders attacked the Egyptian port city of Damietta. The city, under the control of the Ayyubid sultan al-Kamil, was besieged in 1218 and taken by the Crusaders in 1219. The first objective of the Crusaders was to take the defensive river tower that protected the fortress of Damietta and anchored one end of a chain across the harbor. On August 24, the Crusaders captured the tower, paving the way for the fleet to attack the main castle.

Douglas Sterling, "The Siege of Damietta: Seapower in the Fifth Crusade 1217-1221 A.D," in *Crusaders, Condottieri, and Cannon: Medieval Warfare in Societies around the Mediterranean*, edited by Donald J. Kagay and L. J. Andrew Villalon, 101-29, Boston: Brill, 2003.



Detail from The capture of Damiate by Cornelis Claesz. van Wieringen, before 1628 [Frans Hals Museum, Haarlem], Conquest of Damietta and sailing on the chain, 1219, Jan Luyken, 1683.

One of the works of the Italian-born engineer Bautista Antonelli in the Caribbean. It is noteworthy that the use of chains was drawn with it's technique on the map.

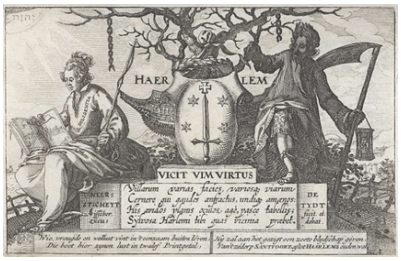


Representation of the entrance to Havana harbor and the first fortification system (1591). Plan signed by Juan B. Antonelli. Source: Archivo General de Indias (AGI), Maps and Plans, Santo Domingo, 12.,

In 1522, the first of several defensive chains that could be raised in an attempt to block the harbour entrance was ordered. A chain was built by II. Charles to block the entrance to the harbor (Gates, 1987).

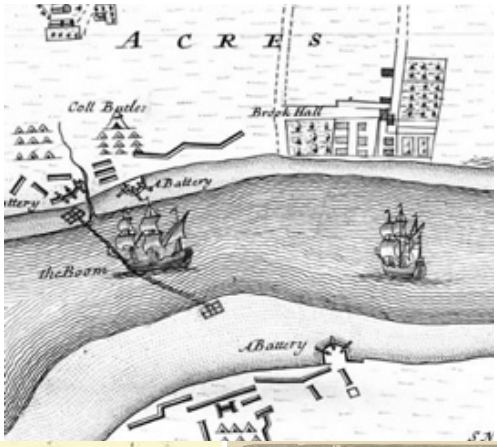

Map, c.1668, showing Portsmouth's fortifications, together with Fort Blockhouse on Gosport point and a defensive chain across the harbour entrance. The pair of links from one of the harbour boom chains that is on display at Southsea Castle, https://www.wikiwand.com/en/Fortifications_of_Portsmouth

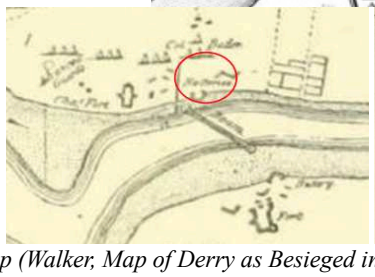
Dutch raid on the Medway shipyards in 1667, breaking the barrier chain that blocked the river was considered painful as a symbol of powerlessness.




Diligence and Time, by Claes Jansz. Visscher II, early 17th century and scene from the Chatham raid by Romeyn de Hooghe, 1667 (Rijksmuseum Amsterdam), https://thingsturnedup.wordpress.com/2014/02/15/how-they-broke-the-chain-at-chatham/, https://museumcrush.org/medway-the-forgotten-battle-that-shook-britain-to-its-core/

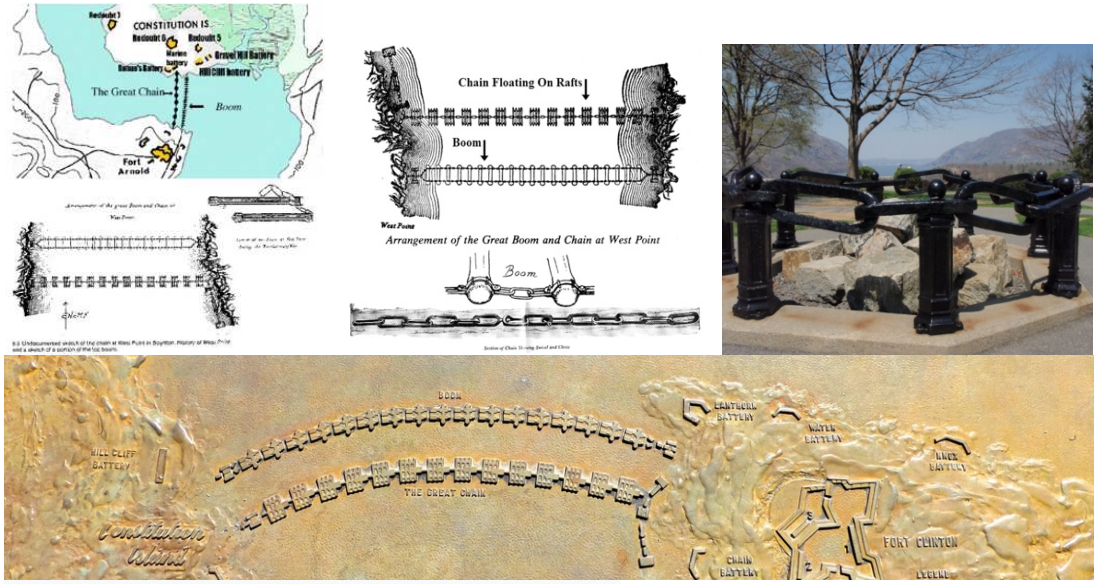
A chain was used to block the Foyle River during the siege of Derry.






1689 Siege Map (Walker, Map of Derry as Besieged in 1688-89], https://en.wikipedia.org/wiki/Siege_of_Derry

The West Point fortification Map describes how the chain barrier was used during the 1775-1783 War of Independence (the Hudson River Chain. It is seen that logs are passed between the rings of the chain used in the first line of the barrier. To construct this barrier, the logs must be attached with two rows of chains. In the other barrier, it is seen that a chain connecting the two shores was carried with the help of pontoons.



Map of West Point fortifications during the Revolutionary War, http://www.ringwoodmanor.org/robert-erskine.html , https://en.wikipedia.org/wiki/Hudson_River_Chains

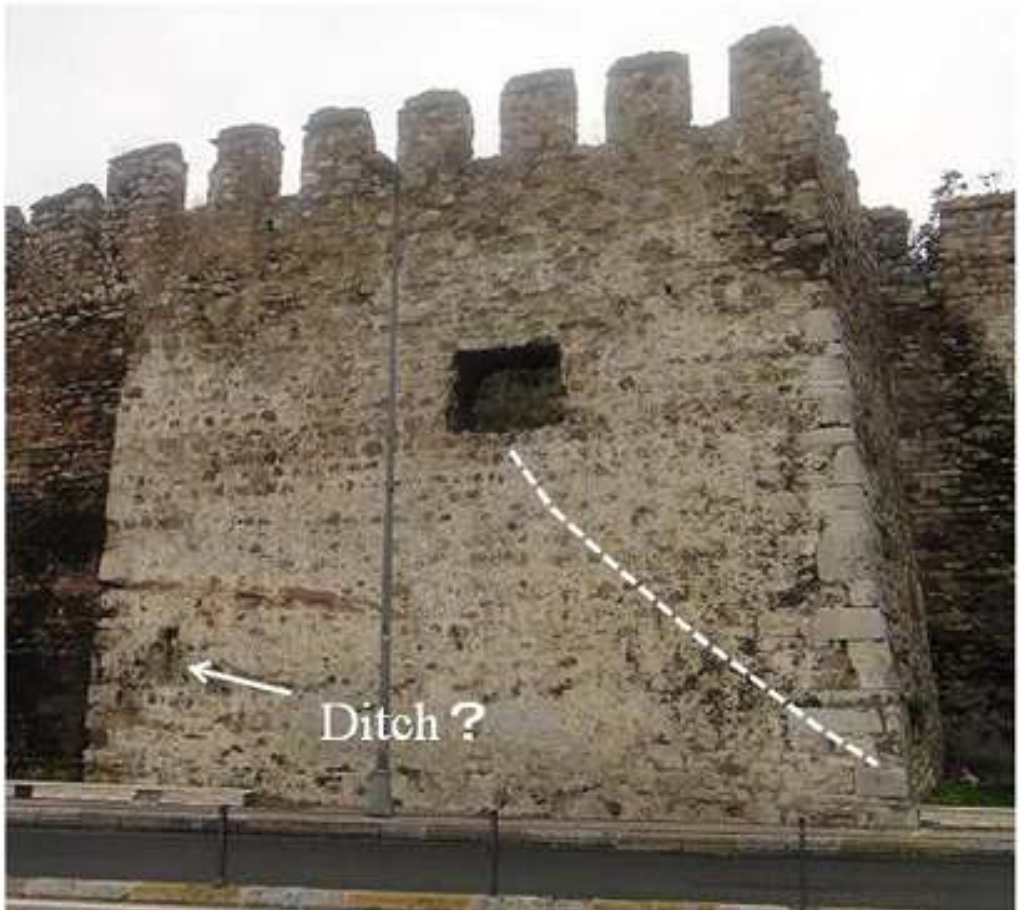
In the history of war, war strategies have also been used in which the ships are tied to each other with chains and the passages are tried to be prevented. An example is the Battle of the Vuelta de Obligado (1845), in which three thick metal chains were hung on 24 boats in the waters of Panama in the Argentine naval defense. As seen in figure, these chains are maritime chains, not the length and thickness of the chains that close the harbor.

Chain links used by Argentine forces during the war,https://en.wikipedia.org/wiki/Battle_of_Vuelta_de_Obligado

Budapest Chain

Personal Archive

Junichi and Yoshihiko Takeno argue that the southern terminus of the chain was at a tower roughly east of Topkapi palace and somewhat south of the usually accepted southern point. They support this theory by noting that the tower's construction varies from that of other towers and by citing marks on its walls where the chain might have been dragged. Importantly to their argument is the existence of a rather large opening in the tower. According to their theory the chain would have been pulled a distance along the shore before entering the water where it would be buoyed by floats (or logs). From there its weight would be negligible. Although the chain may have been pulled into the tower by a capstan they theorize that it also could have been drawn by a waterwheel using water from the Basilica Cistern, the Yerebatan Sarnici, nearby Hagia Sophia cathedral.



https://www.apuleiusbooks.com/2017/10/the-chain-across-the-golden-horn/

The metal object seen behind the chains is interesting. Similar objects of this object can be seen in the windows of the historical Mint building, which is right next to the Hagia Irene Church.

In 1452 Sultan Mehmet II made up his mind to conquer Constantinople which had withstood for centuries some of the most powerful armies in e world. When he came to the throne his plans were ready. He wouldbe the one to conquer Istanbul or Istanbul would conquer him. In fact had the slightest mistake been made, the fate of the Ottoman Empire might have been worse than that of the Interregnum.On 23rd March,1453, the Ottoman Army set out from Edirne, arriving at Constantinople on 2nd April. Their first attack on the city walls began on 6th April. However, on the Golden Horn a formidable obstacle was waiting for the navy - the chain across its entrance.

U Ğ U R G E N Ç

This book;
It is the English version of the book named
Haliç Zinciri with new findings added.