THE OLDEST MAP IN HISTORY

HUMAN AND CARTOGRAPHY

Humans always struggled to benefit and to protect from the harm and danger of nature, in which they lived and a part of which they formed, and also to have sovereignty over it. By time, the experience obtained from these efforts turned into science branches and technology which included various parts of information and brought humans to the level of civilization existing nowadays.

Additionally, science supported today's developments as it passed through the generations and searched for what had been done in the past. The experimental and scientific works, besides the unconscious and instinctive ones, and all works done in the past helped every single branch of science to illuminate their own histories.

Naturally; like other branches of science, the science of cartography makes a research about its history. That is why it is trying to find the old maps and examine the way of drawing, tools, materials and technology which have been used.

The maps, which are created to know about the earth and environment in which humans live, came out at the beginning of civilization. Generally, maps can be defined as an exhibition of graphical methods that shows the geographical, geologic and political qualities of narrow or extensive parts of the earth; based upon a scale. Through another point of view, these are the written documents that reflect the feelings of having properties and sovereignty. Since the creation of earlier maps, there have been much information confirming this view.

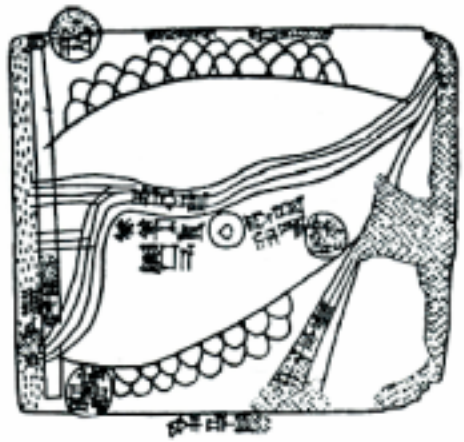
FIRST MAP ILLUSTRATIONS

According to the researches, the earlier drawings that can be accepted as map came out in the period of Middle Ages in the Prehistory Age (BC. 10000-80000). These drawings are the primitive ones showing some details of the earth such as river, mountain, and path. These are the maps of Prehistory Age. The Prehistory Age maps have been drawn on stable surfaces such as wall, cave wall and rock or portable materials such as bowl, leather, bone and pelt. These have been drawn either using pictographic style defined as a reflection of feelings and thoughts which represent the writings in that period or using petroglyphs style which represents scraping on the surfaces of materials such as stone, rock. Throughout the historical ages; as these maps were improved, they included more details and also, they were strengthened by written explanations.

According to recent evaluations, there are 57 maps belonging to the Prehistory Age. These are the maps of the Mesolithic Age, the Neolithic Age (BC. 8000-5000) and Metal Age (BC. 5500-3000). 37 of these maps are in France, 7 in Italy, 2 in Malta and 2 in Denmark. There is also one in Germany, Iraq, Jordan, Bulgaria, Morocco, Algeria, Egypt, Georgia and Turkey. The map in Turkey was found in Çatalhöyük.

Almost all drawings, except one, that were made in the Prehistory Age and can be accepted as map, include some details in a certain part of the Earth. Therefore, these can be mostly interpreted as descriptions rather than being accepted only as a map. Unfortunately, the map of Çatalhöyük made in BC. 6200 is the only one that can be defined as a map.

Yorgan Tepe Clay Tablet Map



Linear Appearance of the Yorgan Tepe Map

World Map on the Clay Tablet Found in Babylon

Cadastral Survey of Babylon Made on Rock (BC.4000)

SETTLEMENT PLAN OF ÇATALHÖYÜK

Çatalhöyük is the name of the place established on two tumulus in the Neolithic Age and very close to Küçükköy which is in a distance of 12 km in the north of a district called Çumra located in the southeast of the center of Konya in the Middle Anatolia.

Çatalhöyük was found by James Mellaart, the president assistant of English Archaeology Institute, David French and their colleagues in November 1958, but the excavations started in 1961.

By dating the foundlings with the method of radiocarbon 14, it was understood that Çatalhöyük was a big urban settlement place in which 8000-10000 people lived between the years BC. 6800-5700.

The main point that differs the settlement of Çatalhöyük from the settlement of other places of the Neolithic Age is that Çatalhöyük was experiencing the phase of urbanization while the other settlement places were in a phase of village. This level of urbanization is one of the qualities that must be focused on while examining the Çatalhöyük Map.

The architectural structure of Çatalhöyük represents an isolated settlement plan. The buildings constructed around the courts have formed the neighbourhoods and the city, Çatalhöyük, has been established by connecting these neighbourhoods.

Some buildings were used to shelter and live in and some were the places for holy worship.

"The Association of World's Monuments" in New York put Çatalhöyük in the list of world's 30 historical estates that should be protected.

During the excavations made between the years 1961-1965, many important and original works including the map of Çatalhöyük were found. Today, these excavations are still continuing.

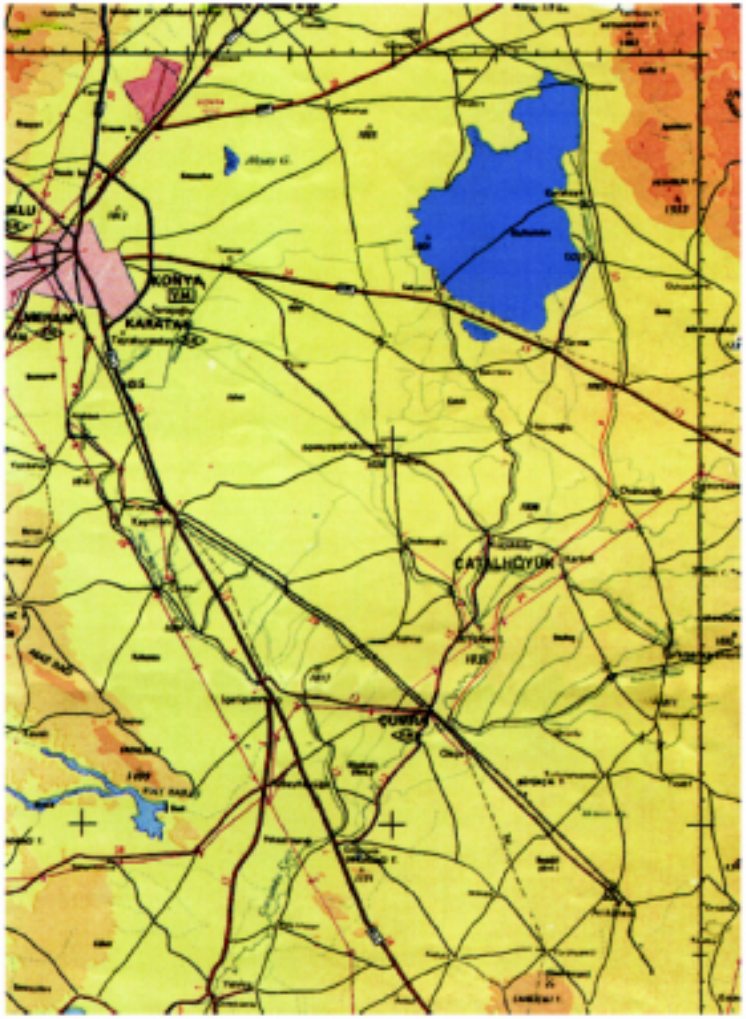
During the excavations made in 1963, the map of Çatalhöyük was found as a map showing the city plan of Çatalhöyük on the northern and eastern walls of a place which had been determined as a holy temple previously.

The large part of the map (approximately two-third) has been drawn on the northern wall forming the long side of the holy place and the other part (approximately one-third) has been drawn on the eastern wall forming the short side. The map drawn on burnished wall plaster had a thickness of 1-1,5 cm.

At the front view, various sizes of rectangular houses with slanting terraces have been carefully displayed and almost all houses have their own wall. An erupting volcano with two openings appears at the back of the country. On the surface of the mountain are the points which represent the rocks thrown by the erupting volcano. The lava comes from the top and flows through the foot. The grond is in cream-colour and the houses are in red. The Fresco is in a much destructed condition.

Without any space between them, the houses have been situated in adjacency to each other. The mountain Hasan, the contour at the back side, is the only mountain with twin tops in the Middle Anatolia, and situated in the east of Konya and also visible from Çatalhöyük. The volcanoes of the middle Anatolia died down in BC. 2000.

The main part of the map, which was located on the northern wall of the holy place and currently exhibited in the Museum of Ankara Anatolian Civilizations, could not be pulled out in one piece. It was pulled out in four pieces constituted by three pieces in exhibition and one piece in the store of the Museum. Additionally, the missing parts of the pieces in exhibition and unsystematic spaces among them point out that they were destructed while being



Konya, Çumra, Küçükköy and Çatalhöyük
(Reduced from the 1/250000 Scaled Hypsometric Map)

An Imaginative Picture of Settlement in Çatalhöyük

Color Drawing of the Çatalhöyük Map

Three of Four Pieces of the Map on the Northern Wall Being Exhibited at the Museum

removed. Also the plaster plate of the map, which was supposed to be smooth, had a defect in shape effected by 8200 years that have passed since that time. However, this defect in shape is not a handicap for the map to be read. The map is 3 m in length and 0,9 m in height.

As it is seen in the figure (the location of the map on the northern wall of the holy room), this piece of the map, which starts at the north-eastern corner of the northern wall of the holy place, ends at the north-western corner of the wall. The remaining small piece continues on the eastern wall of the holy place.

If the civilization level of the Neolithic Period is considered in detail, the map of Çatalhöyük comes out as a very successful work of art which can be interpreted by current technology.

KAŞGARLI MAHMUT AND THE FIRST TURKISH MAP

KAŞGÂRLI MAHMUD'S BIOGRAPHY

Kaşgârlı Mahmud (Mahmud bin Huseyn bin Muhammed), who lived in the second half of 11th century and put out a dictionary called "Divan-ü Lugati't-Türk", was a linguist in Turkish language. There is not too much information about his life, except some information given in this dictionary.

Hüseyin, Mahmud's father, was from Barsgan and Mahmud's grandfather's name was Muhammed. Mahmud was born in Kaşgâr where his father immigrated from Barsgan. There is not an exact information about the date of his birth and death.

Some of Kaşgârlı Mahmud's explanations point out that he was a member of high aristocracy and familiar to Karahan family. Mahmud explains in Divan-ü Lugat that his ancestors, who were "beys", were known as "Hamirs" by "Oguzes", but because of Oguzes' using "h" instead of "e", he points out that the correct word was supposed to be "Emirs". Using these records, it comes out that Kaşgârlı Mahmud was not directly from the Karahan family, but a member of Turkish aristocracy around this family.

According to the probability of his putting out this work in Baghdad, it is thought that Mahmud immigrated from Kaşgâr to Iraq. There is not any information about why and when he came to Baghdad. However, he told that he had been in Turkish steppes, learned about Turkish traditions, customs and various Turkish dialects, and got some notes about Turkish cities he had travelled in the districts and shores of the rivers Tarım, Çu and Sırderya (Seyhun).

Because of Terken Hatun, wife of the emperor of Büyük Selçuklular , it is known that lots of people from Kaşgâr came to Iraq and had an important place in Islamic culture. It is also probable that Mahmud came to Baghdad for such a reason.

Kaşgârlı Mahmud had a good education about Islamic science which was taught by Turkish scientists. During the period in which Kaşgârlı Mahmud was working on Divan-ü Lugat in Baghdad, some other works such as "Kutadgu Bilig" were put out in Kaşgâr.

Kaşgârlı Mahmud knew Arabic and Persian dialects and was able to write and speak in these languages as well as Turkish which was his native language. Hakaniye, Oğuz, Kıpçak, Argu, Çiğil, Kençek and Uygur were the Turkish dialects that Mahmud knew perfectly.

(Reduced from the 1 / 42,000,000 Scaled Political and Physical Map)

Kaşgârlı Mahmud was not only a linguist, but also a Turkish scientist who was equipped with encyclopedic information about Turkish history, geography, ethnography, folklore and folk literature.

Kaşgârlı Mahmud was not only a well-informed man, but also a soldier using gun perfectly. He always defended and focused on the important and particular role of Turkish people in Islamic public in that period.

He always gave more importance to his native language, culture and country even if he knew perfectly about Arabic language and Islamic science. Because of Divan-ü Lugat, he became the founder of Turcology.

His Works :

Divan-ü Lugati't-Türk, which occupies a particular place in Turkish language souvenirs of 11th century, is not only a dictionary; but also an encyclopedia that consists of valuable information about Turkish history, geography, mythology, folklore, folk literature and Turkish culture.

In this ancient dictionary, the words and their examples have been written in Turkish, but the texts, which are the explanations of these Turkish words, have been written in Arabic. This book has been written in order to teach Turkish language to Arabic people, but it has also been put out to prove that Turkish language has been as rich as Arabic.

According to Mahmud's expression, Divan-ü Lügat was started to be written on January 25, 1072. Kaşgârlı Mahmud made corrections four times after he had finished writing this book and completed on February 10th, 1074. He finished his work during the period in which El-Kaim was an Abbasid caliph, but he presented the book to El-Muktedi Billah who took the place of him.

The only copy of Divan-ü Lugati't Türk existing nowadays was copied by Muhammed bin Ebi Bekr Bin ebi'l Fethu's-Savi on August 1, 1266. He was from a town in Iran called "Save", but afterwards, he moved to Damascus. According to the expression of Muhammed from Save in preface of the book, this copy was obtained from the original copy written by Mahmud's own handwriting. The wrong grammar rules used in this book shows that Muhammed, who didn't know Turkish, also was not able to use Arabic efficiently.

Although it was known in the world of ancient Turkish and Arabic science, Divan-ü Lugat which had been forgotten for a long period of time, was found in Istanbul later on. After Ali Emiri Efendi had got Divan-ı Lugat copied by Muhammed; with the mediation of Sadrazam Talat Paşa, this Arabic copy was printed in three volumes in Istanbul under the supervision of Kilisli Rıfat Bilge (1915-1917). Since the edition of first volume; in the world of both Turkish and western science, there have been many writings and statements about this particular language monument and its writer, Kaşgârlı Mahmud.

In spite of being only a dictionary, Divan-ü Lugat also includes some information about the rules of using Turkish grammar. While writing this book, Mahmud focused on Arabic rules and divided the book into eight parts. This book has become a valuable and particular source in Turkish language history because of writing in the order of Arabic alphabet in each part, using unique sentences to be understood well and adding folk poems. Additionally, Kaşgârlı Mahmud gave some information about Turkish history, geography, mythology and social life. Mahmud explained that there had not been anyone else writing about what he had written and expressed that this situation was why he had met many difficulties.

There are two literary dialects in Divan-ü Lugat. One is Eastern (Hakaniye) Turkish which is still being used around Kaşgâr and the other is Oğuz Turkish which creates a large literature.

On the Horn of the Bull (Gültekin Çizgen)

The Fifth Layer (Gültekin Çizgen)

Additionally, Divan-ü Lugat includes important and particular information about Turkish dialects and their qualities.

Divan-ü Lugati't Türk gives us valuable information about geographical spreading of all Turkish clans, their social life and traditions. Mahmud has written their names and residences one by one. The book includes wide and important information about the ancient Turkish countries and these have a great value in terms of illuminating the geographical history of home country. The information given by Mahmud mostly depends upon his own observations. He collected the information when he was in his own country and then passed them into the book. On the other hand, in his book, he also used the information about some Islamic countries and the countries in the north of Tiyanşan. These were the information that he heard from other people.

Divan-ü Lugat is a unique treasure in terms of folk literature and Turkish folklore. In the book; in addition to the wide information about ethnography, there are also untidy but valuable materials about folk poem, folk music and tradition. There are also many examples for poems and proverbs of Turkish folk literature. That it comes from the most ancient Turkish literature gives this work a unique value.

Divan-ü Lugat was translated into our language by Rıfat Bilge from Kilis, and then by Tevfik who was an old deputy from Van and by Atıf Tüzüner from Konya. In a period, Samih Rifat and Mehmed Akif also worked on this subject. These translations of Divan could not be printed because all these attempts did not give the desired results. Finally, Besim Atalay undertook this translation work and made our national library have this work completely. Atalay's translation, which was one of the publications of Turkish Language Association, consisted of 5 volumes in which there were 3 originals, 1 copy and 1 index (1939-1943). Publishing Divan-ü Lugati't Türk became a very important event in our history and also in the history of western science (1915-1917). After publishing the book written in Arabic alphabet in 3 volumes, there have been many writings and books about the subjects in Divan such as language, history, geography, mythology, folklore and folk literature.

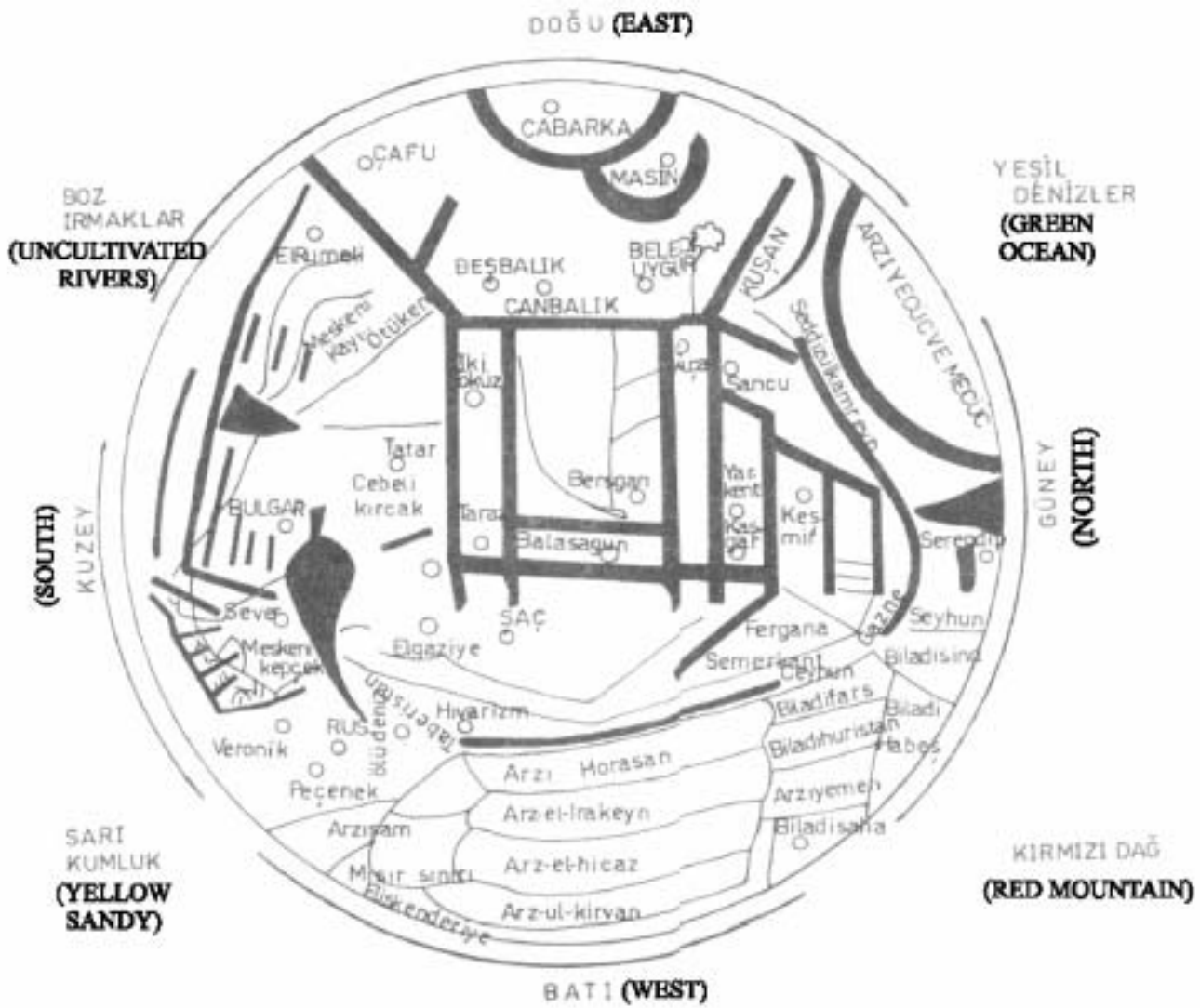
Even if it is known that Kaşgârlı Mahmud wrote another book called "Cevahirü'n Nahiv fi Lugati't-Türk", it doesn't exist nowadays.

First Turkish Map :

In Kaşgârlı Mahmud's first Turkish World Map, which he added to his work called Divan-ü Lugati't Türk, the places, in which the Turks lived, and the nations and the countries, which they have communicated with, have been pointed out. This map includes a large part of the Middle Asia, North Africa and China. It is bounded by the River Volga on the west. This map, which indicates that the world is smooth like a tray but circular, has the features of a croquis. In the map, the mountains have been displayed in red, seas in green, rivers in blue and sandy places in yellow. The center of the map is the city Balasagun in which the Turkish sovereigns lived. The Lake Isıg is very close to this city but not signed with its name. It is normal that Kaşgârlı was not hesitant while choosing the center of the map because of being from these lands. Therefore, Kaşgârlı's own lands became the center of the world in his map. Kaşgârlı, who had never neglected the Turkish superiority, did not hesitate to show his nationalism at this point.

The other geographical names, the countries and the names of places have also been arranged based on the center of the map. According to the ancient Turkish traditions, the directions are parallel to the ones in Orhun inscriptions. Therefore, he formed the main direction center of the map correctly. The importance given to the places, in which the Turks lived, was also given to other countries and nations that were in communication with the Turks.

The World Map Of Kaşgarlı Mahmud



Turkish Translation of the World Map Belonging to Kaşgārlı Mahmud

The places or the nations that are not in relation with Turks have not been situated in the map. The formation of the center with the city Balasagun, pointing out the places covered by Turks very carefully and showing the names of places clearly indicate that the map is a work of a Turkish geographer. In Hun Turk's Era, in the life of the Middle Asia State Organization, it became a Turkish tradition to give map as a gift among the members of the palace because of Bairams. The country map, which was sent to Chinese Emperor by a foreman of Hun, had the meaning of entering the nationality. Kaşgârlı Mahmud's Map has got a great value in terms of 11th century Turkish imperialism, although the existence of two ancient Turkish maps belonging to the East Turkistan is known.

The Turkish clans, whose places and residence regions have been shown on the map, are made up of twelve main origins according to Kaşgârlı Mahmud's ethnic classification. Each clan is divided into other different clans in their own structure. Only the main clans were included in council. The Turkish clans and descendants have been neglected because of forming a great number of people. Only the ones who were accepted as a requirement and the ones whom everybody had to know were included in the council.

THE TURKS AND THEIR WORKS IN THE HISTORY OF WORLD CARTOGRAPHY

MAP AND THE TURKS

Like other nations which have a reputation in the science of cartography; Turks, who had been almost in all places of the ancient world because of climatical, economical, social and political reasons, learned about the geographical and structural qualities of the places, in which they have lived, and turned them into the drawings in the shape of map as long as the technical opportunities of that period were sufficient.

BEYRUNİ (BİRUNÎ)

In Turks, the beginning of the scientific studies about geography reaches over to Beyrunî (Ebu Reyhan El Birunî), a major Turkish scientist. In the period of his education, there were not any other scientist who was able to rise to Beyrunî's level in the Western and Islamic World. Science historians also named the 11th century as the Age of Beyrunî. He was born in a place near Ket, the capital of West Harezm, on September 4, 973. He gives information about his nationality in his work, Kitabu's Saydene. He explains that he was not able to write any book in his native language, which was not scientific and that he has learned the Arabic and Persian languages but had difficulties while using these languages.

Beyrunî, who entered the Harezm Palace when he was a child, was educated about Mathematics and Astronomy under the supervision of the scholars such as Ebu Nasr and Samed El Hekim. After the East Harezm's sovereignty on the West Harezm, he firstly settled in the city Rey near Tahran and then settled in Cürcan. He was accepted to the palace of Sultan Kabus and continued his studies here. When he presented El Asaru'l Bakiye, his work about history and chronology, to Sultan Kabus, he was only 28 years old. He came back to Harezm in 1009 and continued his studies in the palace of El Memun. In these years, he also came together with Ibn-i Sina who was a famous Turkish scholar. A small book including the arguments of these two scholars about philosophy and physics has reached to our period.

Beyruni (on the left). Kanunüddünya (15th Century), The Library of Topkapı Palace Museum

After Harezm had been captured by Gazneli Mahmud in 1017, he settled in the city Gazne and continued his works. After Gazneli Mahmud's period; his son, Mesud, and his grandchild, Mevdud, were also respected in their own periods. He died there in 1052.

The common quality of the scholars in the Middle Age is that they worked on many branches of science. This quality comes out in Beyrunî's character. It is known that Beyrunî produced 148 works and wrote 110 books on the branches of physics, medical science, pharmacy, the science of nature, geology, sociology, history of philosophy, history of religion, linguistics and especially mathematics, geography and astronomy. However; only 32 of them exist today.

He stated that the world was revolving around the sun and its own axis. He is the first representative of this opinion in Islam countries. He calculated the specific gravity of the eighteen valuable gems and minerals. He wrote the book called "History of India" in 1032. In many parts of this book which focuses on India of the Middle Age , he explained the subjects about the Indian inventions on the branches of mathematics and astronomy. His book about geography is in the Library of Fatih. In his book named "Asarı Bakiye", he summarized the information about calendars and time calculations in some countries such as Arabia, Greece and Pers. Al Kanun Al Mesudi (Mesud's Law), the book written for Gazneli Mahmud's son in 1030, has the quality of an encyclopaedia and is very important for the history of trigonometry.

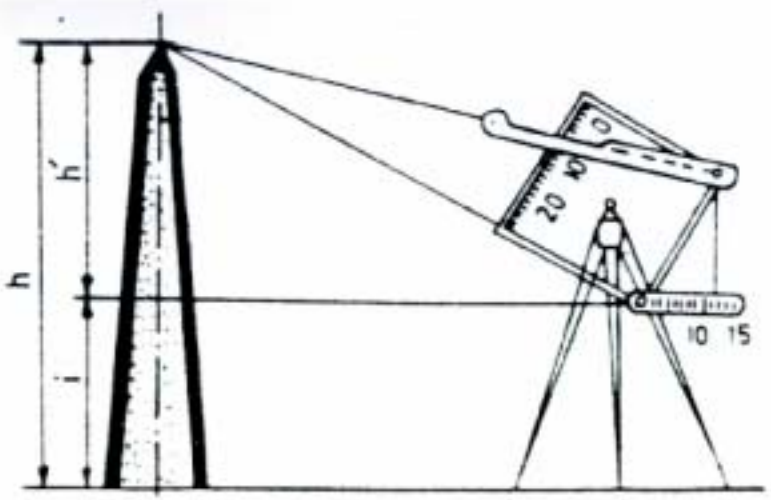
In this book, he compiled the information written before him and added his own observations and calculations. In this book of 11 volumes, he explains the subjects about trigonometry, time and calender, spherical astronomy, special astronomy problems (the movements and shapes of the moon in different times, the movements of the planets, star catalogue) and geodesy.

In this book, he tells about a different method of determining the size of the sphere. Therefore, he measured the angle as $\alpha=33'$ between the sea horizon and the horizontal line of mountain Zira el Savda, which is 652 cubit in height to the coast of Indian Ocean, and found out that one degree of meridian is 58,2 miles (~118,1 km) in length and the circular length is 6800 parasangs (~42516 km) and R is equal to 3333 Arabic miles (~6426 km) based on the correlation $\cos\alpha=R/(R+h)$.

Beyrunî used some methods to determine the latitude by observing the star eclipse and determined the longitude difference during the sunrise by observing the moon eclipse. By using a triangular chain, he determined the longitude differences of all cities located up to Gazne in the east of Baghdad. He took a meridian located in 24 degree west of Greenwich as the starting point because longitude values were different from the values used today and this difference is 24 degree.

In his work about geodesy, he has given a large space to the azimuth calculation by the geographical co-ordinates of the mosques constructed in the direction of Mekke (qibla) and in a way that the builders could understand, he has clarified two methods about the determination of azimuth on a plane.

Beyrunî defined various tools in order to measure the angles and most of them were made by himself. He made a 7,5 m horizontal circle in 994 and a gnomon for watching the shadow. Using this tool, he measured the altitude of the sun and the azimuths in the detail of 2'. He made important astronomical observations by using the quarter circle made in 1016, which had 1 degree section and 3 m diameter. This tool was made of an alidat, which can be curled in the middle, and a ring, which had a 1' section and was made of metal and board. Using this tool, he was able to measure vertical angles. In order to increase the details, the diameter was taken longer. In 1019, Beyrunî used a quarter circle with 1' section and 4,5 m diameter. Using



The Altimeter of Beyrund

The World Compose of Seven Climates:1.Climate:India, Sind, 2.Climate:Ethiopian, Aden, Arabian Country, 3.Climate:Syria, Egypt, Sudan, Maghreb, 4.Climate:Iraq, Iran, Horasan, 5.Climate:Greek (Anatolia), Azerbaijan, Europe, 6.Climate:Khazar, Turk, Russian, 7.Climate:China, Tibet, Maveraünnehir. The Circular Diagram Has Been Oriented to the South. Beyruni, Tahdid-u Niyayati'l Emakin, Fatih Library

this tool, which was made by him to measure the height, was coming from the principle of measuring the length. In his book that he explained the Astrolabe and how to measure the length by using a quarter circle, he pointed out the solutions of the problems about the depth of well etc, and the difficult calculations on measuring the distance which could not be reached. It is also known that he invented a machine in order to divide the quarter circles into pieces.

Beyrunî, who thoroughly worked on geography and mathematical geography, gave priority to determining the latitude and longitude of the settlement places. The navigation has great importance in Islam. The necessity of turning to the Gibla at the time of Namaz forced the geographical locations of the Islamic cities to be determined according to Mekke. Also, the time of Namaz, which is related to the geographical location, put out the necessity of determining the times of sahur and iftar in Ramadan and giving special importance to these studies.

As it is explained in his work, Tahdid-u Nihayati'l-Emakin, Beyrunî showed the geographical information of some countries on a hemisphere with a diameter of 6,8 m made by himself. Therefore, he showed the geographical locations of the cities and countries practically on the hemisphere on which the latitudes and the longitudes had been drawn previously. By suggesting projections for the maps of land and sky, he showed the conical and cylindrical projections by the pictures for the description of the hemisphere to the plane. He stated that he was planning to create a detailed world map at the end of these studies. The geography of Batlamyus, the mesalik and memalik geographical works of Islamic scholars and his own information are the sources of this map. However, he tried to correct Ptolemaios' mistakes in the determination of position.

XV.-XVI. CENTURY

OTTOMAN CHARTS

Since the Ancient Times, humans have struggled to know about the places and surroundings in which they have lived, to determine the secrets of the natural events and to improve their living conditions by benefiting from them. The geographical discoveries has a particular importance in these efforts. These discoveries, which were more organized and conscious especially in the XV. and XVI. Centuries, form one of the basic stones of the current world civilization.

This period, which is also known as 'the great overseas journeys', is named as 'the period of the great geographical discoveries'. The most important features of this period were making people benefit from the arrived place by the way of feedback and forming the base for the scientific geographical discoveries. Another feature was becoming dense on the oceans. This period, which started with the discovery of the Canary Islands in 1395, continued in spite of some pauses of 10-15 years and new places and roads were found. On the other hand, the New World (America) was found during the journeys toward the west and later on, they went to the Asia by passing through the Pacific Ocean from the west.

Christopher Colomb, who departed from Palos on August 3, 1492, was able to arrive at the Bahamor Archipelagos of the New World on October 12, 1492. After Colomb's first journey, these discovery journeys gained speed and were carried out up to the coasts of the Middle and South America on the 52. Southern parallel. Passing through the strait which had his name, Macellan went to the Pacific Ocean (1520), the Indian Ocean, the Cape of Good Hope, the West Africa and came back to Spain.

The Gunboat Made in Istanbul Shipyard in II. Beyazıt Period
(Kâtip Çelebi, Library of Topkapı Palace Museum)

The importance given to the seamanship by the Turks as soon as they arrived at the Anatolian coasts increased gradually. The Mediterranean was turned into a Turkish lake and on the other hand, the shipbuilding technique and the shipyards were improved. It is natural that the brave, well-informed and foresighted sailors were educated by such a government. Based on the information above; XV. and XVI. Century Ottoman charts occupy an important place in the history of world cartography. This works, which was produced in the development period of Ottoman Government, have the quality of an important historical document belonging to those years. That the Ottoman region includes the countries, which are out of their sovereignty, may provide us the information about the most important purpose of map production. The charts produced by the Ottoman levent (sailors) chiefs, who had superiority in almost every part of the Mediterranean, attracted the attention of the Sultans in that period and their production was supported and probably ordered to be completed. It is a rumour that the victorious sultan said, “how small the world is for a conqueror" when Piri Reis presented the first world map to Sultan I. Selim who conquered Egypt in 1517. It is normal that Ottomans, who attempted to conquer the world, collected information about the new countries. One of the main factors that provided the formation of the charts is the unprevented development of the Ottomans' victories on land and sea from the last quarter of the 15. century. This development would not be limited to the Mediterranean, but also cover the Black Sea, the Red Sea and the Indian Sea. The cradle of the Mediterranean civilization passed to the Ottoman Turks' sovereignty. Ottoman Turks, who separated from the structure of migratory society and was supported by the information of the Islamic civilization and the East, produced unique works after storing the information of the advanced West illuminated by the Renaissance in the Mediterranean.

Most of the sailors in the Ottoman Turks, who set sail in the Mediterranean, were not only ordinary ship captains, but also the pirates and sea wolves that chased, found and captured. The new world map of Columbus was captured by Piri Reis as a result of such an effort. The maps in all ships were accepted as the most valuable loots. In addition to capturing; understanding and using were also the most important points. These are what Piri Reis and Ali Macar Reis did. Columbus' map was not the only one captured by Piri Reis. He also captured many different maps and created unique world maps by using his knowledge, experience and talent.

One of the most important events of this period was Admiral Hızır Hayrettin Pasha (Barbarossa)'s letter to Sultan Suleiman the Magnificent telling about his desire of putting out to seas beyond the Strait of Gibraltar. This letter is situated in Historian Mehmet Esat Efendi's work named "Hulasa-i Ahval Tunusia and the West" registered with "number 6145 of Turkish Writings" in the Library of Istanbul University. Hızır Hayrettin Pasha's knowledge about geography and his interest in the New World clearly comes out in this letter.

Sultan Suleiman the Magnificent asked Ibrahim Pasha, the army commander who was in the barracks in Halep at that time, to evaluate the situation by writing him about his opinions. It was understood later that both the Sultan and the army commander did not have any permission for Hızır Hayrettin Pasha (Barbarossa)’s wishes about campaigns.

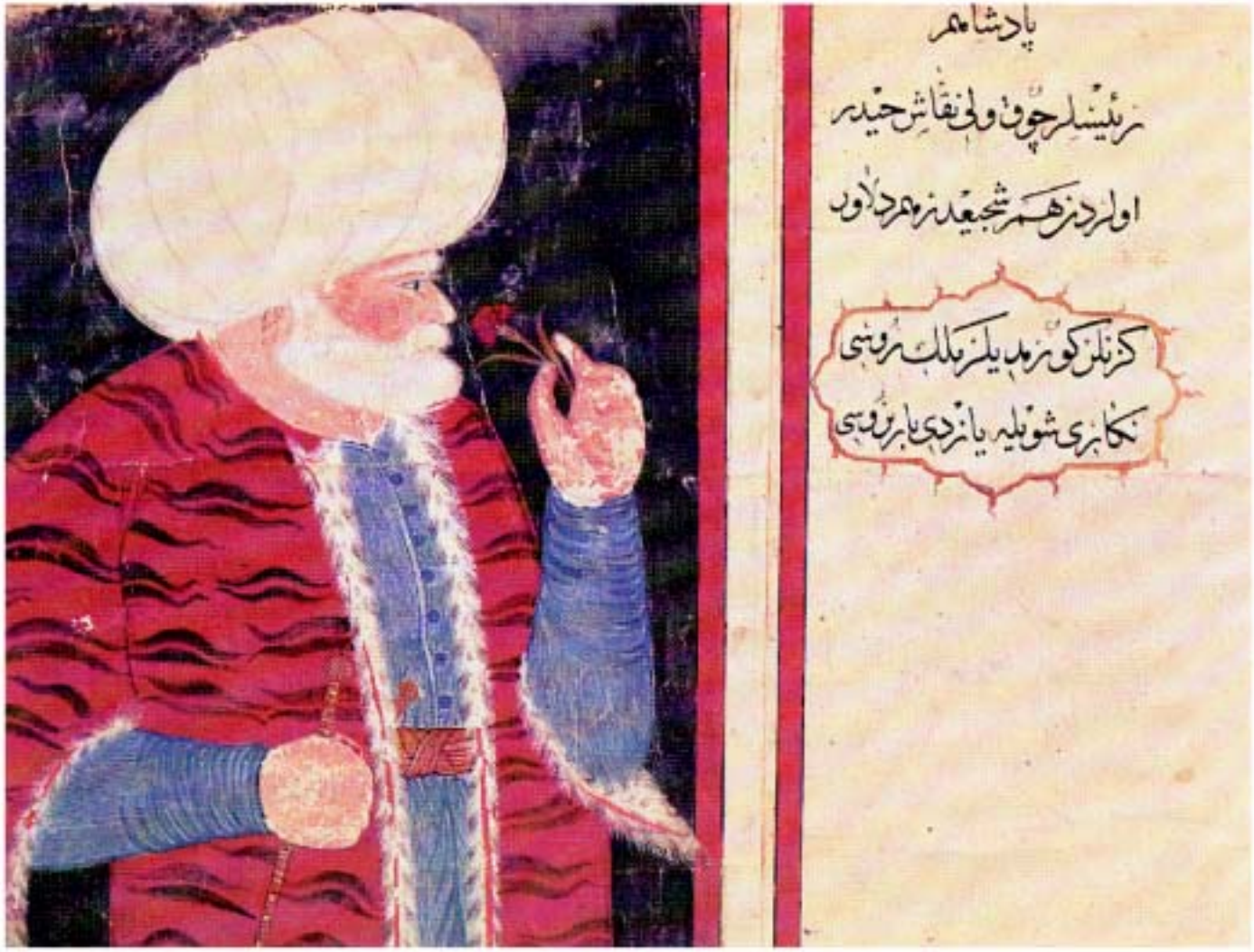
Hızır Hayrettin Pasha, who had enough information about America, wanted to show his new, realistic and correct targets on his letter by using his foresightedness and ability to collect this information and his huge knowledge about geography and astronomy to use this information.

It is estimated that his suggestion was not supported since the politics of the Ottoman Empire focused on the east and southeast at that time.

Ottoman Galley and The Costumes Belonging to the Navy
(Library of Istanbul Naval Museum)

Discoverers in the America Continent, Library of Beyazit

Flags Belonging to the Ottoman Navy, Library of Istanbul Naval Museum



Admiral of the Fleet Hızır Hayrettin Pasha (Barbarossa)
(16. Century, Topkapı Palace Museum)

TAKİYÜDDİN

Takiyüddin, who is thought to be an Arabian-origined according to the western sources because of the writing of his name, was born in Damascus in 1521. In the pedigree at the end of his work named Reyhanetü'r Ruh written in Nablus in 1567-1568, he clearly mentions that he was a member of a Turkish family that settled in Syria in the VIII. Century. Takiyüddin was educated in Damascus and Egypt and was a teacher and a judge. When he was a judge, with the direction of Abdülkerim Efendi, who was the judge of Egypt and the grandchild of Ali Kuşçu, he focused on mathematics and astronomy and started to make observations. He came to Istanbul in 1570 and became the chief-astrologer of the Ottoman Palace in 1571.

Being supported by Sokullu Mehmed Pasha and Hodja Sadettin Efendi, he got the permission of III. Murad, the sultan in that period, to establish an observatory. Istanbul Observatory located on the upper parts of Tophane was in action between the years 1575-1580. It is known that a comet was observed from there in the Ramadan of 1977 and this astrological event attracted the attention in Istanbul.

The miniatures in the work named Alât-ı Rasadiye li Zic-i Şehinşahiye point out that Takiyüddin made many observation tools for the observatory. Almost 20 of Takiyüddin's works are mostly about astronomy. In two of his works, he about the sundials, watermeters and mechanical tools in which III. Murad was interested.

There have not been many researches about Takiyüddin's interest in cartography although it is known that he was the founder of the first observatory in the Ottomans. His two works named "Reyhanetü'r Ruh fi Ale'l-Müsteviy'il-Sütuh" and "Düsturü't-Tercihli Kavaidü't Tastih" were about making and using map. Besides Kitab-ı Bahriye, these works of Takiyüddin are the important ones of the books about cartography.

The work named Şehinşahnâme, which was written by Alaaddin Mansur in verse, tells about the first period of Sultan III. Murad's sovereignty years and includes information about the observatory.

The miniature in Şehinşahnâme displays the observatory room. The chief-observer, Takiyüddin, and other observers appear to be using the tools. It can be said that the globe in this miniature was made by Takiyüddin.

On the globe, the Mediterranean's being longer than it is, Brazil's approaching to Africa toward the east and the South Pole's getting closer to the Cape of Good Hope attract the attention. However, it is seen that the places, which have been just discovered, have been drawn closer than those on Pirî Reis' maps.

As a matter of fact that the astronomy and mathematics are the most important scientific branches supporting cartography, it can be easily said that Takiyüddin did not meet many difficulties while making the globe because of his wide knowledge on these subjects.

The first and the only observatory of the Ottomans, but the last one in the Islamic world, was destroyed with an artillery fire with the order given by Sultan III. Murad to Kılıç Ali Pasha in 1580 as a result of the provocation of Sheikh ul-Islam Judge Ahmed Şemsettin Efendi. That this event occurred in a period in which the Danish astronomers, Tycho Brahe (1546-1601), made observations and Kopernik (1473-1543) proved his famous theory depending upon these observations is a bad luck for Turkish astronomy.

The Sons of Murat III in front of the Portal of the Old Seraglio
(Library of Topkapı Palace Museum)

Murat III Presenting a Robe or Hilat to Osman Pasha
(Topkapı Palace Museum)

The Plan of Istanbul and a Comet Observed in the Sky of Istanbul in 1577, Library of Istanbul University

Takiyüddin and His Observer Friends in Istanbul Observatory Library of Istanbul University.

İBRAHİM MÜRSEL (TABİB İBRAHİM EL-MÛRSÎ)

There is not much information about this Turkish sailor who is originally from Trablusgarp. He has an important place in the history of Turkish cartography because of the Mediterranean map he has drawn in 1456 and the map of the South Europe made in 1460. Among the maps which have become a source for Ali Macar Reis' Atlas made in 1567, the map of the South Europe which perfectly shows the Mediterranean, the Aegean and the Black Sea, was a masterpiece in terms of history and quality. This map exhibited in Istanbul Naval Museum was not only the main source of Ottoman cartography, but also that of Venice cartography.

FATİH SULTAN MEHMET AND MAPS

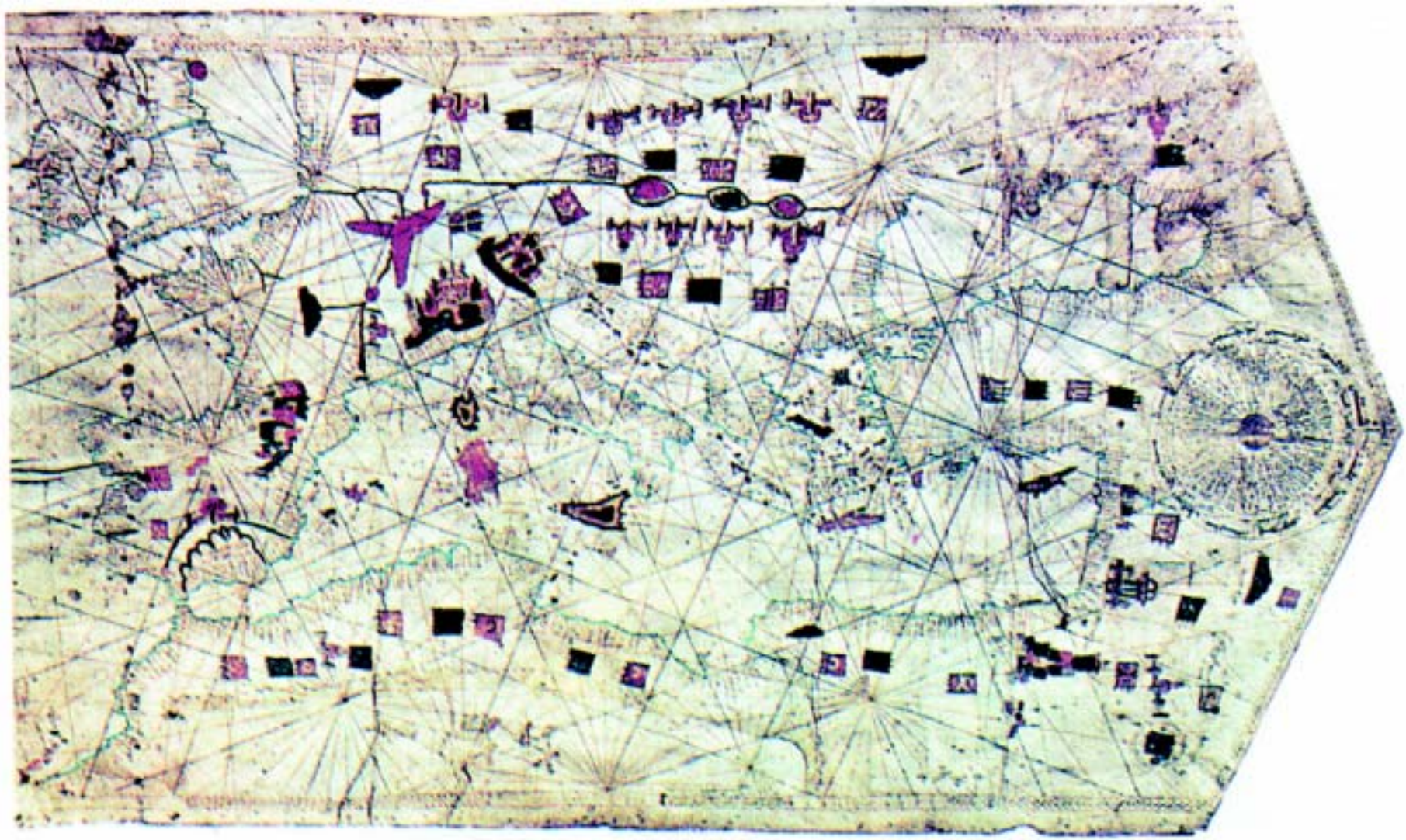
The second part of the XV. Century were the years in which the Ottomans moved forward to emperorship rapidly. The most urgent subjects in the agenda of the Ottoman Sultans were the conquest of new countries and extending the borders of the empire. The information about the road maps, topography and administrative geography of the foreign countries was needed urgently for the military operation. Geography started to proceed in a more universal direction after getting rid of its traditional meaning. Fatih Sultan Mehmet (II. Mehmet) established the basis of this beginning. The Conqueror of Istanbul, who has the reputation as the greatest protector of the Middle Age science and knowledge, had a wide vision that made the Ottoman-Byzantine and the other Occidental scholars work together. He wanted to provide the participation of the philosophical and scientific thought in the Medresseh education, which had been intensified with religious information. The mathematics and astronomy scholar, Ali Kuşçu who had been educated in the Semerkant Observatory established by Uluğ Bey under the special concern of Fatih, started to teach in Ayasofya Medresseh for the daily fee of 200 akçe (a small silver coin). İn the period of Fatih, the mathematicians and astronomers such as Mirim Çelebi, Hocazade Sinan Paşa took a particular role in the settlement of the positive sciences in the Ottomans.

Fatih's interest in geography and archaic maps attracts the attention because of the geographical books left from his library till today and the old maps made on the leather. It is perceived that the purpose of this intensive source collection is to have a perfect world map made.

II. Mehmet who conquered Istanbul in 1453, gathered many foreign scientists and artists whom he charged with protecting the Byzantine antiques and work of arts. Georgios Amirutzes was one of these Byzantine doctors, philosophers, astrologers and mathematicians.

Fatih Sultan Mehmet was interested in the 'Geographia' of Batlamyos and since the world map was missing in the writing of this work in the library of the palace, Georgios had a Greek and Arabic World Map made for Amirutzes based on the Batlamyos' article and had this woven in a large carpet. Later on, he charged Georgios and his son with translating Geographia into Arabic. When he learned that there was a good Latin translation of this work in Italy, probably in 1450, he obtained a copy made by Francesco di Lapacino from Florence.

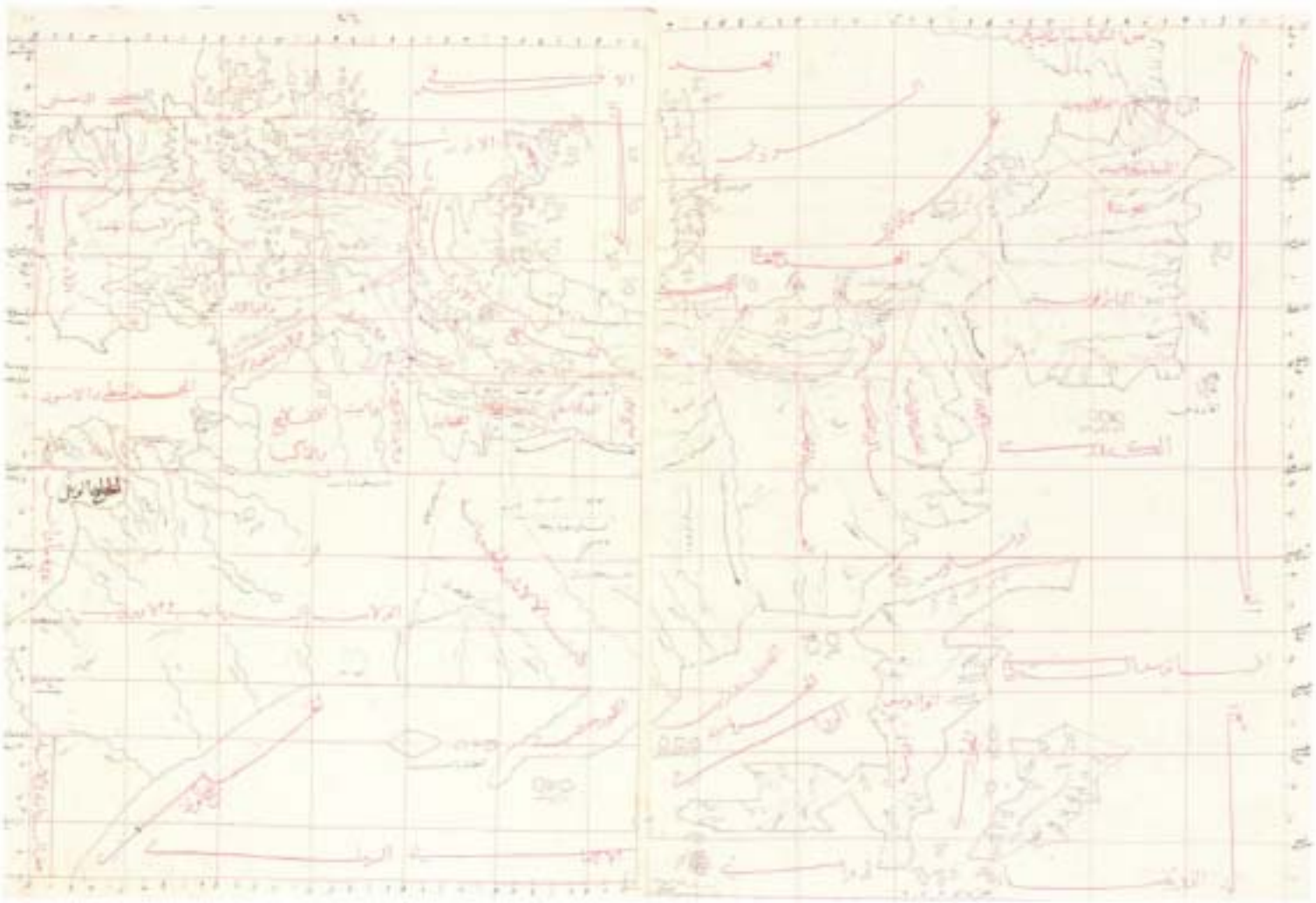
Francesco Berlinghieri, who knew that Fatih Sultan Mehmet was interested in the works of Batlamyos, sent him a new printed copy of Geographia (1481) with his signed dedication later on. Fatih died on May 3, 1481 and then, it was presented to II. Bayezid with a letter of dedication. The hand-writing of the Geographia of Batlamyos mentioned above, is currently in the Topkapı Palace Library but the clues of Georgios' world map and its woven form have not been found yet.



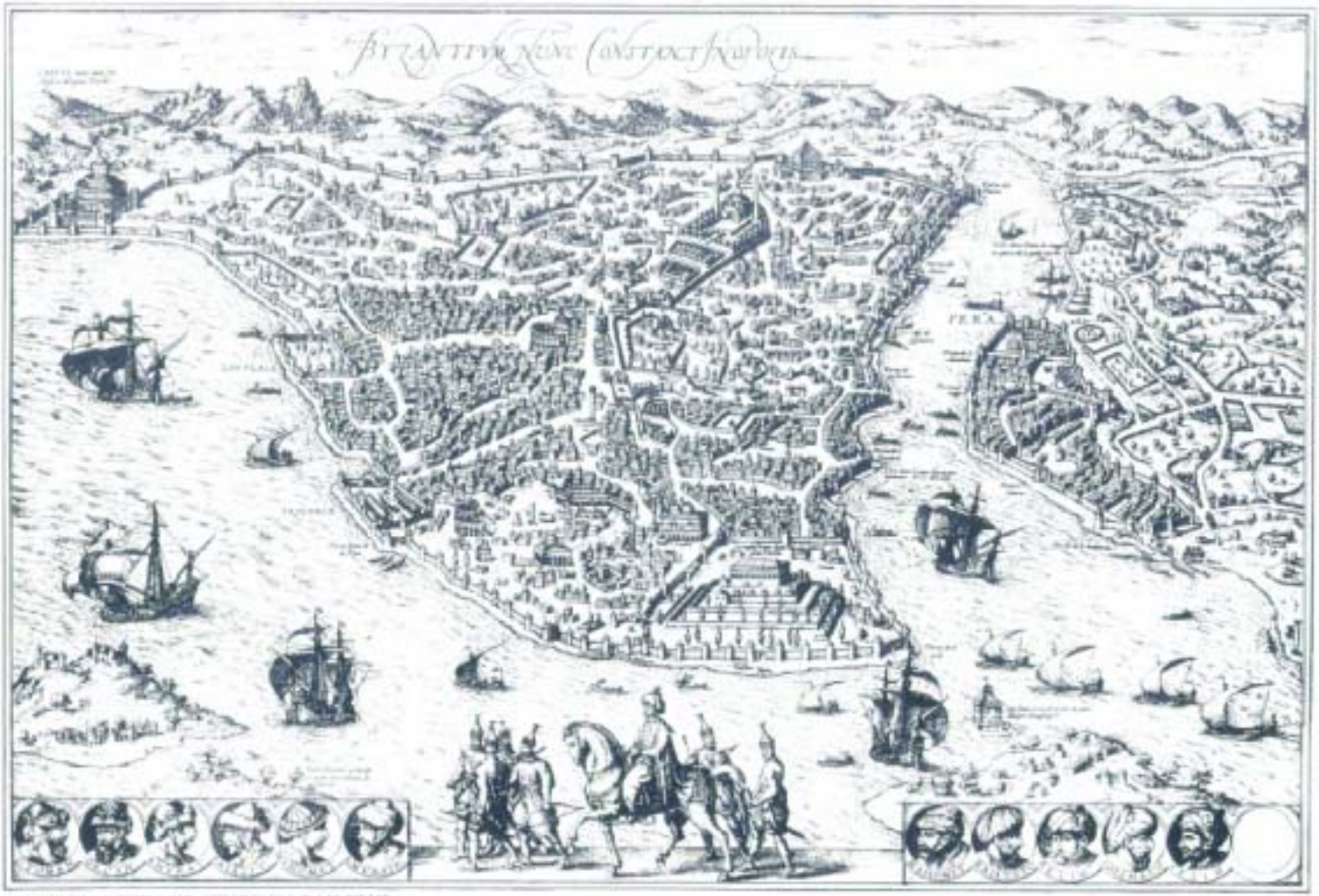
South European Map of Ibrahim Müsel (1460)

Portrait of Fatih Sultan Mehmet. Constanzo da Farrara
Topkapı Palace Museum

The Map of the Eastern Anatolia in Ptolamoios' Book "Geographia" Prepared by Amirutzes. The Ayasofya Library. No:2610. The Map Has a Reverse Image Because of Being Oriented Towards the South



The Map of Europe. From the Translation of Ptolemoios (Batlamyus)'s Geographia. No:2610
(The Map Has A Reverse Image Because of Being Oriented Towards the South)



Plan of Ancient Istanbul. Printed in Venice Between 1566-1574. According to Dr. Mordtmann, the Original of the Map Belongs to Amirutzes. İstanbul1889. Library of Istanbul University . No: 902/6

In this library, there are some Italian charts and pieces of the interesting Catalan map left from XIV. Century. Among them, there is Cristoforo Buondelmonte's Aegean Isolaria and an atlas consisting of 12 maps made by Grasioso Benincasa in the second half of XV. century. The existence of these maps in Topkapı Palace Library is not a coincidence; the maps of Pirî Reis, the famous Turkish sailor and charter, were all in the same collection and these constituted the sources of his works.

Besides Fatih's world map, it is known that he had Georgios Amirutzes made a plan of Istanbul. The first print of the plan has the date of 1558, second print 1889, but it does not have the signature of Amirutzes. Under the plan printed in 1889 are the names of the Ottoman Sultans up to II. Selim. However, it is seen that the mosques, the medresseh and the buildings made after the period of Fatih are not situated in the plan. The old and new palaces, the Fatih mosque and medresseh are located in the plans. Therefore, it is understood that the original one was drawn in the Period of Fatih. It is mentioned that Fatih made corrections with his hand-writing in the original plan. The original work could not be found. The interest in geography and maps in the Ottoman Palace, which started because of Fatih, increased in the XVI. Century. As a result of this interest, a unique map collection has been constituted in the Topkapı Palace as mentioned above.

In the second half of XV. century, besides the interest in the map which started in the Ottoman Palace, the portulans for ships and portulan maps were made and sold in Galata which was just in the opposite shore of the Palace. The most well-known of these map producers is Safai from Sinop. Safai was also a poet who had written legends about the campaigns of the Ottoman Navy.

PİRÎ REİS

His Life

In Ottoman Turks, the actual cartography starts with Pirî Reis. His work named "Kitab-ı Bahriye" is accepted as the most important naval work produced by a Turk. His convenient drawings and perfect projection system of North America and World Map arouse a great amazement and admiration in the world.

In addition to his being a unique cartographer and master of oceanography, he was also a pirate, navy admiral and a captain of Egypt who occupies an important place in the Ottoman naval history. His date of birth was not known exactly. He was born in Gelibolu between 1465-1470 and educated there. His place in the Ottoman naval history was provided by his uncle Kemal Reis who was a famous and effective pirate in the Mediterranean in the last quarter of the 15^{th} century and a Turkish admiral.

Kemal Reis, who was the leader of the Azaps in Eğriboz, was also the commander of the small fleet of the Sanjak Governor of Eğriboz. Later on, he started piracy in the Mediterranean with his three ships equipped by him. Beside Kemal Reis who used the Cerbe Island as a base, there were famous pirates Burak Reis, Kara Hasan Reis and Pirî Reis at a small age. They continued the piracy in the Western Mediterranean and the coasts of Spain by 1492. In this period, in which the Islamic Government in Grenada lived its last years, Kemal Reis worked with the Turkish and Islamic sailors while conveying the defeated Muslim nations to North Africa and also fought against Spain. Throughout these years, Pirî Reis was together with his uncle. Kemal Reis and Pirî Reis, who were put into the service of the

Map of Europe, Pirî Reis, Kitab-ı Bahriye
(A Copy Belonging to the end of 16. Century) Library of Istanbul University . No:6605

Portulan of the Marmaris Harbor, Piri Reis, Kitab-ı Bahriye
The Ayasofya Library. No:3161

Portulan of Gelibolu, Piri Reis, Kitab-ı Bahriye
The Ayasofya Library. No:3161

Ottomans again after leaving the piracy because of Sultan II. Beyazid's invitation, participated in Inebahtı, Muton, Koron, Navarin, Midilli and Rodos Wars.

Because of Kemal Reis' death in 1510, Pirî Reis came to Gelibolu and started to work on Kitab-ı Bahriye here. In 1517, Pirî Reis participated in I. Selim's campaign to Egypt as one of the Ottoman navy admirals and presented the world map dated 1513 to Yavuz. Pirî Reis, who participated in some campaigns in the Mediterranean with his cousin Muhiddin Reis who was one of the famous chiefs of Barboros, mostly worked on the maps and Kitab-ı Bahriye in Gelibolu in the following years. In 1524, he became the guide-captain of the navy of Ibrahim Paşa who was the favourite grand vizier of Kanuni who wanted to suppress the rebellion of the beylerbeyi (military governor) of Egypt, Hain Ahmed Paşa. Pirî Reis, who was the leader of this campaign up to Rodos, returned to Gelibolu because Pasha preferred to keep going on land due to bad weather conditions. After rewriting his "Kitab-ı Bahriye", he prepared the map of the North America in 1526 and presented it to Kanuni Sultan Süleyman in 1528 and won great approval.

Pirî Reis, who returned to Gelibolu because of Kemal Reis' death in 1510, started the first studies on Kitab-ı Bahriye in these years. In 1517, he joined to Yavuz Sultan Selim's (I. Selim) campaign to Egypt as one of the Ottoman Navy Admirals and presented his I. World Map dated 1513 to the Sultan.

The last mission of Pirî Reis in the Ottoman navy was the captainship of Egypt which resulted in tragic events. During his captainship starting in 1547, he fought against Portugal on the openseas of Yemen and Aden. In Basra, which was the last stop of his second campaign in 1552, he left the navy, which needed to be repaired and rest, and set off to Egypt with the three ships loaded with loot. He lost one of his ships on the way and was imprisoned after coming back to Egypt. He was accused of fault in duty because of leaving the navy in Basra and not giving bribe from the loot to Kubat Paşa who was the governor of Basra and because of the negative manner and political ambition of the new beylerbey of Egypt, Mehmet Paşa. He was executed in 1554. When he died, he was over 80 and his estate was confiscated by the government.

First World Map Of Pirî Reis

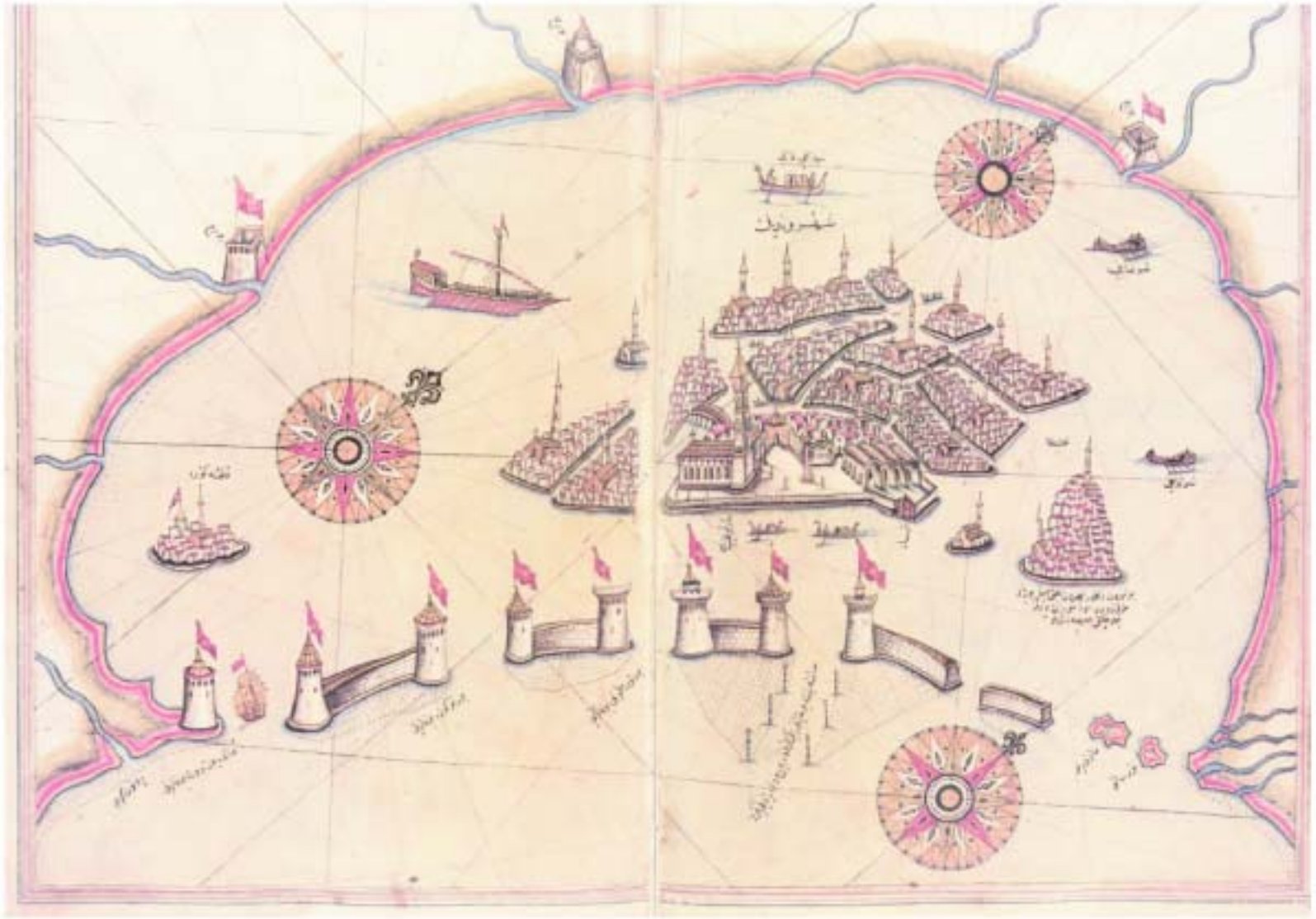
Pirî Reis' map was found by Halil Edhem, the manager of the national museum, while Topkapı Palace was being changed into the museum of old works in 1929. Halil Edhem examined this map with Prof. Kahle, a German orientalist who was a guest in Istanbul at that time and Prof. Kahle presented the results of this examination to the XVIII. Orientalist Congress which assembled in Leiden in September,1951. This discovery of Turkish and German scientists attracted the attention of the science world and the declaration of Prof. Kahle was published after being translated into Italian and Spanish. This discovery was explained to the Academy of Vienna in December, 1931 by Oberhummer, geography professor of the University of Vienna.

The map, which was taken to Ankara after the articles published in the Istanbul press, was examined by the historians and Atatürk and its exactcopy was made in the state press under Atatürk's private interest and orders.

The map known as the first world map has been drawn on a gazelle leather, painted and pictured in nine colours. It is 86 cm in length. The width is 61 cm on the upper side and 41 cm on the lower side. When examined carefully, it is seen that its right side is entirely broken off. The lower side is shorter because of the natural structure of the leather. Due to this breaking off, two coasts of the Atlantic Ocean are the only parts left from the first world map. Spain,

The World Map, Pîrî Reis
Library of Topkapı Palace Museum. No. H. 1824

The World Map, A Detail from the South Africa
Library of Topkapı Palace Museum



Portulan of Venice, Piri Reis, Kitab-ı Bahriye. The Library of Istanbul University, No:6605

Portulan of the Crete Island, Pirî Reis, Kitab-ı Bahriye
The Ayasofya Library, No:3161

France, the eastern parts of America, the coasts of Florida, Antilles and the eastern part of the North America have been drawn correctly when compared to today's maps.

The map is a typical chart. Instead of latitude and longitude lines, it has been ornamented with wind roses, direction lines, legendary and realistic pictures. Many ship pictures are seen on the map and most of them are Portuguese caravels. On the islands in Antilles are more than ten pictures of parrot ('Tuti Birds' in Pirî Reis' style of speech). In addition to the place names on the map, there are also dates of discovery, legendary information and notes about the formation of the map. The map has the beauty of a unique picture. The visuality is very important because of being presented to the Sultan of the Ottomans. On the map, there are five wind roses, which consist of three small and two big ones.

The number of the wind roses is a way to prove that the map is a world map. Like the drawings in the standard portulans, the number of the wind roses was supposed to be 17, but there are only 5 of them on the map. If it is assumed that there are 17 wind roses on the whole map, it comes out as a world map. The variety of the sources proves this view. Pirî Reis' signature situated on the lines on the north-western part of America is clearly read. In the lines on the South America, Pirî Reis clearly points out the sources of his map in a way of honesty of all scientists.

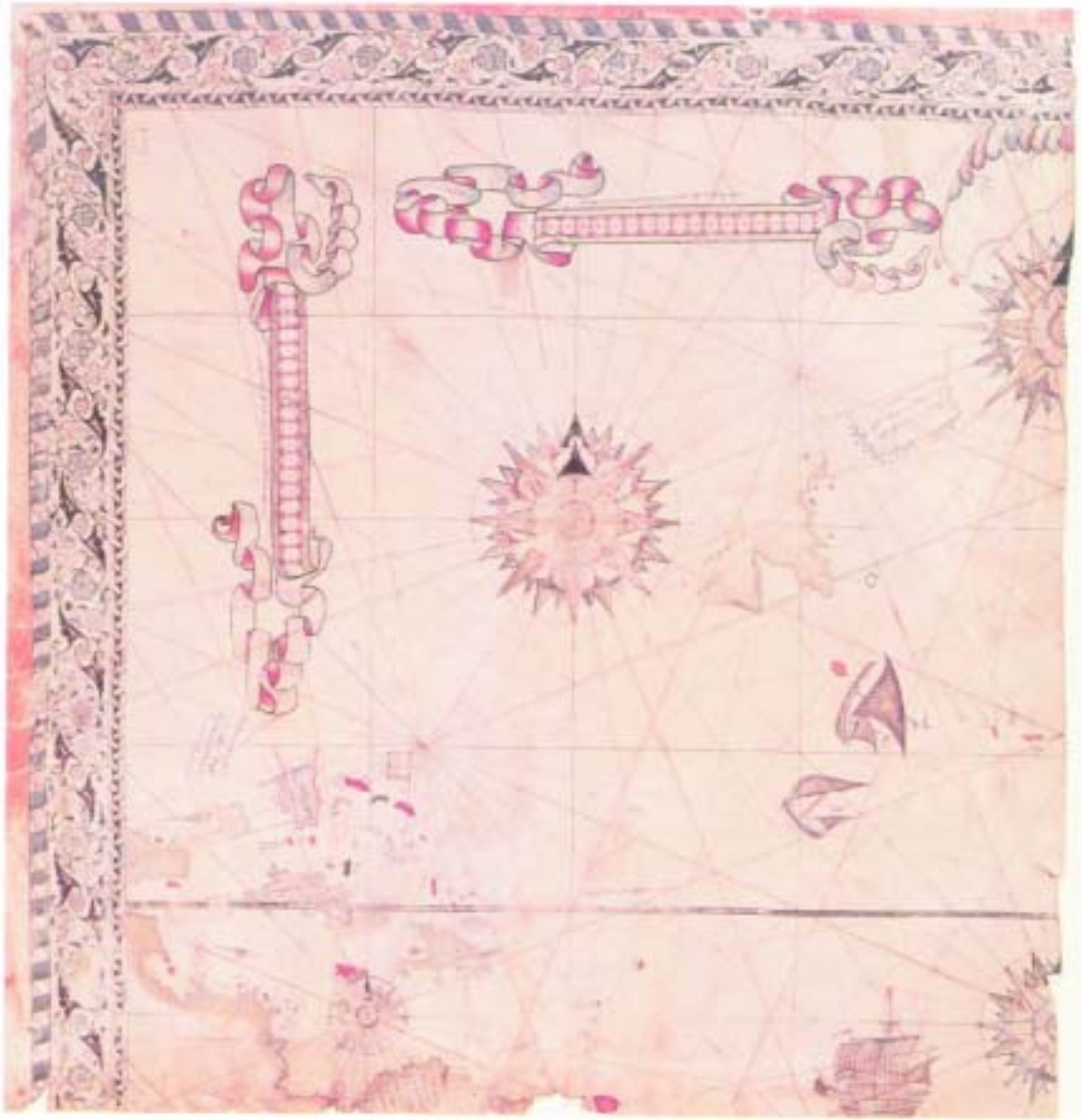
The part placed on these lines, the information concerning to the discovery of America is given, and in the last line, it is expressed that some lands and islands placed on the map were taken from the map of Christopher Colombus.

Between the years 1492 and 1504, Columbus had a journey to America four times and made the maps of these coasts. However, none of these maps exists nowadays; it lives only with the part placed in the map of Pirî Reis today.

The world map made in 1500 by Juan de la Cosa who attended the second journey with Columbus as a guide, Contari's world map dated 1506 and Martin Waldseemüller's world map dated 1507 (in this map, the South and North America have been displayed separately from the Asia for the first time) are the first maps in which the America continent is located. Pirî Reis' map has been drawn more correctly than these three maps. As a result of the researches made by Prof. C. Hapgood, it was seen that it had a great similarity with air photographs centring Kahire. Erich Von Daniken puts forward a sensational opinion that the map were made by using the photographs taken from the spaceships. The existence of the Antartic mountains on the map is another unknown. These mountains covered with glacier were discovered in 1951. Pirî Reis' map is the most proper and suitable one to our modern maps among the maps made after the discovery of America by Columbus. Its projection system is incredibly perfect. The only piece of this map in hand, which is probably made up of 21 or 22 pieces, is being protected in the library of Topkapı Palace Museum.

Second World Map Of Piri Reis

While searching for the lost pieces of Pirî Reis' first map, a new map was found by Tahsin Öz, the manager of the Topkapı Palace. This map, which has been made on gazelle leather, painted in eight colours, ornamented with a unique Ottoman style of adorning frame and made more carefully than the first one, is a typical chart (portulan). The map, which is a typical example of Pirî Reis' style, is in the dimension of 69x70 cm. That the frame on the map is only on the northern and western side and the uncompleted marginal notes show that this map is only one piece. The remaining piece covers the north of the Atlantic Ocean and the North and Middle America. As the typical quality of the portulans, it has two mile scales and six wind roses made up of four big and ornamented ones and two small ones.



Map of the North America, Pirî Reis
The Library of the Topkapı Palace Museum, R.1633a

The borders of the broken parts are Antarctica on the lower edge and Istanbul on the right edge. Pirî Reis wanted to show the new world and the capital of Ottomans on the same large-scaled map. He wanted to explain Kanuni Sultan Süleyman about the new geographical discoveries, the location of the New World and its distance to the Ottoman State. The four lines under the perpendicular scale on the map is the signature sample of Pirî Reis.

On this map, some missing imaginary islands on the first map, the drawing of the Tropic of Cancer (the broken and lost parts show that the Equator and the Tropic of Capricorn have been drawn) and the drawing of the American coasts more properly indicate that Pirî Reis aimed to form a map which was more correct than the first one. As a result of the innovation above, it is clearly understood that Pirî Reis observed the new discovery journeys on these coasts made after Columbus and used these observations in his maps.

Kitab-ı Bahriye

Kitab-ı Bahriye is the most excellent work made by the Turks on branch of geography. Any portulan that explains the Mediterranean in such a detailed way is not encountered in the western countries.

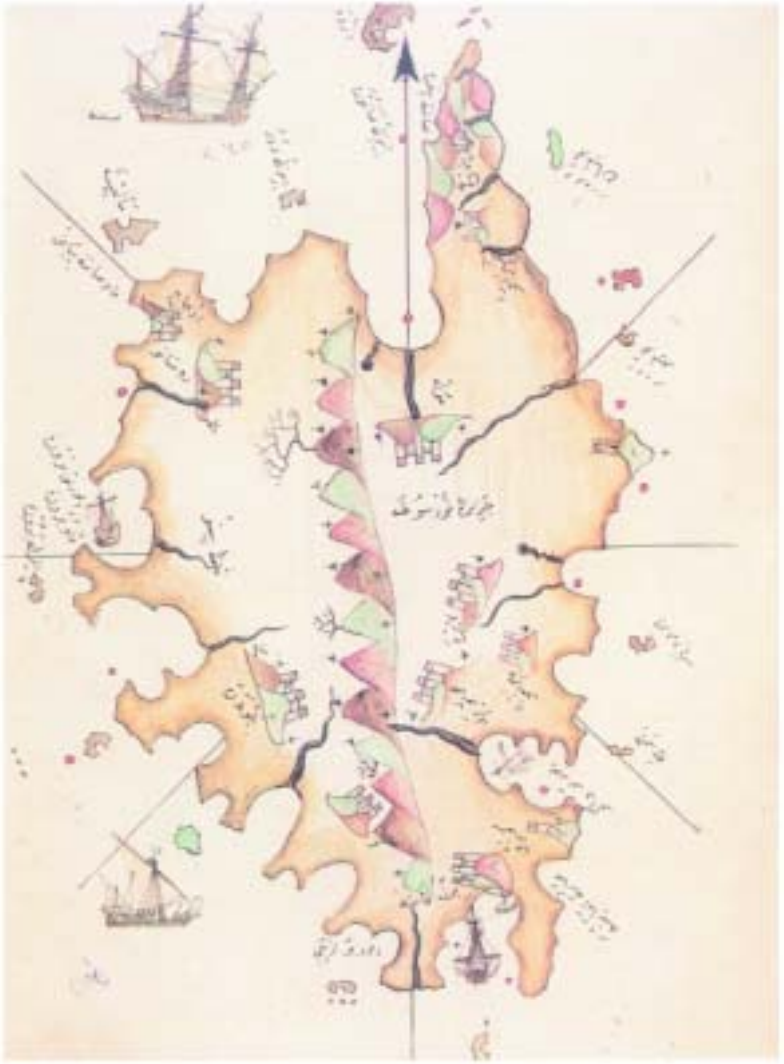
After Kemal Reis' death, Pirî Reis came to Gelibolu and had the opportunity to combine his observations and knowledge that he had during his piracy and the years of serving the state. Gelibolu, which was an important sea base in addition to those in Western Bases of the Turks in those years, was not only the place of birth of the many sailors, but also the education, maintenance and encampment place for the navy. It is obvious that Pirî Reis made use of the sailors while working on the Bahriye. When he completed the Bahriye in 1521, he was over 50 and had the knowledge and experience of more than 30 years. It is known that the Bahriye, which had a great prestige, was read and copied by the sailors in Gelibolu.

That the Grandvizier Ibrahim Paşa went to Egypt to suppress a rebellion caused the Kitab-ı Bahriye to be presented to Kanuni. Ibrahim Paşa took Pirî Reis to his ship as a guide. During the journey, Pirî Reis made use of the guidebook created by himself and this situation attracted the attention of Ibrahim Paşa. The Grandvizier wanted the work to be rewritten in a faircopy and presented to Kanuni. After returning to Gelibolu, Pirî Reis reviewed Kitab-ı Bahriye, added parts in which the world geography and geographical terms were situated, increased the number of the maps and presented it to the Sultan via Ibrahim Pasha in 1526.

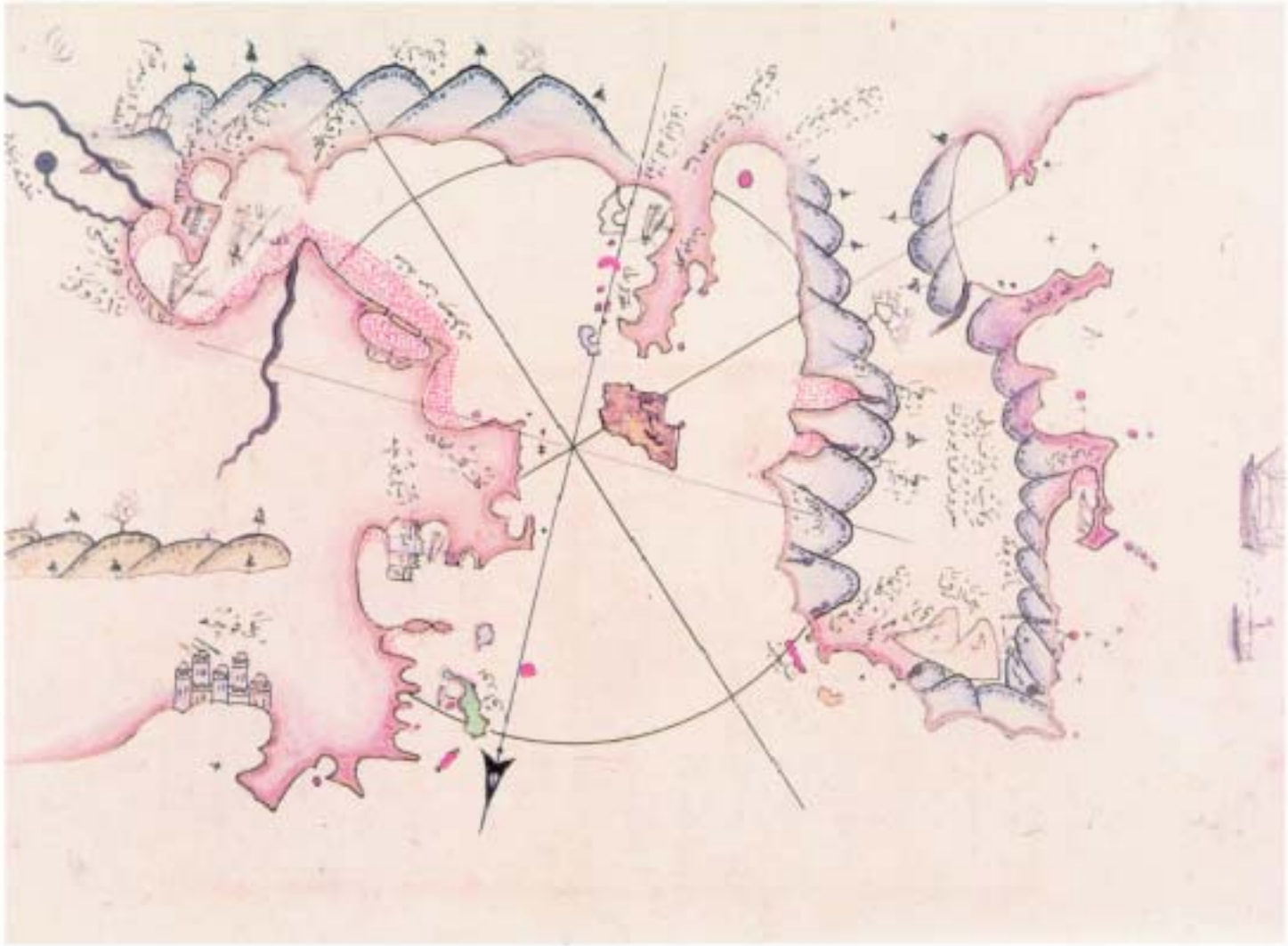
The introduction part of the Kitab-ı Bahriye is quite long and especially written in verses for Sultan Suleiman the Magnificent who wrote poems with the name 'Muhibdî'. It is mentioned that Muradi gave a hand for this part to be written. In the verses, Piri Reis explains the subjects about the purpose of writing the book, the necessity of the oceanography for the sailors, the necessary information for the ship management and equipment, the names of the storms and the winds, the definition and the usage of the compass and the map, the signs of the map, the names of the seas, the settling of the Portuguese people on the Indian Ocean, Habeşistan, the application of cosmography, the Portuguese people who travelled from the Mediterranean to the Indian Ocean, Chinese Sea, Indian Ocean, Pers and Hürmüz Seas, Muğti coasts in Habeşistan, Zenci Sea, Kamur Islands, Mağrıp Sea, the discovery of Antilye coasts (the discovery of the continent America).

At the end of this part, after explaining the reasons of writing out the work, he tells about the castles Sultaniye and Kilitbahir. He dwells on the Aegean Sea, Greece, the Adriatic coasts, the Mediterranean coasts of Italy, France and Spain, the North Africa, Egypt, the coasts of Eastern Mediterranean, Cyprus, the islands and the seaports around the Aegean coasts of Anatolia. After telling about the Saros Gulf in the north of Gelibolu, he completes his book. In addition to the explanations about the water depths of the seaports and the coasts,

The World Map, Pirî Reis, Kitab-ı Bahriye (A Copy Belonging to the end of 16. Century)
Library of Istanbul University, No:6605



Portulan of the Corsica Island, Pirî Reis, Kitab-ı Bahriye
The Ayasofya Library, No:3161



Portulan of the Wharves of Izmir, Urla, Ancient and New Foça, Pirî Reis, Kitab-ı Bahriye
The Ayasofya Library, No:3161

anchoring places, the plant cover of the coasts, water to drink and opportunities related to the ship constructions, he also gives detailed information about the humans, religions and the balances of political power. The work has also archaeological information. The Kitab-ı Bahriye is an attractive reference book for the people working on this branch. The portulan of each seaport that he told about strengthened his knowledge. The pictures of important buildings are situated on the city maps.

Bahriye can be defined as a unique Mediterranean travel book.That it has first-hand information about Pirî Reis is another important feature that makes Bahriye important.

Two different original writings of the Kitab-ı Bahriye dated 1521 and 1525 have not been found yet. The copies obtained from these two writings are situated in various libraries in Istanbul. The 8 copies of the writing dated 1521 are in different libraries of Europe. The numbers of the maps in these writings are different. The writing which has the most number of maps (223) is in the Topkapı Palace. The maps which do not belong to Piri Reis have been added to some writings. The Istanbul map in the writing in the Nuruosmaniye Library is the most conspicuous one. Additionally, its shortened and detailed copies are situated in the Libraries of Süleymaniye, Tersane, İstanbul University, Köprülüzade Fazıl Ahmet Pasha and Ali Emiri Efendi.

Also, some of its copies are in the Bologna "Dresden" University in Europe and the National Library of Paris.

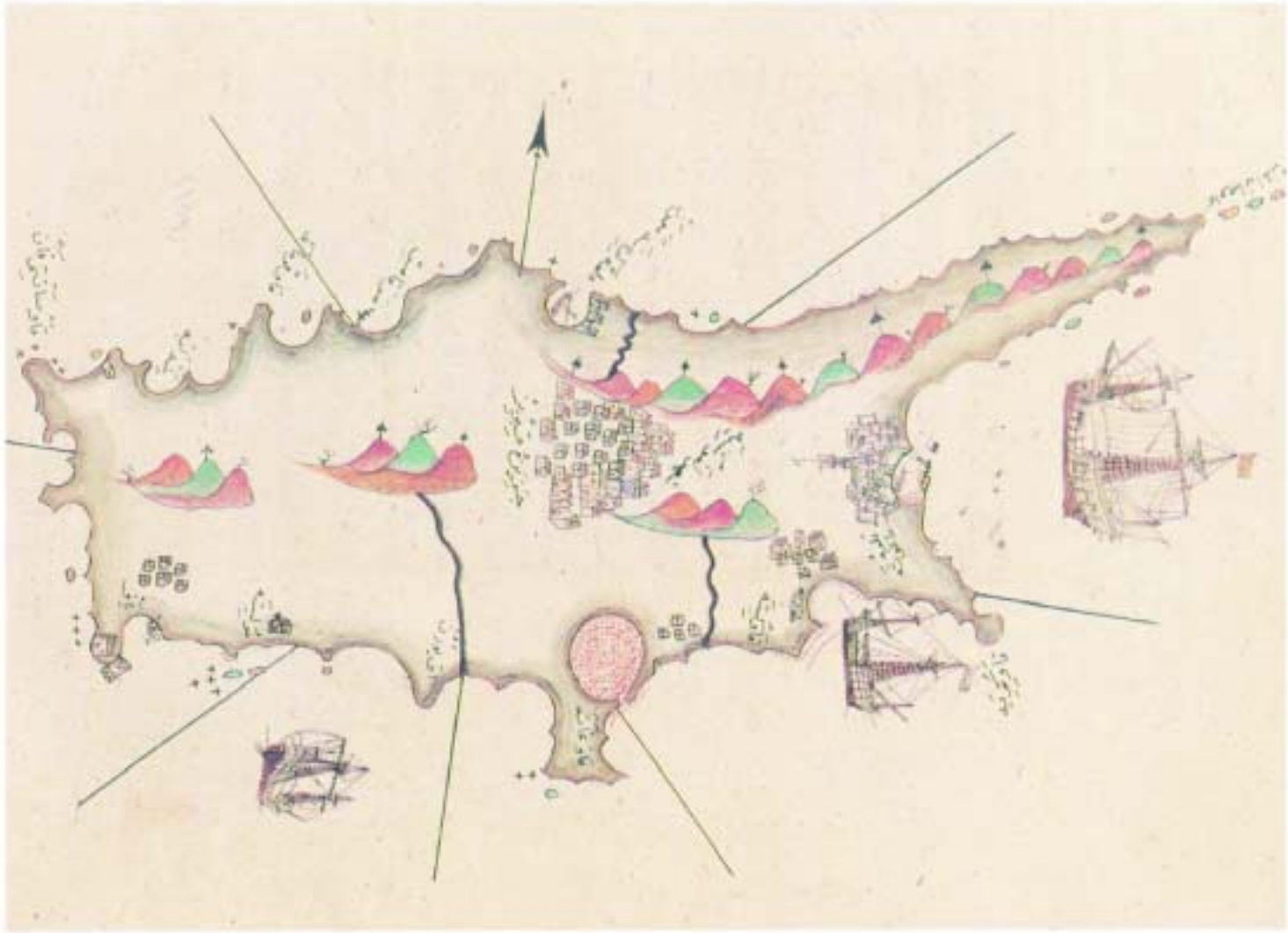
MATRAKÇI NASUH (MAP IN MINEATURES)

16. Century named as the Classical Age by the historians was certainly the time of the greatest achievement for the Ottoman Empire which was one of the most magnificent empires in the history of the world. Throughout the long reign (1520-1566) of Sultan Suleiman the Magnificent who set his mark on the Age, the Empire had a brilliant appearance in every field. Besides the 16. Century was full of military success, it was the period in which the important culturists and scientists were educated and produced works and many firsts were carried out.

Matrakçı Nasuh was one of the interesting characters of this century as a historian, musketeer, calligrapher and a painter. Nasuh, who was born in Bosnia through the end of the 15. Century, was taken to the Ottoman Palace at a young age and educated in Enderun (the Palace School) during the last years of the Sultan II. Bayezid's Period (1481-1512).

He was known with the nickname "Matrakçı" because of his great success in the play called "Matrak" which was his own invention and played with a stick. His proficiency in games played with guns and javelin was documented by Sultan Suleiman the Magnificent in 1529 and it was ordered to respect him and know him as a master and a chief while playing these games. In addition to the Turkish sailors who put out the topography of the seas, a very valuable land atlas, in which the cities and paths in Anatolia, Iraq and the west of Iran have been pointed out, is Matrakçı Nasuh's work named "Beyan-ı Menazil-i Sefer-i Irakeyn-i Sultan Süleyman Han".

This work of Matrakçı, which is the most famous one and has the features of a city plan atlas, tells about the stages in which Sultan Suleiman the Magnificent encamped between the years 1533 and 1536 during the campaign to Safavi. The book, which comes out of Nasuh's pen and brush in 1537, is made up of 88 pages of text, 107 pages of miniatures, 25 pages of text with miniatures and 218 pages in total.



Portulan of the Cyprus Island, Pirî Reis, Kitab-ı Bahrîye
The Ayasofya Library, No:3161

In Mecmu-i Menazil, Nasuh has given the names, places and the pictures of the cities, small towns, castles, ruins, temporary encampments, khans, mountains, important passages, rivers and bridges, deserts and the steppes, explained the climates and tried to show the distance among them. The work includes the whole information that can be obtained from the topographic maps.

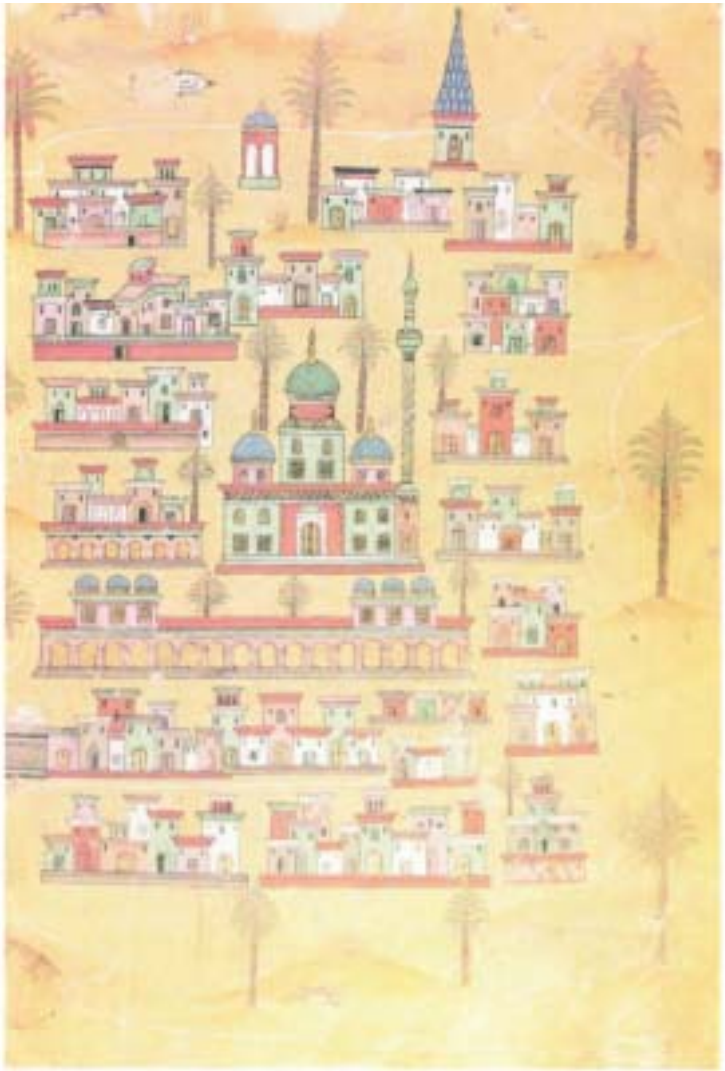
However, that the directions and the regions, which were the absolute features of the maps, were neglected attracts the attention. Menazil can be defined as an atlas of city plans made up of the miniatures. Like those in the maps, everything has been displayed in bird's eye view in the miniatures. Adding this principle to particularly observed details, the most impressive productions were put out. The miniature city plans has the feature of painstaking visual documents, in which the 16. Century Anatolian architecture and urbanization were determined. Matrakçı Nasuh carried the visual maps, which came out in Piri Reis' Kitab-ı Bahriye during the period of the Ottomans, from sea to land.

The city plans of Istanbul and Galata in the book had the greatest interest. There are almost 300 important buildings in Istanbul, Haliç, Galata and a small part of Usküdar. It has important information about architecture and topography of the capital of the Ottomans. The triangular region of Istanbul, which has been put on the rectangular page, has been tightened and narrowed on the line of Yedikule-Haliç. This topographic defect came out because of enlarging the region of Sultanahmet-Sarayburnu, in which the historical buildings are more common, more than needed. Because of the anxiety of showing the historical buildings, the topographic reality had secondary importance. The only writing of Mecmu-i Menazil produced for Sultan Suleiman the Magnificent is situated in the Library of the Istanbul University. Its exactcopy was made by the Turkish History Association in 1976.

Matrakçı has two more works which have the same qualities with Mecmu-i Menazil. The work, which is in the treasure section of the Topkapı Palace Museum and named "Tarih-i Feth-i Sikloş and Estergon and Istunibelgrad", was the only independent part of the book, which is named "Nasuh's Süleymanname" and tells about the events of the years 1542-1543. Like those in the Mecmu-i Menazil, Sultan Suleiman the Magnificent has told about the camping places, castles, mountain pass and its ranges during the Hungarian War by using the names and visions. In a part of the work are the miniature plans of the harbour cities such as Nice, Toulon and Marseilles visited by the Ottoman Navy commanded by Hızır Hayrettin Pasha (Barbarossa), who helped France during that time, on the way of going and Reggio, Antibes, and Genoa visited on the way of coming back. The Ottoman Navy is seen on the openseas of the cities in these miniatures. There are 32 miniatures in the work. In addition to being a historical book, its topographic aspects are also very important. The work was completed when the war was over in 1543. Nasuh's original writing named "Tarih-i Sultan Beyazıd", which has been written about the events and campaigns in the period of II. Beyazıd, is in the Topkapı Palace Museum. The book includes the cities and castles of Kili, Akkerman, Inebahtı, Muton, Gülek and the ship miniatures belonging to the Ottoman Navy. The city plans in this work have the features of the other two writings. In this work, the distances between the ranges have been pointed out in mile.

In addition to his works with city miniatures that had been previously told about, Nasuh also wrote books about history, mathematics and soldiering. "Tarih-i Sultan Beyazıd and Sultan Selim", "Tarih-i Sultan Süleyman (Süleymanname)" and "Fetihname-i Karaboğdan" are his other works about history. Matrakçı Nasuh gained reputation as a mathematician. Aşık Çelebi praised his mathematical knowledge. "Cemâlu'l-Küttab and Kemâlü'l-Hissâb" and "Umdetul-Hissâb", his two works written for Yavuz Sultan Selim in 1517, are about mathematics. The work focuses on the subjects of the basic mathematics, fractions and measurements. Nasuh

The Ottoman Sultan Leaving for a Campaign

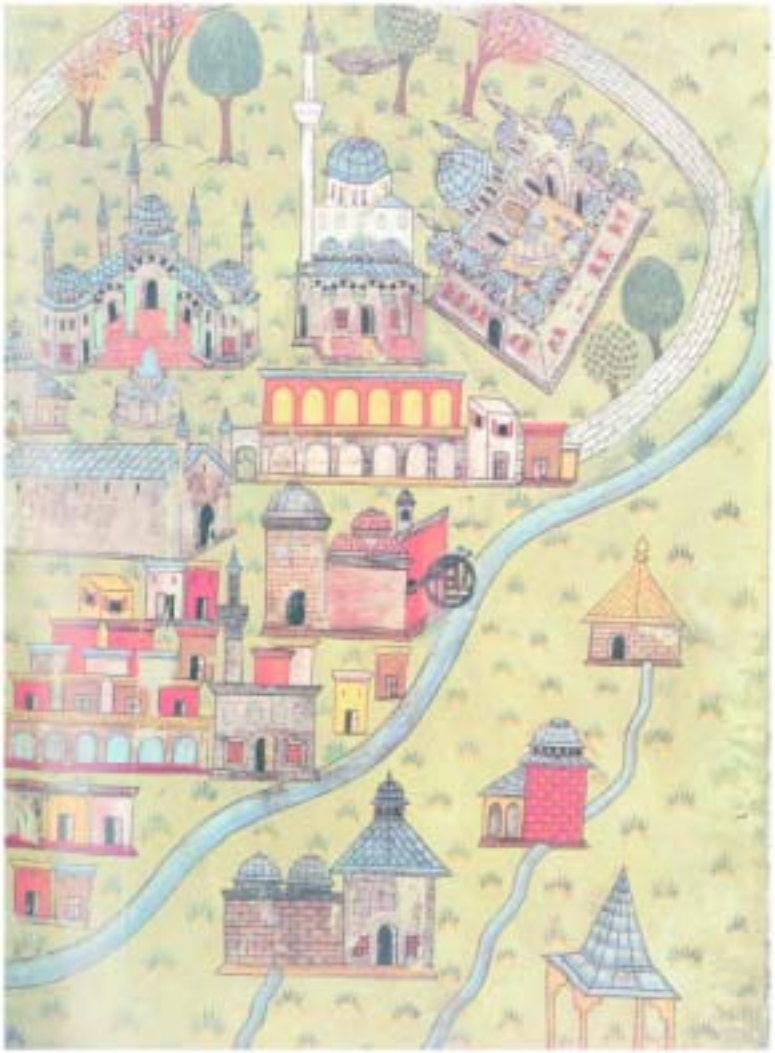


Various Types of Houses Displayed in the Pictures of Matrakçı Orient (Iran, Irak, Syria)

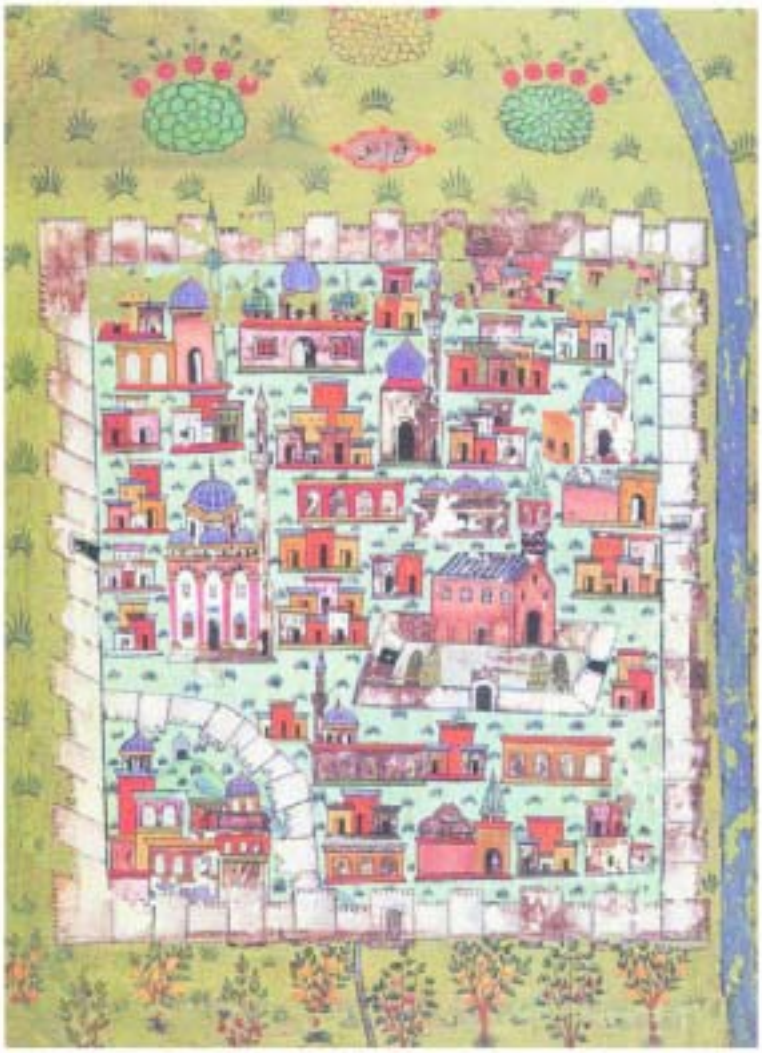
Plan of Istanbul, from Beyan-ı Menazil-i Sefer-i Irakeyn-i Sultan Süleyman Han

Plan of Baghdad from Beyan-ı Menazil-i Sefer-i Irakeyn-i Sultan Süleyman Han

Ottoman Fleet off Toulon, Tarih-i Feth-i Sikloz and Estergon and Istunibelgrad



Eskiyahir, from Beyan-ı Menazil-i Sefer-i Irakeyn, Matrakçı Nasuh
Library of Istanbul University, No: 5964



Plan of Tatvan, from Beyan-ı Menazil-i Sefer-i Irakeyn

developed this work and formed a second mathematics book named "Umdetu'l Hissâb" in 1533 and presented to Sultan Suleiman the Magnificent.

Nasuh started to gain reputation as a skillful musketeer after 1517. His being a musketeer praised by the famous Ottoman historians such as Aşık Çelebi, Celaloğlu Mustafa, Mustafa Ali from Gelibolu rose to the top level with the invention of war play named "Matrak". Matrak is a big and heavy stick which is made of a box-tree and in a shape of club. Two rivals, with 'matrak' in their hands, come to the open area and fight against each other. The purpose is to hit on the rival's head. Matrak has 160 different movements. Because of his great success and being known as the master of the game, Nasuh is known with the nickname "Matrakçı".

In 1529, he wrote the work named "Tuhfetu'l Guzat" which was about archery, shield-sword, maze, flagpole and horse training. This book is the only work written about this subject.

Matrakçı Nasuh is an Ottoman historian and artist who carried the views of the cities and the architectural works of the most magnificent period of the Ottomans to the current time. It is estimated that he died in 1564.

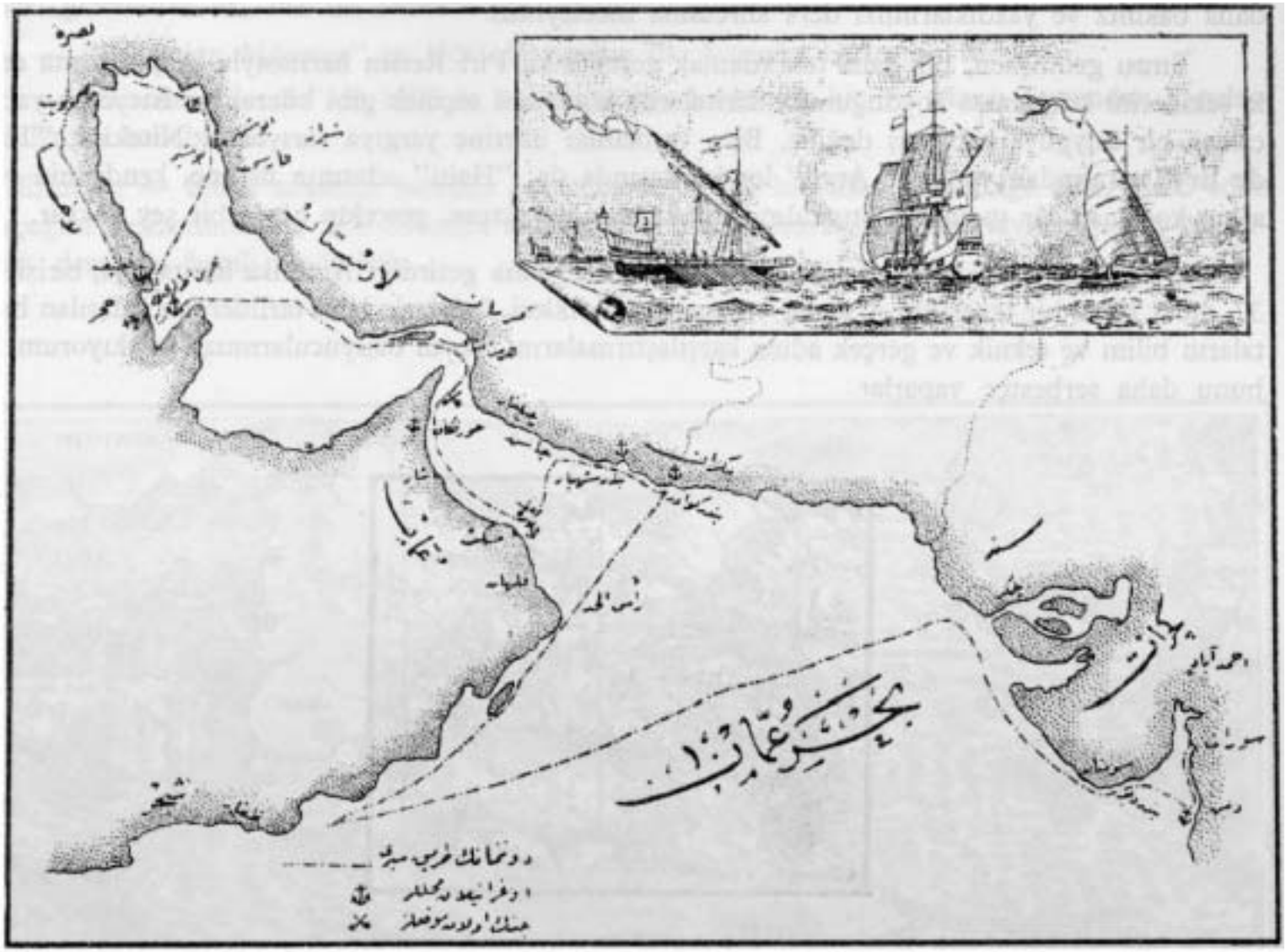
SEYDİ ALİ REİS

Seydi Ali Reis was one of the Ottoman sailors that produced works on the branch of geography in XVI. Century. His versatile personality let him to be the most well-known face in the Ottoman society. He developed interest in seamanship which was his father's profession and had education about this subject. He participated in the conquest of Rodos with Sultan Suleiman the Magnificent, set sail with Hızır Hayrettin Pasha and was in the left side of the Ottoman Navy in the Preveze Naval War. Afterwards, he went to campaigns with Sinan Paşa and became the commander of the fleet. Like his grandfather and father, Seydi Ali Reis, who was known as 'Katib-i Rumî', also carried on the duty of being the chief steward of the shipyard.

He was appointed to the captaincy of Egypt in 1553 and charged with bringing the Indian Ocean fleet to Egypt which was in Basra. This duty also let him produce a unique work on the branch of geography. He set sail with his fleet in Basra in 1554, passed Hürmüz Strait and fought against the Portuguese ships that he met on the Umman and Maskat coasts. His ships, which were dragged by the continuous storms, knocked on the Gücerat coasts of India and stayed in the Islamic Gücerat Emperorship for a while. He could not have the opportunity to return to Egypt by his damaged ships and together with his fifty men, he started a hard journey on land to arrive at Istanbul. He came to Baghdad after crossing Sind, Afghanistan, Pakistan, Maveraünnehir, Horasan, Azerbaijan and arrived at Istanbul at the beginning of May, 1557. In the meantime, he came before Sultan Suleiman the Magnificent in Edirne and presented 18 letters given by the rulers of the places that he had passed during his journey. He told about his adventurous journey, which lasted 3 years and 7 months, in his work "Miratü'l Memalik" (the mirror of the countries) that he wrote out in Istanbul. He also gives information about his curriculum vitae in this book.

Muhit (Kitabü'l Muhit fî İlmi'l Eflâk ve'l-Ebhur) written in Ahmedabat in 1554 is a work which has information providing the sailors, who set sail in the Indian Ocean, the opportunity to make journeys without guides. While writing the Muhit, Seydi Ali Reis has not only made use of some works written out previously and the sailors, who has set sail in these seas, but also added his own knowledge and experiences to the book.

Admiral of the Fleet Hizir Hayrettin Pasha (Barbarossa), 16th Century. Miniature, Topkapı Palace Museum



The Persian Gulf, Seydi Ali Reis

Battle Between Seydi Ali Reis and the Portuguese in the Indian Sea (1553), 26 x 13.5, Watercolour
Istanbul Naval Museum

The work, which is composed of ten parts, contains the subjects about the indication of direction, time calculation, calendars, division of the compass, names and locations of some stars that are important for seamanship, astronomical information, starting dates of the winds and Monsoon rains, routes of journeys, torrential rains and taking precautions. That this book has the quality of an important portulan prepared for the Indian Ocean is understood from the information explained in the sections. There is some information about the continent America in the appendix of fourth section. He mentions that the Portuguese sailors discovered a continent by going in the direction of twenty degree west from the Canary Islands and this continents lay up to ninety degree longitude in the west and ten degree latitude in the south. It is written that the Malaganiye (Magellan) Strait, which took its name from its discoverer Magellan, was passed through especially while going to Karanlık Diyar (Dark Region). From these writings, it is understood that Seydi Ali Reis got the newest information about the discovery date of the continent America. Therefore, in addition to the Kitab-ı Bahriye, Muhit became the second source of information about the New World. Muhit attracted attention in the western world and was translated into various languages. While writing his famous work 'Cihannüma', Katip Çelebi transferred the information about Cava, Sumatra, Seylan and other islands from Muhit. The existence of the regional maps, in addition to Muhit, is one of the common characteristics of portulans. It is supposed that the work was presented together with the maps to Sultan Suleiman the Magnificent in Edirne.

It can be said that these maps were the sources of some atlases produced in the Ottoman palace in the following years. Seydi Ali Reis, who had a versatile personality, wrote poems with the pen name (pseudonym) of Katibî and his mansion in Galata became a place in which the poets met. It is recorded that he had a divan (collected poems), but these have not been found yet. His being a poet was of secondary importance and he gained his reputation because of his scientific works.

In addition to Muhit and Miratü'l Memalik, he has two more books. The first one of these books including the information about astronomy is Hulasatü'l Hey, which was produced with additions to Ali Kuşçu's work named 'Fethiye'. In his other work, Mir'at-ı Kâinat, he gives information about usage and production of astrolabe, measurement of the height of the sun and stars, time measuring and gibla determination.

Seydi Ali Reis mentioned that the earth was circular and the height of the mountain was not able to change the circularness of earth. He wrote out that the radius of the earth was 1545 parasangs and added that the heavy materials fell down toward the center of the earth.

ALİ MACAR REİS AND HIS ATLAS

Ali Macar Reis' Atlas, which was one of the highest points of charting in Ottomans of 16th century, is the work of a sailor. In detail, Ali Macar is one of the pirate leaders in Mediterranean. Pirates were the most skillful sailors of the Ottoman Empire.

In addition to their aggressiveness, they had extensive information about oceanography. They became the leader of seamanship and cartography. There is limited information about Ali Macar who was one of the most well-mannered and well-informed pirate leaders in 16th century. It is known that II.Selim, who got the throne after Sultan Suleiman the Magnificent's death (1566), called the volunteer levent (sailor) leaders to give mission in the navy during the preparations for the Cyprus conquest. Ali Macar accepted this call and because of traditions, he presented his maps to the palace. Ali Macar left this leadership, joined to the Ottoman Navy Hassa leaders, participated and injured in Inebahti War (1571). Because of his success, he asked for a better mission and this demand was accepted.

II. Selim, To Whom Ali Macar Reis Presented His Atlas, Shooting An Arrow. Nigâri
The Library of Topkapı Palace

Map of The Aegean Sea -The Western Anatolia
Ali Macar Reis

Ali Macar Reis's nickname, Macar, comes from having family origin from Hungary. There are also other assumptions made by examining the reasons of the nicknames of some statesmen in some periods of the Ottoman Empire. For example; it is anticipated that he got this nickname because of his love to Hungarians and fighting in Hungary.

Throughout his pirate leadership; Ali Macar saw many maps, obtained them by force and made map-exchange with other levent (sailor) leaders as it was usual. Atlas is a work of someone who is very familiar to cartography.

After the conquest of Istanbul, the Ottomans built their second biggest shipyard on the coast of Kasımpasa in Halic. Because of being the capital of the Empire, Istanbul experienced commercial activities and that is why it became the most visited and important harbour for the ships and sailors.

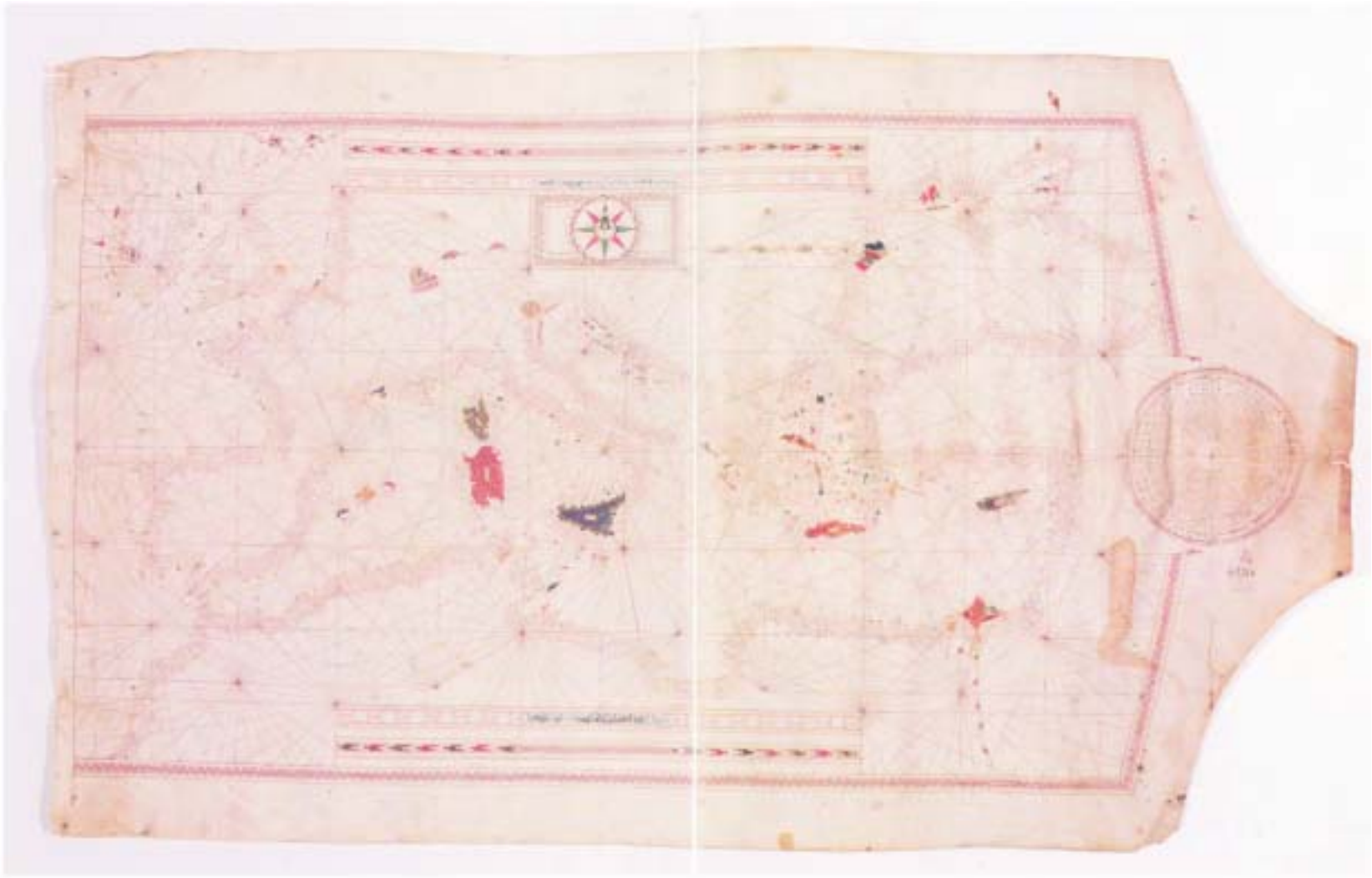
It is known that charts were made and sold in Istanbul to be used in ships at the end of 15th century. Evliya Celebi stated that there were fifteen people working on cartography at eight stores in Istanbul in the 17th century, that these people knew some languages especially Latin, that they read the books of old writers about geography and world map and pointed out the seas, rivers, mountains, forests, paths, sandy and rocky places on the earth, that they sold them to the sailors and that these works helped sailors to travel fearlessly. Also, he declared that there were 45 people earning their life by making compass at ten stores. It is said that in fifteen stores, there were 20 people making hourglasses which were very useful for sailors. It is a historical fact that there were cartographers working at workshops of the palaces in the 16th century. Obviously, Venice was the cartography center of Europe whereas Istanbul was the cartography center of Ottoman's. The reason of why Venice was more active in appearance is that they used the press. The maps, which were printed and produced more, spread out and became permanent. This is the reason of the small amount of the maps, which belongs to 15th and 16th century and comes from Ottomans to today. The producer of the only model, in addition to other gifts given to the palace, was one of the official leaders of the Ottoman Navy and this map exists today because of being booty. None of the handmade Ottoman maps, which were sold to trade ships, exists nowadays.

Ali Macar Reis' Atlas was created in a country in which people were dealing with the same job during the period after him. In the copies of Kitab-i Bahriye that were made at the end of 16th century are the maps copied from Atlas. It is said that Atlas was copied from Gastaldi, Freducci and Agnese who were representatives of the school of Venice. There are differences of style and ornament between Italian Portulans and Ottoman maps. There are also some differences between the locations of cities in Ali Macar Reis' Atlas and those in Italian maps. Even if Atlas is a copy, it is the most direct and easiest way to search for its sources in Italy. Many maps, which can be a source for Ali Macar Reis' Atlas made in 1567, are exhibited in the museums of Istanbul. Two of these portulans are very important in terms of history and quality. The Mediterranean portulan made by Ibrahim Katibi from Tunus in 1413 and exhibited in the library of Topkapi Palace and the portulan made by İbrahim Münsel in 1460 and exhibited in Naval Museum display the Black Sea, the Mediterranean and the Aegean Sea in a perfect accuracy. These maps are not only the main source of Ottoman cartography, but also the cartography of Venice.

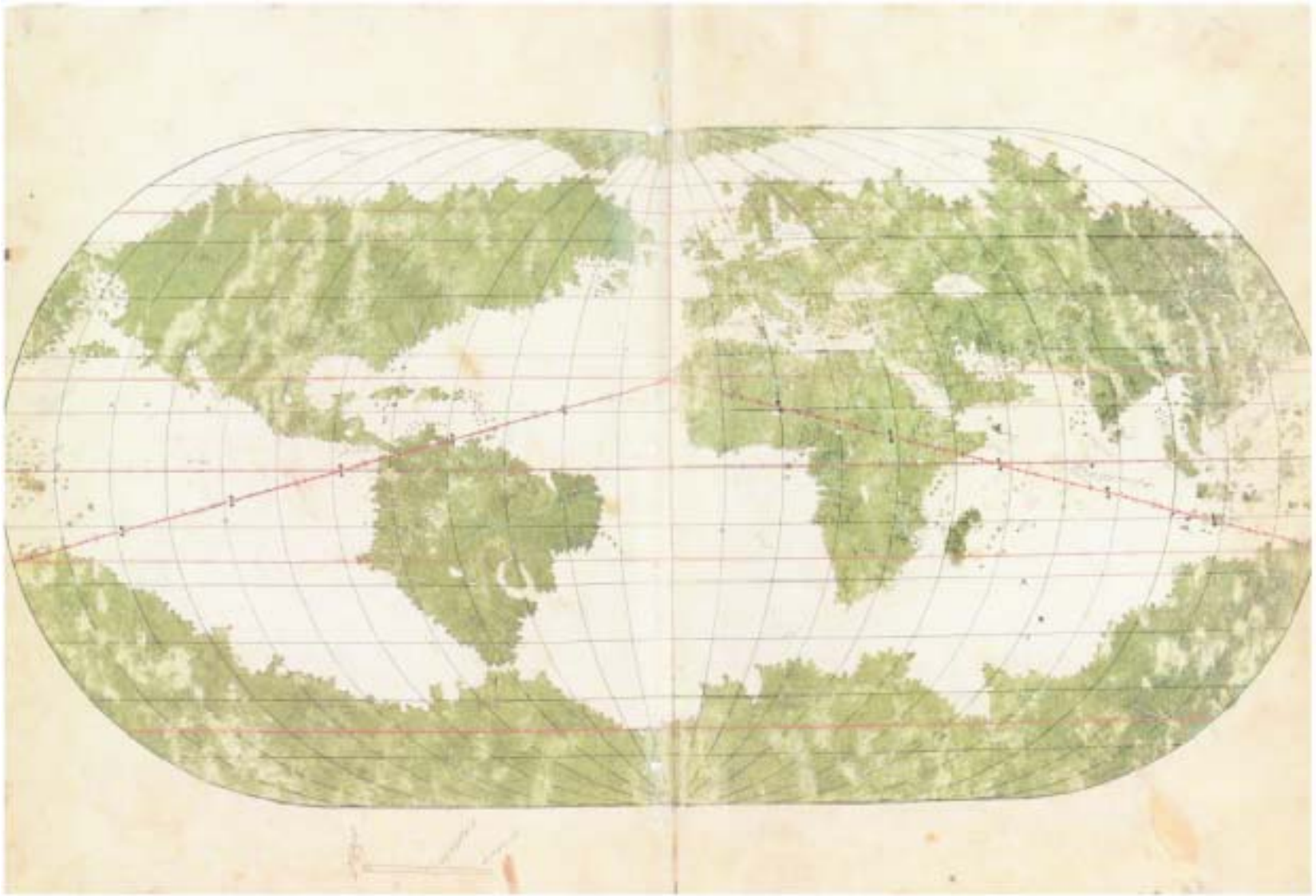
Ali Macar Reis' Atlas, which is in the library of Topkapi Palace Museum, consists of 7 maps. It has a brown cover belonging to Atlas period. In the middle of the front and back cover is the "şemse" which is a sunburst design of Ottoman ornament style. The edges of covers are surrounded by a golden gilt, ruler and zencerek. As the years passed, these gilts started to be erased. In the Atlas of 18 pages are the maps which cover a part of 31x43 cm on seven pairs of pages. It has been drawn on a leather parchment. The first six maps in the Atlas are the

British Islands and the Atlantic Coasts of Europe

Map of Italy Displaying the Simple Miniatures of Important Cities and Fortresses in That Period



İbrahim Kâtibî's Map, from the Sources of Ali Macar Reis' Atlas
Library of Topkapı Palace Museum, Number H. 1822



World Map (The Last Map in Ali Macar Reis' Atlas)

typical examples of 16th century Ottoman charts. The last one is a world map. The first six first six maps in the Atlas have the typical features of portulans and in total, they have seventeen wind roses. 32 direction lines separated from the wind roses are in specific colors. Eight main directions have been drawn in black, the middle of these directions is red and the interior directions called "rhumb" have been drawn in green color. Each map has a mini scale at the bottom. The harbours have been pointed out with exaggerated indentations and headlands. This feature, which all portulans have had since the beginning, resulted from the necessity of giving detailed information about the harbours to ship captains. The places, in which the land and the seas are connected to each other, have been shaded in dark blue; therefore, it was aimed to get the attention on the coasts. The islands located in the portulans have been displayed in some impressive colors such as golden gilt yellow, green, pink and red. Colors in both Aegean Seas in the Atlas are the same. Displaying islands in the same colors means that each color has a specific meaning. As it is usual for portulans, the shallow places have been marked with red points and the hidden rocky places have been marked with (+). The rivers have been displayed in the color of golden gilt. The deltas of some big rivers have been drawn in an exaggerated way and painted in an impressive way. Except the world map and the second Aegean map, the important cities and castles have been displayed with simple and colorful miniatures. The names of the cities have been written in black and by this way; the rule of using red color to display important harbours in portulans were broken. All maps have been canalized to the north and there is not any information given about the political borders.

ATLAS-I HÜMAYÛN

It is one of the rare Ottoman Atlases in the Istanbul Archaeology Museum which belongs to the 16th century. As it is understood from its name, Atlas-ı Hümayûn is a work produced for the Palace in Nakkaşhane. It was found and introduced by Thomas D. Goodrich, who was an American researcher, in 1984.

Atlas is in the dimension of 35x53 cm. Front and back cover of its leather skin is ornamented with decorations. Side paper on the front and back cover is made of marbled paper which is a common material of Ottoman covers. Atlas is made up of ten parchments. Maps covers a space of 53x70 cm on a pair of reciprocal pages. This dimension is larger than that of Ali Macar Reis' Atlas.

Eight of the maps in the Atlas are typical charts. In these charts, the traditional drawing rules of portulans have been enforced exactly the same. The charts have been displayed in impressive colors. Colors of black, red, golden gilt, dirty yellow, dark and light green, melonpink and light purple have been used in the portulans, except the world map. All edges and intersection points of the lands and seas are displayed with red. Islands have been displayed in effective colors. In each map, there are seventeen wind roses and the direction lines that separate from these wind roses.

Nine charts in the Atlas have been situated in the order of:

1. Chart of Black Sea and Marmara Sea
2. Chart of East Mediterranean and Aegean
3. Chart of Middle Mediterranean and South Italy
4. Chart of West Mediterranean and Spain
5. Charts of West Europe, the English Channel and British Islands

Map of the Western Mediterranean and Spain. Atlas-ı Hümayûn
The Library of Istanbul Archeological Museum

Map of the Black Sea and the Marmara Sea. Atlas-i Hümayün
The Library of Istanbul Archeological Museum

Map of the Aegean Sea and the Eastern Mediterranean. Atlas-i Hümayûn
The Library of Istanbul Archeological Museum

6. Chart of Aegean Sea
7. Chart of Greek Peninsula, Mora and South Italy
8. World Map (reverse bounded)
9. Chart of Europe, Mediterranean, the Middle East, the North Atlantic (reverse bounded)

Except numbers 7 and 9, all maps are almost identical to Ali Macar Reis' Atlas. In the first five maps are the simple visions of cities which represent the settlement centres and these have been drawn frequently in Europe. The appearances of some important cities are larger than those of others. These simple drawings have been formed in black and green.

Borders of the countries do not exist on the map. It is not necessary because the purpose is not to draw a political map.

The mile scale is used in all maps. Another feature of the scale frame, which has been drawn at the left bottom of the ninth map, is that only the names of the settlement places in the Black Sea have been written. These two clues give the impression that the map could not be completed. The ninth map is interesting because of including the parts which are out of the borders of traditional portulans made in the Mediterranean. The Gronland Islands represent the western borders. The borders in the East lie up to the Persian Gulf and the Bosphorus Hürmüz. The map includes the Middle Africa in the South and a large part of the Scandinavian Peninsula in the north.

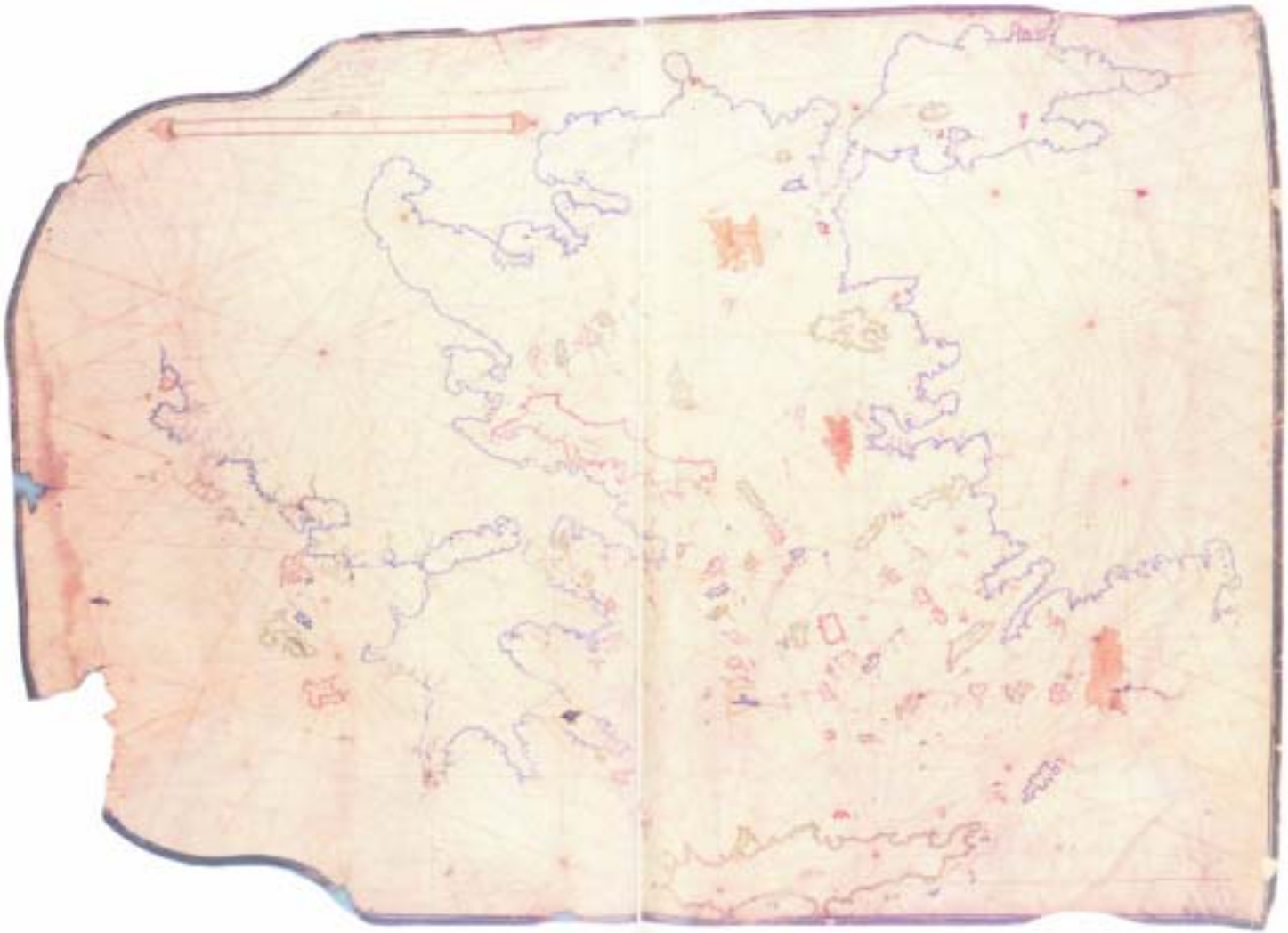
The world map of Atlas is very similar to Ali Macar Reis' Atlas. However; in this Atlas, the rivers have not been drawn clearly, but only the rivers, which joins to the Caspian Sea, and some rivers in the South Asia have been pointed out in an uncertain vision. In the map, the lands have been displayed in yellow and additionally, the Equator and the tropics have been displayed.

It is clearly known that Atlas-ı Hümayûn was passed from hand to hand and used frequently in the palace. It is supposed that Atlas was prepared in order to be used for the education of princes. The date of production is not recorded. Because of its typical features, it is an interesting model of 16th century. It is understood that it was made just after Ali Macar Reis' Atlas dated 1567. Probably, it belongs to the years 1570-1575.

MENEMENLİ MEHMED REİS' MAP

This unique example of 16th Century of Ottoman charting is in the Correr Museum in Venice, Italy. The Greek Peninsula, the Aegean Sea and the coasts of Western Anatolia have been displayed in the chart that was made by Menemenli Mehmed Reis in 1590. The most important feature of Menemenli's portulan, which is a typical production of Turkish cartography tradition, is that it is the only example existing today without being presented to people in the Ottoman Palace or who have high rank, like other maps and atlases. This chart, which became Mehmed Reis' guide during the wars in Aegean Basin for many years, has been worn out and broken off at the left bottom. The most understandable reason of the chart's being in Venice is that Menemenli was captured or killed by Venice people in the battle in Adriatic Sea between the years 1600-1610. Venice people got the map as a loot.

The map has been drawn on leather which has been a traditional structure material for portulans. It has a dimension of 81x56 and a scale of 1/1,200,000. The remarkable features of these portulans are 17 wind roses (standard number), larger coasts, impressive colors such as sky blue, golden gild and black, some warning notes except the names of places and the mile scale.



Portulan of the Aegean Sea, Menemenli Mehmed Reis
The Correr Museum, Venice

The identity of the producer and the date of production have been clearly written on the map. Writing in Ottoman-Turkish language on the map is completely convenient to our sailor's terminology. Menemenli's chart is very similar to the sixth chart in Ali Macar Reis' Atlas. However, when it is examined carefully and compared to today's charts, it is seen that Menemenli Mehmed Reis' drawings are more similar to the modern charts.

There are differences between the names written in these two charts. There are almost two hundred names of places and notes in Menemenli's chart. The intensity of the place names differs in each region. The names on the coasts of Albania are close to each other, but not that much on the West Aegean coasts. This is not a standard feature of portulans. However, it shows that Menemenli Reis had a base on the coasts of Albania and missions on the seas.

KÂTİP ÇELEBİ

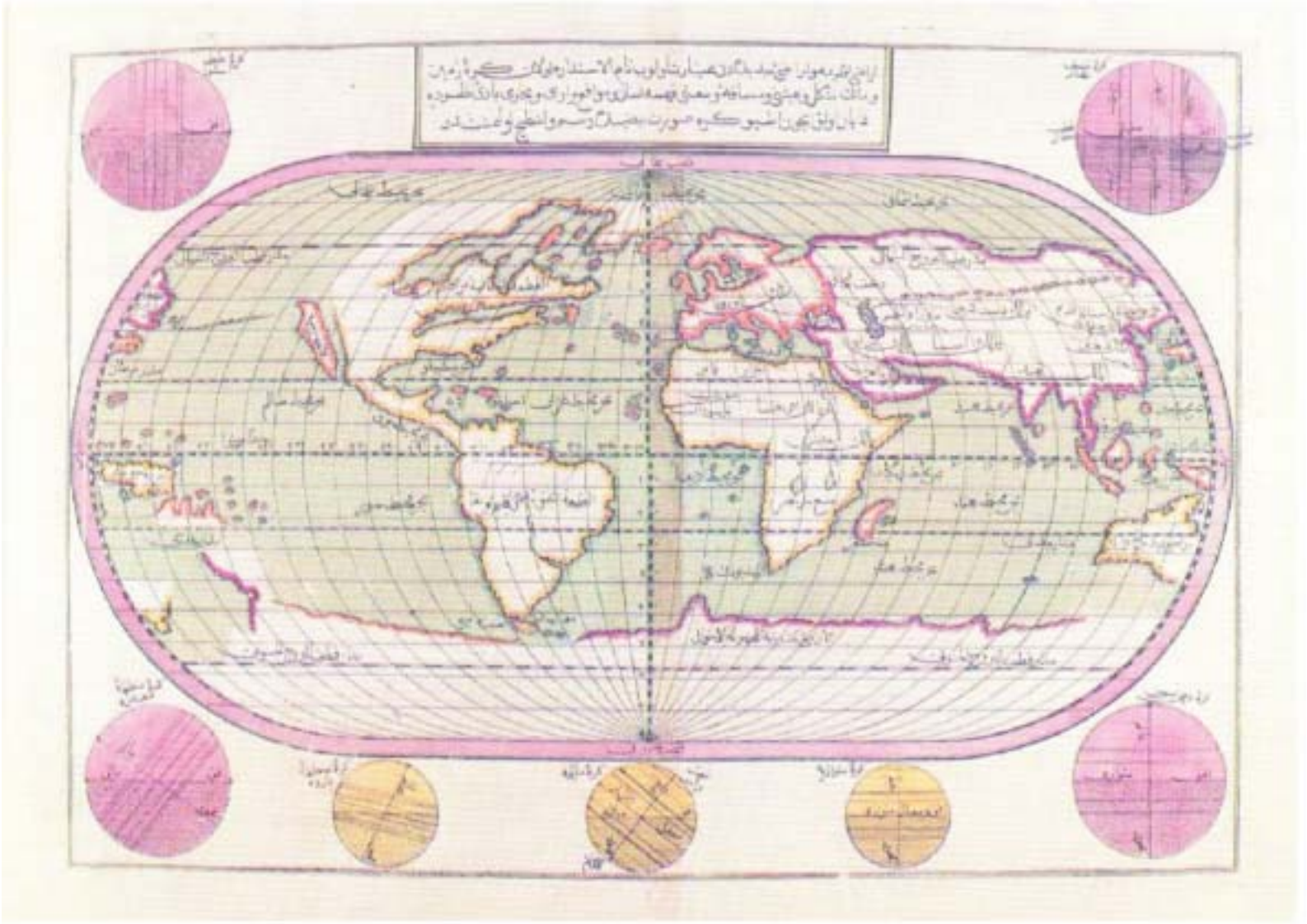
He was one of the famous Turkish scholars and born in Istanbul in 1591. His father was a knight. During his education period, he was taught lessons by the most important scholars of that time such as Kadızade A'rec Mustafa, Kürt Abdullah, Mehmet Veli and he showed his talent in writing poems in Turkish, Arabic and Persian languages. While learning about the sciences of fiqh, hadith, translation and logic, he was also taught mathematics, astronomy and especially geography by a Dutchman who came to Istanbul for the education of eastern languages and embraced being a Muslim after an investigation.

Katip Çelebi, who knew Persian and Arabic very well and had 27 works about history, geography, bibliography and social science, learned how the maps used during the Girit War (1645-1646) had been made.

Cihannüma was the turning point of the transition from east ideology to west ideology. In this book, which was started to be written in 1648 and had 5 maps and 75 pages, he proves that the earth is spherical and tells about plants, animal classes and geography and short history of the countries from Japan to Iraq and Erzurum. This book was printed by Ibrahim Müteferrika just after the establishment of the press in Istanbul in 1752 and then translated to several languages. In 1629, he entered the mutual reading room in the Sublime Porte and joined to the Turkish army for the campaigns to Hemedan and Baghdad in Sultan IV. Murad's period. While the army was encamping in Halep for winter, he went to Hicaz to become a hadji and again came together with the army for the campaign to Revan. After coming back to Istanbul, he had a great desire of reading and writing. He wrote "Takvim-üt Tevarik" which is a "General History" about the evolutions of Human in an index plan, "Fezleke" which is a "Ottoman History" including the events in the last several years and "Tuhfet-ül-Kibarfi Esfar'il Bihar" which is a history of all naval wars among the Ottomans and other countries. He also wrote an Arabic book named "Keşf-üz Zunun". His work, Keşf-üz Zunun, is a real masterpiece known all over the world.

Katip Çelebi's Keşf-üz Zunun, which is known by Europeans, was published on six large covers including the translation in Latin and a detailed index in Leipzig in 1835. Katip Çelebi wrote also another book called "Kozgeography". He determined the compass deviation for the first time in Istanbul. He died in 1656.

There are 36-40 figures and maps in different copies of the book and each copy includes a different number of them. Figures and the maps have copies which have been colored later. Katip Çelebi set Cihannüma in two plans. Although he used the works of occidental writers such as G.Mercato, A.Ortelius and P.Culuverius in the second plan, like the first one, he could not succeed to complete this. After Katip Çelebi's death, in 1657, Ebubekir and B.Behram continued his works. Although Ibrahim Müteferrika wanted to print Cihannüma in two



Kitāb-ı Cihānnümā, Tertībü'l Eflāk

volumes consisting of Asia and Europe, he was able to print only the part including Asia. Even though he mentioned that he had worked according to the principals in Katip Çelebi's own copies, he did not pointed out his marginal notes. By following the order starting from Katip Çelebi, especially in the introduction part, he made important additions under the title of "Tezyilü't-Tabi" which was printed in the text as an appendix.

TURKISH CARTOGRAPHY AFTER THE FOUNDATION OF PRESS

FIRST MAP PRINTED WITH ARABIAN LETTERS IN EUROPE

The first map printed with Arabian letters in Europe is the World Map belonging to Tunuslu Hacı Ahmed. Turkish writings in lines are located at the edges of the heart-shaped planispherical World Map drawn on a wood of an apple tree by Hacı Ahmed in 967 (1559). This is the first Turkish writing in a wooden plate print (xylography). The map has the dimension of 115 x 111 cm.

Tunuslu Hacı Ahmed's World Map in the Library of San Marco in Venice has the feature of being the most discussed work among the Ottoman maps of 16. Century. The map has been drawn on a wooden plate of an apple tree in six pieces. The samples of the map printed in 1559 are not present. Six pieces of wooden plate in a chest in the archive of Consigli de' Dieci attracted the attention of Pinelli who was the official printer of the council. He got 24 prints from the plates and made the samples existing today. Interesting information in Turkish is also situated on the heart-shaped World Map. It is estimated that Hacı Ahmed produced this map by making use of Johannes Werner's map dated 1514 and Orontius' World Map dated 1536. This map is surrounded by a frame whose three sides have been ornamented with flowers. The New and Old World and Antarctica which covers a huge area in the south are located in the map. It is seen that Antarctica was extended up to the equator line from its right and left bottom side. This mistake was repeated in most of the maps of that period. The names of places are almost identical with those in the world maps of that period.

The information "the Spanish navies have been conquering these places for 98 years" has been written in a note on the coasts of America. The names of these directions have been written on the cloud figures drawn on the places in which eight main directions are located at the edge of the World Map (the North, the East, the South, the West ...).

The Turkish text in a tight order covers the surroundings of the heart-shaped map up to the flowered frame. The text has information about the strong countries and sovereigns in 1559. The sovereigns of the countries have been compared to the stars. The right and the left ones of three circles located under the map and the writing are the typical sky maps showing the locations of the fixed stars. In the following years, the Islamic scholars developed these sky maps which have been made since the Ancient Times. The groups of stars have been symbolized with the animals and mythological heroes.

The ring sphere is located in the middle of two sky spheres at the bottom of the map. This sphere is an astronomical instrument which displays various sky circles such as the equator, tropics, polar circles and horizon lines. The ring spheres, whose first illustrations were made in İskenderiye in AC. 2nd Century, were developed by the Islamic astronomers and spread out to Europe through the Endülüs in the 12th Century.

In his research published in 1950, V. L. Menage mentioned that the map was not produced by an Arabian, but a person in a relationship with the Ottoman Government.

Another researcher, Antonio Fabris, stated that the work had been made for one of Kanuni's princes in Venice and translated into Turkish by Mambré and Cambi who were the translators from Venice; and later on, Giovanni Battista Ramusio, the writer of the work named 'Voyages', made the map by using the nickname 'Hacı Ahmed'.

The geography writing belonging to Hacı Ahmed is at the Old Bodleian Library in Oxford, England. According to the information in this writing which ended the indefiniteness on his life, Hacı Ahmed was educated in the medresseh of Morocco during his childhood and dedicated himself to science. He lived as a captive in Europe for a long time and because of Sultan Ismail Ebü'l-Feth's (Ismail Ebü'l-Fida, his master) interest in geography and Hacı Ahmed's knowledge on this subject, his master treated him well. Therefore, besides those written in the east, he also learned about the geographical works written in the west and even he produced this work by writing in Turkish. He hoped that his master would set him free as a response to his efforts and he would be useful for the Muslims by taking his map with him. The information given about the statesmen and sovereigns of that period is quite similar to that in the text on the map. The date of the writing, 1559, is identical with the date of the map. The lines, in which Osmanoğulları (the origin of Ottomans) has been told in the handwritten book, surpass the writings about the other world states and sovereigns. The origin of the writer becomes definite in these lines.

ESTABLISHMENT OF THE FIRST TURKISH PRESS

The first Turkish press was established by Ibrahim Müteferrika in his house in Yavuz Sultan Selim neighbourhood in Istanbul at the beginning of July, 1727.

According to historical records, it is known that some minority presses were established and operated in Istanbul before Ibrahim Müteferrika. First of them was established by Jewish David and Samuel Nahmias brothers who have immigrated from Spain to Turkey in 1492. The second one is a press established in 1567 by Apkar Tıbir from Sivas whose origin is Armenia. The last one is a Greek press of Kefalonian Nicodemus Metaxas near the English Embassy in Beyoğlu.

In order to succeed in his attempts to establish a press, he arranged his project "Vesiletü't-tıba'a" which explains the benefits of the art of printing and presented it to the Grand vizier Damat Ibrahim Pasha from Nevşehir.

In this project, he mentioned that reproducing books was useful for both public and high society, so the possibility of the spreading of the printed books in the Islamic world increase, that it would give confidence to the teachers and learners because of passing through the process of correction while being printed, that the ink used in print was better in terms of permanence whereas the ink in the written works was dispersed by the moisture and the water, that it was easier to get a printed book because of the cheaper cost of a reproduced book, that the number of the science learners would increase because of the reproduced books and that printing books would serve Islam. Additionally, at the beginning of his project, he emphasized how the books were completely destructed and destroyed after Endülüs had been gotten by the Europeans in the periods of Cengiz and Hulagu and asked for a permission to establish a press.

When his wish encountered the danger of conservative people's strong obstruction, Ibrahim Müteferrika, who knew that Damat Ibrahim Pasha supported him, presented a petition to the grand vizier to get rid of such obstacles.

After asking for a firman given by Sultan III. Ahmed and a fetwa given by Sheikh ul-Islam in order to print a book with this petition which did not have any seal, signature and date, he said that first of all, he wanted to print Cevheri's dictionary which was a very important work and translated by Vankulu and he gave information about the press by expressing that he sent the printed forms of several pages in this dictionary.

Emphisizing how and by whom the corrections would be made, he added the names of the proofreaders onto the side of the petition. Afterwards, he mentioned that he had been working on this job for eight years and he was in need of protection and help and that Said Efendi, who was the partner of the press, had helped him in both expenses and work and he did not have any revenue from anywhere. Also at the end of the petition, he wanted the price of each book to be clarified and the necessary processes to be done.

Because of Said Efendi's insistence and Damat Ibrahim Pasha's mediation, the press was opened with the name "Darü't-tıba'ati'l-ma'mure" with the firman of Sultan III. Ahmed and the fetwa given by Sheikh ul-Islam Abdullah Efendi from Yenişehir. In public, the expression "Darü't-tıba'a" sometimes appears to be "basmahane", "tab'hane" and "karhane-i basma" in the official records. Later on, this name was used in different ways such as Darü't-tıba'ati'l-amire, Tabhane-i Hümayun, Tabhane-i Amire, Darü't-tıba'ati's-sultaniye, Matbaa-i Amire, the National Press and the State Press.

Print of the Dictionary "Vankulu Evasıt-ı Recep", whose typesetting was started in December, 1727 as the first book, was completed on January 31, 1729. Along the 16 years between 1729 and 1743, the date of Ibrahim Müteferrika's getting sick, 17 works were printed at the same press. Among them, the work named "Tahfet'ül-Kibâr" is about Ottoman marine history. The work written in November, 1656 was printed on May 29, 1729. It consists of 85 pages, 3 charts and one figure. 1000 copies in the dimension of 25x15 cm were printed.

"Tarihü'l-Hindi'-Garbi" is another book including information about cartography. This book does not have the writer's name on it and it is formed by 94 pages and 3 charts. 500 copies in the dimension of 21x15 cm were printed. Katip Çelebi's work, "Cihânnümâ" is one of the most important works printed by İbrahim Müteferrika. The information about this has been given in the preceding section.

The emerging of the rebellion Patrona Halil (1730) did not affect the press and even the books were printed in that year. I. Mahmud, who has ascended the throne in the same year, renewed the firman given by Sultan III. Ahmed just for İbrahim Müteferrika and Said Efendi separated from the partnership. The press stopped its activity between the years 1735 and 1743. The illness of İbrahim Müteferrika, who got sick in 1743, lasted two years and he passed away in 1745. In addition to these 17 books, Ibrahim Müteferrika also printed 4 maps.

After the death of Ibrahim Müteferrika in 1745, the privilege of the press passed to the Rumelian Judge Ibrahim Efendi, who had been educated by him, and the Anatolian Judge Ahmed Efendi to be managed co-operatively with the firman of Sultan I. Mahmud (dated January,1727). However, the press could not be active because of unknown reasons. After a while, the privilege of the press, which was renewed with the firman of Sultan III. Osman (January, 1755), was given to Ibrahim Efendi and Ahmed Efendi again and the second edition of Dictionary Vankulu (2 volumes) was made in 1755-1757. Because of the death of Judge Ibrahim Efendi, the press experienced an unproductive period and this situation lasted until the grand viziership of Halil Hamid Pasha.

During that time, with the attempts of Choiseul-Gouffier, the French ambassador, a press was established in the building of the French Embassy in Beyoğlu in 1785 and three works that consist of 2 about military service and 1 about grammar were printed.

Meanwhile, it was heard that the French Embassy had attempted to buy the whole necessities of the press from the estate of Judge Ibrahim Efendi, and in order to prevent this, Vak'anüvis (historian) Ahmed Vasıf Efendi and Beylikçi Raşid Efendi asked Babıali for a permission to buy the press from the inheritor of Judge Ibrahim Efendi and to operate it together. With the proposal which Grand vizier Halil Hamid Pasha presented to Sultan I. Abdülhamid on this subject, a firman came out in 1784 and the press was renewed by repairing the old tools. In a short time after the press was activated, Vasıf Efendi was not only on strained terms with the proofreader Gelenbevi Ismail Efendi, but also disagreed with Raşid Efendi because of the income percentage of the press. Their partnership lasted until Vasıf Efendi was appointed to the Embassy of Spain (July 1,1787). After a while, Raşid Efendi gave up operating the press alone and it was closed for an indefinite period of time.

MAPS PRINTED BY
İBRAHİM MÜTEFERRİKA

The Marmara Map

(Darü't-Tiba'atil-Ma'mure), (1719-1720)

The map having the dimension of 19x43 cm. has been designed on a boxwood plate. It does not have any information on it about whom it has been made by. By time, the plate has cracked on some parts. The first plate print (xylography) in Turkish printing is in the two lines at the right bottom of the map: "My illustrious Sir, the greater ones can be done if you give firman; date 1132 (1719)". It is understood from this expression that the studies to establish a press started much earlier than 1728. The scale has been clarified at the bottom of the map as "these are the miles of françe and twenty miles is equal to one degree".

Probably, the plate was made by Ibrahim Müteferrika in 1719 as a sample to be presented to Damat Ibrahim Pasha. The original print copy of the map has not been met in the libraries, museum and archives by today. It was firstly introduced by Ihsan Sungu and a picture of the plate, which was obtained from the original one and made smaller in the ratio of 1/4, was published.

The Black Sea Map

(Bahriye-i Bahr-i Siyah), (1724-1725)

The map having the dimension of 65x100 cm. has been designed on four different copper plates. The map, which was colored later, was been glued on a green cloth. It is understood from the record on the right upper side of the map that it was printed in 1137 (1724-25) in Istanbul.

The Map of Iran (1729)

The map having the dimension of 48 x 58 cm has been designed and colored on four copper plates. This map was obtained from the Iran Map of Guillaume Delisle printed in Paris in 1724 by developing it.

The Map Of Egypt

(İklim-i Mısr), (June 17, 1730)

The map having the dimension of 39,5x49,5 cm. has been designed on a copper plate and printed in black & white. The animals, the mountains and the pictures of the ships have been displayed on it. This map of Ibrahim Müteferrika, which had the Zatü'l-küsi'il-sana'i on the right bottom side, was pointed out as a missing one in the sources for years. In fact, the map is located in the Tarih-i Mısri'l-Kadim which was the sixth book printed by Ibrahim Müteferrika in 1730. There is not a map in each copy of the book. They are located rarely in some copies. The map does not have any date or the name of producer. The Egypt Map of Jansonius was used as a sample in the production of the map.

The number of the copies of the Black Sea, Iran and Egypt Maps printed by Ibrahim Müteferrika is not known yet. C.W. Lüdeke wrote that these three maps were sold for 130 kuruş in 1789.

FIRST ATLAS PRINTED IN TURKEY

First excellent atlas in Turkey (Ucaletü'l-Coğrafiyye, Cedid Atlas) was printed in November, 1803 in Istanbul by Prof. Abdurrahman Efendi, the manager of the press named 'Darüt-Tebaati'l-Amire' (the state press established by III.Selim in Selimiye, Üsküdar).

This Atlas was produced by Mahmud Raif by making use of many sources and atlases made in Europe. There is a preface at the beginning of the atlas, 50 of which were printed, and there are some parts including information about astronomy and geography in this work, which has 79 pages in total, and these are followed by colorful maps formed by 26 copper plates.

Prof. Abdurrahman Efendi taught geometry in Mühendishane-i Berri-i Hümayun (the Artillery School) during the period of III. Selim.

INITIATION OF THE CARTOGRAPHIC STUDIES IN THE ARMED FORCES

Technically, cartographic studies were firstly initiated in the organization of the Armed Forces as a duty of general staff caused by the necessity of its service. Actually, the beginning of these studies is as old as the history of the Armed Forces. According to the historical records, it is known that first surveying school was established in 1818. However, there is not any record about the education and graduates of this school.

After the foundation of both Mühendishane-i Berri-i Hümayun (the Artillery School) and the Military Academy, the young officers were sent to France, England and Prussia for education because of the necessity of focusing on western science and technique. Among these young officers; many valuable survey officers, who established the base of Turkish Cartography, were educated. The first lieutenant Hafiz Ali (Lt. Gen. Ali Şeref), who was in education in Paris in 1862, produced a map named "the New Atlas" in 1868 by his own efforts.

The maps, which are situated in this Atlas and showing the borders of the Ottoman Empire in that period, have a historical importance. 4 of 32 officers who were educated in the sixth term

of 1853 and again 4 of 64 officers who were educated in the tenth term of 1858 graduated from the Military Academy as the map officers. Therefore, the first cartography branch was established in the organization of the Armed Forces in 1853. Some students of the Military Academy experienced a technical education in the Mekteb-i Osmaniye (Ottoman School) which was founded in Paris in 1859.

After 1834 which was the date of foundation of the Military Academy, the education programs had the subjects of modern cartography such as topography, map drawing, shading, hachure, geodesy and determination of road route.

In these years, although the foreign cartography experts, who were brought from France for the Mühendishane-i Berri-i Hümayun (the Artillery School), optic survey instruments map tools and the officers, who were sent to Europe for the cartography education, were the proofs in terms of making modern maps, the mapping organization to make these maps could not be established. Only a base on the Bozdoğan Aqueduct was measured with these tools and a 1/500 scaled city plan of Istanbul was made with a triangulation network based on this base.

The private education terms, which contained geography for 2 years and drafting for 4 years, were constituted train teachers for the Military Academy education programs prepared in 1876.

LIEUTENANT GENERAL HAFIZ ALİ ŞEREF

General Hafız Ali Şeref, who had a great role in the establishment of cartography in the Armed Forces, was born in Istanbul.

First Lieutenant Hafiz Ali Şeref, who was sent to Paris from the Military Academy for the education of cartography in 1862, graduated from Mektebi Osmani (the Ottoman School), which was established in Paris in 1859 and providing an education in French, and additionally he had an academy education. He was also a member of the French Geography Society during the period in which he made the New Atlas in Paris.

After his education, he was charged as a survey officer at the General Staff, and because of the new organization made in 1880, he became the survey officer of the 5th Mapping Department of the General Staff, and then, the commander of the Cartography Section of this department.

General Ali Şeref, who rose to Brigadier Generalcy in 1887 and to Lieutenant Generalcy in 1896, gained reputation as a good painter, a well-informed geographer and a map drawer. The works and maps produced by him shows his superior talent in this field.

The Atlas, which he produced by making use of French atlases during the education in Paris, has the dimension of 23x33 cm. and includes 22 colorful maps. The sample of this Atlas printed in France is in the Museum of the General Command of Mapping.

Throughout his duty at the General Staff, he translated the Anatolian Map of Kipert and drew the Rumelian Map formed by 73 sheets and prepared a large wall map for the schools.

Additionally, he made a detailed map of the Ottoman Empire. Although he started the drawing of the Anatolian Map formed by 100 sheets, he was not able to complete because of his death on February 24, 1907.

FOUNDATION OF THE GENERAL STAFF MAPPING DEPARTMENT

When the General Staff Presidency was re-organized consisting of five departments in 1880, it was established as the fifth department of mapping and scientific affairs. This department was charged with making the maps of West Anatolia and the Turkish lands in the districts of the Balkans to meet the needs of map at that time.

Making use of the 1/210,000 scaled Thrace Map made by Russians with reconnaissance during the Turkish-Russian War and Austrians' 1/300,000 scaled West Rumelia Maps, the 1/210,000 scaled maps were prepared. They were completed in one year by displaying cities, towns and natural defects on these maps and making field works. These maps, which can be evaluated as the ones with low accuracy in comparison with today's map technique, met the needs in that period.

The officers, who were sent to France for the education of geodesy in 1892, established the base of modern cartography after coming back to Turkey.

FOUNDATION OF GENERAL STAFF COMMISSION OF MAPPING AND MODERN TURKISH CARTOGRAPHY

The Lieutenant Colonel Deforges and Captain Barisien, who were map experts brought from the French Geography Department, Gen. Staff Lieutenant Colonel Rıza, who was having an education of geodesy in France, Gen. Staff Captains Halit Ziya, Hakkı and Mehmet Şevki worked in the Commission of Mapping established in relation to the fifth department of the General Staff.

For this reason, theodolite and some instruments for astronomy and gravimetry were brought from France and the first mapping studies based on the essentials of the Base and Triangulation started in the Vardar Basin and one year later, on a terrain in Eskişehir region in May, 1896.

A base in the length of 7235.52 m was measured during the studies in Eskişehir region and according to this base, the triangulation and topographic completion of 1/50,000 scaled sheets of Eskişehir and Ağapınarı were made and additionally, a 1/10,000 scaled plan of Eskişehir was formed. The Commission returned to Istanbul after completing their studies. The original maps belonging to the studies made in Eskişehir are being protected in the museum of General Command of Mapping.

The establishment of the Commission of Mapping as a connection of the Fifth Department of the General Staff is accepted as the beginning date of modern cartography studies in our country and the establishment date of the General Command of Mapping. The Commission of Mapping continued its first studies in five or six rooms reserved at the tentmaker edge on the upper floor of the old Gendarme Office.

In spite of the Commission's preparations for the field works that would be done in the spring of 1897, these studies was not carried out due to the suspicious manner of II. Abdulhamit's government. Only Gen. Staff Lieutenant Colonel Mehmet Şevki continued his duty in the Commission and the other members were appointed to different jobs.

STUDIES OF MODERN TURKISH CHARTING

Through the end of XVIII. Century, in spite of losing wide lands, the Ottoman Empire still had huge coasts. Sea was the easiest and the most economic way of transportation between the lands of these coasts. The Naval Forces had great functions in defending these huge coasts. During this period, in which the marine and sea traffic became more important, new instruments and machines used in the sea traffic required the superior quality of chart production. This situation had an influence over the Ottoman Empire and it was decided to give more importance to the sea traffic and charting in marine studies. Therefore, Mühendishane-i Bahri-i Hümayun, which had been founded in 1776, was re-arranged by Ali Efendi from Mora, the Minister of Marine, and turned into Mekteb-i Bahriye (Naval Academy). The sections of "Ship Construction Technique" and "Mapping Technique and Geography" were constituted in the State School of Ship Engineering. This formation was an organized step for systematic and technical chart production. If it is thought that the first land mapping school was established in 1818, it can be said that the first steps for charting also took place in the same years.

The officers from "the Mapping Technique and Geography" section were charged with teaching about sea traffic, mapping affairs and cartography in Naval Forces.

During the period, in which the shipping teachers were educated and distributed to the units in the Ottoman Empire, Russians initiated the first depth measurements in the Black Sea. These measurement studies were carried out by Senior Captain Manganari, Russian marine officer, and lasted 12 years from 1824 to 1836.

After the depth measurements of the Black Sea had been completed and the results had been evaluated and published, the Russian team in the leadership of Manganari, who rose to the rank of Colonel, applied the Ottoman Empire for making depth measurements in the Marmara Sea cooperatively. This application was examined and approved. Therefore, Turkish personnel would be educated about marine measurements. The gunboat named "Gülsefit" was charged in these studies. Depth measurements of the Marmara Sea were initiated in 1854 and completed in 1848. Results were published with the title "the Marmara guide" by Admiral Manganari and have been used for years.

After the results of the depth measurements of the Marmara Sea, Russians asked for making new joint depth measurements in the Black Sea. Because of the success in the first measurement, this application was also accepted. Therefore, the second depth measurement in the Black Sea was initiated in 1848 (Russians had carried out the first measurements alone between the years 1823-1826). Our ships "Ahter and Neyyir-i Zafer" under the command of Navy Commander Ethem and the Russian ships attended these researches together. The studies were completed in 1853.

The students of the Naval Academy were educated about sea measurement and mapping survey, besides sea traffic, with the frigate Mehmet Selim used as a school ship between the years 1890-1900, the brig Nüvid-i Fütuh and the gunboat Heybetnüma. These educations mostly focussed on charting surveys on specific regions. The portulans of İzmir and Ali Ağa and the city plan of İzmir can be shown as the examples of these studies.

The hydrographic maps of the harbors of İzmir and Aliağa and 1/500 scaled city plan of İzmir were made with the gunboat Heybetnüma under the command of Captain İsmet in 1900. Naval officers were sent to England to be educated about engraving on copper in 1901 and after coming back, they translated the British maps into the Ottoman language and printed

them at the engraving section of the Naval Press in Kasımpaşa, which had been established in 1881.

The hydrographic map of the Persian Gulf was made in 1903 under the command of Rahmi who was a naval officer. Deciding to improve charting, the V. Department of the General Staff Presidency was charged with naval services and charts. Based on the plans, this department firstly started to make the maps of slip places in the Black Sea and completed in 1911. Through the end of 1911, since the national and international importance of charts was understood better, the duties related to charting were given to the VIII. Department, which had been just established, and Navy Commander Sezai was appointed to the Presidency.

The gunboats "Beyrut" and "Galata" was given to this department, which was strengthened with some officers in 1914, as the measurement ships. While visiting the harbor Urla on the way of Istanbul, the gunboat Beyrut was attacked and sunk by the English warships. After this gunboat had been sunk, the gunboat Zühaf was assigned to the service of VIII. Department as the measurement ship at the end of 1914. Between the years 1915-1925, the maps of harbors in Yeşilköy, Çekmece coasts, İstanbul (1916), Trabzon (1917) and Samsun (1921), border determination on the river Meriç (1923), plan of Haliç (1924) and hydrographic maps of the Büyükdere and İzmir Yenikale passages (1925) were made with the gunboat Zühaf. A reconnaissance map was made in 1916 to understand if the river traffic was appropriate for transportation with boats and sloops on Kızılırmak in a distance of 600 km. from Zarp to Yahşihan. This department also undertook the duties of naval press, management of the publishing house and time determination.

Only a small amount of studies could be done by the Naval Department in 1915 because of the war. For this reason, it was approved to support the responsible personnel to make the land maps. Therefore, five officers from the Naval Department were sent to Aleppo to do the studies about latitude and longitude determination, which were necessary for the production of 1/200,000 scaled maps, by using the method of point determination.

Additionally, sea depth measurements were also carried out in front of Yeşilköy and Çekmece.

After 1916, they generally worked on the charts and portulans of harbor and places away from the battle regions.Triangulation of the Bosphorus and the portulan of Istanbul harbor (1916), the depth measurements of Trabzon harbor (1917) and the portulan of Samsun harbor (1921) can be counted in these studies.

Since the struggles during the Independence War were densely on land, any production, except the portulan of Samsun, could not be carried out till the period of Republic.

At the end of the Independence War, the Charting Department was continuing its function as a foundation affiliated with the Ministry of Marine.

It was connected to the General Directorate of Mapping in 1928 and got the name "VII. Naval Department". Later on, the studies became intense and the surveying ship 'Aydın Reis' was put into use instead of the gunboat 'Galata' which was used till 1922 but not suitable for the hydrographic surveys. The name was changed as the Hydrography Department in 1943 and it was re-arranged as the Hydrography Department affiliated with the Naval Forces in 1949.

In 1950, the working area of the department was expanded and its name was replaced with the name "the Presidency of Navigation and Hydrography Department" and later on, it moved to the new building in Çubuklu with its new name "the Department of Navigational Hydrography and Oceanography.

TURKISH CARTOGRAPHY DEVELOPING WITH THE DECLARATION OF SECOND CONSTITUTIONAL MONARCHY

The desired mapping works could not be carried out until July 10, 1908 which was the date of declaration of the Second Constitutional Monarchy. The project "The instruction for making the map of Ottoman lands" dated November 11, 1908 and prepared by Gen. Staff Colonel Mehmet Şevki, who was the only member of the Commission, was presented to the General Staff Presidency with the signature of Brigadier General Mehmet Zeki, the manager of the 4th Department of the General Staff, on December 14, 1908.

Forming the right triangulation network with the efforts of Turkish survey officers without the need of foreign experts, meeting the map needs of the Ottoman Empire instantly according to this principal, purchasing the necessary materials, forming the field units of the Triangulation and Topography, completion of the map of the Ottoman country in 10-15 years and starting the studies firstly in Eskişehir and Salonika were approved in this project.

This project could not be activated because of the March 31, 1909 event, but it was approved after the end of this event and a new Commission of Mapping was established as the combination of the Triangulation and Topography sections of the General Staff Mapping Department.

INSTRUCTION OF THE COMMISSION OF MAPPING AND PREPARATIONS OF DIFFERENT SCALED MAPS

The instruction of the Commission of Mapping, which was privately prepared for the surveying services to be managed according to the technical principals, was presented to the General Staff Presidency on July 28, 1325 (1909). As it was mentioned in the first item of the instruction, the Commission of Mapping would be connected to the 7th Department of the General Staff Presidency and the director of the Mapping Department would also be the president of the Commission of Mapping. The center of the Commission of Mapping would be in Istanbul and its duty would be producing the modern map of the whole Ottoman Country. This instruction was approved by the High Military Council on December 19, 1325 (1909).

The Triangulation Section in the organization of the Commission of Mapping, which was re-established on August 9, 1325 (1909), was charged with providing the triangulation network of the country; the Topography Section was given the duty of making topographical map and plans based on this system and the Reconnaissance Section, which was added to the Commission in 1911, was charged with forming the maps of the land on the scale of 1/200,000 in the Anatolian and Asian region of the Ottoman Empire based on the serial triangulation.

It was approved to make field works for 8 months as long as the weather condition was suitable and to evaluate these works along the 4 months of year.

According to the program prepared by the Commission of Mapping, the maps of the country would be made in the order of:

a. Important districts (the fortified districts); 1/25,000

b. Rumelia, Anatolia, Iraq and Syria; 1/50,000

c. The Arabia Peninsula, Trablusgarb and Bingazi; 1/100,000

d. Lands of the Ottoman Empire in the Asia Continent and Trablusgarb; 1/200,000

e. 1/25,000 scaled maps of the lands in Rumelia after the Balkan War

The Bonn projection system would be used in the formation of these maps and the longitude circle, which passed by the dome of the Ayasofya Mosque, would be taken as the beginning of meridians and all sheets would be made in the dimension of 40x50 cm.

The need of map officers for reestablishment of the Commission of Mapping in 1909 was met by selecting the ones in the organization of the Armed Forces and the talented ones on this subject. In fact, although it was approved to educate the survey officers privately in the instruction of the Commission of Mapping, it was not possible to open a surveying school because of the Trablusgarb and Balkan Wars and I. World War following them.

FORMATION OF FIRST 1/25,000 SCALED MAPS

The Commission started the field works in 1/25,000 scaled Bakırköy sheet on August 25, 1325 (1909). Firstly in our country, the original of the 1/25,000 scaled Bakırköy (Makrıköy) map is being kept in the museum of the General Command of Mapping.

During the studies in this year, the Triangulation Department measured the Bakırköy Base in the length of 4,396.703 m. and established the triangulation of the Bakırköy sheet and additionally, extended the triangulation network up to Maltepe and made the measurements of the triangulation of Kağıthane, Istanbul and Çamlıca sheets in 1910. The Topography Department completed the Bakırköy sheet and the Commission returned to the center, Istanbul, after a field work of 4 months.

Since the Commission of Mapping was connected to the 7th Department of the General Staff in 1909, the General Staff Presidency moved to the mansion of Ali Pasha, who was one of the old grand viziers in Mercan, in the Ministry of Harbiye (the Ministry of Defense) in Istanbul.

After the building burned up in July, 1911, the General Staff Presidency and the Mapping Department moved to the building of the old Imperial Army Hospital near the Fire Department Barracks.

FOUNDATION OF FIRST ORDER TRIANGULATION NETWORK IN TURKEY

The Commission of Mapping has firstly established the first order triangulation network, which was made up of the following 16 triangulation points, in Turkey. (The southern point of the Bakırköy Base, the northern point of the Bakırköy Base, the Karlı Hill, Çamlıca Hill, Beyazıt Fire Tower, Alemdar Hill, Kınalı Island Hill, the district of the Gürgen Hill, Aydos Hill, Gaziler district, Obeyli district, Çeke Mountain, Teperen district, the district of Babat Hill, Bakacak Başı district, the district of Kel Hill).

Ten 1/25,000 scaled sheets, which were started in 1909 and completed in 1910 by the Topography Section of the Commission, are those of Istanbul, Kağıthane, Bahçeköy, Kilyos, Çamlıca, Hisarlar, Kavak, Rumeli Feneri, Maltepe and Kınalı. Each sheet covers an area of 125 km². The field works, which started in May, 1910, lasted 7 months and then, map units returned to the center.

On the other hand, the Topography Section completed three 1/25,000 scaled maps left in Istanbul and its neighbourhood and made the maps of 6 sheets of Edirne and its neighbourhood on the same scale. Also, it formed almost 20 sheets of the fortified district of Edirne on the scale of 1/2,000. It completed the 1/50,000 scaled sheet of Ömerli edge, the sheet of Medarlı edge in the Kocaeli Peninsula, the triangulation of which had been made previously, and also completed 4 sheets named Ömerli, Medarlı, Taşköprü, Şile and 2 other uncompleted sheets. Three 1/25,000 scaled sheets named Akpınar, Petnaor and Küçükköy were made around Istanbul and the sheets of Üsküdar, Kemâl, Fikle, Havariş, Edirne and Doğanca on the same scale were made around Edirne.

FORMATION OF 1/200,000 SCALED RECONNAISSANCE MAPS

The Reconnaissance Section was established in the organization of Commission in May, 1911 and Gen. Staff Major Sabih was appointed to the directorship of this section. Artillery Major Mahmut was charged as the commander of the land units and the officers of various ranks were charged as the officers of the units.

The field works were started in August by meeting the needs of instruments and materials for the Reconnaissance Section and these works could last 3 months. 1/200,000 scaled sheets of the East Beyazıt, the Black Church and the Hasankale were made at the end of these works. The dimension of the 1/200,000 scaled sheets was accepted as 40x50 cm. Each sheet covers an area of 8,000 km².

After the beginning of the Balkan War in 1912, the field works were started in April and could last 5 months.

First order triangulation network was lengthened from Adapazarı to Bolu and it had 10 points that are the district of the Başkı Hill, the Kerim Ali Hill, the district of Kaplan Dede, the district of Kardüz, the Terse point, the Bacaklı Plateau, the district of Kel (Red) Hill, the Sevince Hill, the Merkeşler Hill and the district of the Dikmen Hill. They worked in Erzurum Region to establish the second and third order triangulation. A base was measured on the northern foots of the Palandöken Mountain and depending on this base, the triangulation of nine 1/25,000 scaled sheets, which covered an area around the fortified district, was made. The reconnaissance units were sent to Rize and Trabzon to make 1/200,000 scaled maps. The triangulation network was established during these works by connecting the sheets of Rize, Artvin, Tortum, İspir, Erzurum, Kiği, Palu, Trabzon, Erzincan, Kemâh, Harput and Siverek to each other. Although the triangulation units, which came back from the field, were sent to Çanakkale, but this work failed because of the Balkan War and some officers charged in the Commission were sent to the front by removing them from their jobs.

Topography Section; During the field works in this year, 1/25,000 scaled sheets of Çömlek, Akpınar, Karayusuf, İskenderköy, Tayakadın, Ahırköy and Saltıklı in the neighbourhood of Edirne were made and also the 1/50,000 scaled sheets of Kefken, İzmit, Hereke and Noksanlar were made in the Erzurum and Kocaeli Peninsulas.

Reconnaissance Section made ten 1/200,000 scaled sheets of Rize, Artvin, Tortum, İspir, Erzurum, Hınıs, Malazgirt, Barkiri, Başkale and Van. The Russian maps were used in the production of some of these sheets.

During the Balkan War, with the order of the Supreme Military Command, some map officers were charged with making different scaled maps in the region of the Lake Terkos and Büyükçekmece and in the southern part of the Gelibolu Peninsula. Gen. Staff Major

Abdurrahman, who was the manager of the Operation Department of the 3rd Army Corps (later on, the Brigadier General A. Aygün who was one of the Vice General Directors), 1/10,000 scaled reconnaissance map of the Kırklareli region.

STUDIES ON CARTOGRAPHY DURING I. WORLD WAR

The Commission of Mapping was strengthened with some officers during the studies in 1914 and the Field Units of Mapping were sent to the field works in March. However, with the declaration of the General Mobilization and I. World War, many officers charged in the Commission were appointed to the detachments and the Commission of Mapping dispersed in July, 1914.

Since the war got a general shape and the Çanakkale region gained importance, some of the survey officers who were sent to the detachments in November, 1914 returned to the Commission and gathered in the Çanakkale region. The formation of the map of the Gelibolu Peninsula was started and these works lasted till February, 1915. At the beginning of this year, the field works lasted 5 months and they worked on the field for 4 months after the declaration of the Mobilization.

Triangulation Section made the triangulation network of 8 sheets of the Çanakkale region and a 1/25,000 scaled area of 1,500 km² between Edirne and Kırklareli. Brigadier General Mehmet Şevki and Gen. Staff Major Ahmet Nuri (Denkmen) directed the works in the Çanakkale region by themselves.

Triangulation network of five 1/25,000 scaled sheets of the Gürcü Strait was made in the fortified district of Erzurum. Additionally, the sheets of Ünye, Reşadiye, Sivas and Gürün were completely made whereas the sheets of Elbistan, Maraş and Kilis were partly made.

After it was approved to finish the Map of Çanakkale Strait in November, 1914, the Triangulation Field Unit, which was organized from the map officers who returned to the Commission of Mapping from that neighbourhood, completed the triangulation of 12 sheets in 4 months by working on both sides of the Çanakkale Strait.

Topography Section; The map of nine 1/25,000 scaled sheets was partly made by the middle of July, 1914 because of the mobilization. These are the sheets of Sinekli, Bekirli, Küçük Seymenli, Fener, Kapğaca and Silivri in the Silivri region and those of Güngörmez, Zakfi, Dumlu and Köşk in the Erzurum region. Additionally, the topographical map of a 1/50,000 scaled sheet on the north of Sapanca was completed. Because the formation of the sheets of the Çanakkale Strait was started just before the declaration of the mobilization and the map officers returned to the detachments, they could not be completed.

Reconnaissance Section; The sheets of 1/100,000 scaled Midye Region, 1/25,000 scaled Sule in the Edirne-Kırklareli region, Kiremitli, Gerdelli, Teke, Gerginli, Erikler, Karahisar, Kavaklı, Hasköy, Demirci and Havsa and also those of 1/200,000 scaled Giresun, Şarki Karahisar, Divriği, Arapkir, Diyarbakır, whose triangulation points were ready, were partly made because of the mobilization and the map officers charged in this region were appointed to 3rd Army Units.

These maps took a great role to succeed in the Çanakkale War. The commander of the Çanakkale fortified district, Brigadier General Cevat (Full General Cevat Çobanlı) who appreciated these studies, rewarded the cartography officers with war medal and industry

pride medal. The 10 sheets made in Çanakkale are Tayfur, Anafartalar, Karainekli, Kurucadere, Bigalı, Damlar, Kale'i Sultaniye (Çanakkale), Seddülbahir, Kirte and Erenköy.

That the survey officers charged in the 3rd Army Units were supposed to gather in Sivas and using them in the mapping services were approved in 1915 and it was decided to make the sheets of the Istranca region and the Çanakkale Strait (the Dardanelles) which had not been completed previously. The studies lasted till December and the field units returned to Sivas because of the season. The field works in this year continued at an average level.

Triangulation Section; after completing the triangulation network between Şarköy and Saros Gulf in the Çanakkale Strait region, they passed to Lâpseki.

The triangulation network was extended up to Baba Burnu along the Marmara coast and the Aegean Sea. A wide working region of 30 sheets was formed in this area. Additionally, the Aleppo Base, whose reconnaissance had been made one year ago, was measured. Based on this base, the triangulation of incomplete sheets of Kilis, Maraş and Elbistan left from the preceding year were completed. Also, based on the Erzurum Base, the triangulation network was extended toward the west and connected to the Ezanlı and Gökdili Base between Elbistan and Gürün. In accordance with the Aleppo Base, serial triangulation was expanded along the eastern coast of the Mediterranean to convey the triangulation network to the Sina Peninsula. The sheets of Adana, Antakya, Lâzkiye and Trablusşam were completely made whereas sheets of Munbiç, Birecik and Adıyaman were partly made.

This unit was sent to Aleppo in August, 1915 in two groups of one stable and one movable ones under the command of the Unit Commander Privileged Major Mahmut Nedim (the deputy of Malatya, M. Nedim Zapçı) to initiate the studies. This map unit made field works till the middle of February and achieved the preparation of 20 points on both sides of the Fırat river in a period of 4 months.

FOUNDATION OF KÜTAHYA MAPPING DEPARTMENT

A mapping department was founded by bringing some of the personnel from the Mapping Department of Istanbul, many maps and documents and a printing machine to Kütahya since the Dardanelles was under the pressure of enemy ships during the Çanakkale War. This department continued its activities for 1.5 years from March, 1915 and returned to Istanbul in July, 1916. The sheets printed in Kütahya are being kept in the Museum of General Command of Mapping.

PERSPECTIVE PICTURE OF THE ÇANAKKALE STRAIT (THE DARDANELLES)

The picture was made by the German painter, M. Zeno Diemer, during the First World War (1914-1918). According to today's technology; it can be said that it was made by taking inclined photos from a plane flying from the southwest of the line Gökçeada-Bozcaada in an altitude of 1200-1500 m. and in convenient meteorological conditions or by making observations directly. It comes out as an interesting and remarkable work since the plane was invented in 1903 and has been used for taking photos from the air since 1910, and the balloons and kites were incapable of reaching that altitude and it was impossible for a painter to have a better condition during war. It is also probable that the painter got the photographs taken over the Gallipoli Peninsula by Mapping Department of Egypt in 1915 and made use of

them. Another interesting feature of this picture is that the topography digitized by using current technology is similar to the perspective (three- dimensional) image obtained by using special computer-aided software.

There is not any information about where the original of the picture is and its painter. Making use of Kiepert's 1/250,000 scaled maps, which were the most developed ones of that period, it is accepted as one of the rare works in which the painter's wide perspective knowledge and experience was combined to the topographical image. No matter how it was made; under the conditions of that period, the reflection of the topography in the form of painting on canvas at a correct perspective image puts this work in the history of cartography. The names of location on the picture, which was written by numbering with the old alphabet and added onto the picture later on, gives the impression that it was used as a three-dimensional perspective map in that period. The Turkish writings was added onto the picture digitized by scanning with the current technology and in the computer medium by the General Command of Mapping.

FOUNDATION OF MAP DRAWING SCHOOL

Seeing that the officers educated up to 1911 were not sufficient, it was decided to open a Map Drawing School affiliated with the Mapping Department of the General Staff Presidency. For this reason, the instruction of the Map Drawing School was prepared and activated in 1911. However, this school was able to start the education under the name "General Mapping and Drawing School" in three classes consisting of two middle and one high in 1916. In this school, the map officers were educated in three terms in which 15 of them were educated in 1919, 21 of them in 1922 and 13 in 1923. The school was shut down on February 1, 1923.

YEARS 1916-1918

1916 was one of the most studious years in the First World War in terms of cartography. Triangulation and topographer field units continued their works till February and the Reconnaissance Section directed their office works by staying in Aleppo in the winter. The Commission continuously made the field works for 12 months in 1917.

They made the field works for 8 months from the March of 1918 up to November 30, 1918 which is the date of Mondros Convention. Because of the convention, all of the other survey field units, besides two topographer units working in the İzmir region, were brought to the headquarters in Istanbul.

The survey field units in Aleppo and Nusaybin region had to return to Istanbul in November since the political situation in this region prevented the studies of the units.

Consequently, the difficulties created by the Trablusgarb, Balkan War and the following I. World War disrupted the planned mapping works. Especially as in the Çanakkale and Syria Fronts, the mapping works were continued behind the front line. According to the essences of the base and triangulation, the triangulation network of a wide area of 480,000 km² was established in Anatolia, Rumelia, Syria and Palestine. Based on this triangulation network, a map of 365,000 km² region (in other words, almost one-third of the French lands) was made and presented to the benefit of the Armed Forces.

Survey Company in the First World War

Survey Post of Hejaz Making the Map of Medina

Survey Officers Working in Hejaz (1917)

FOUNDATION OF THE MAPPING DEPARTMENT OF MINISTRY OF DEFENSE

The Mapping Department of the General Staff prepared various scaled maps of the regions that were thought to be necessary by the headquarters of the Supreme Military Command and the Front Command in the Balkan War and I. World War. In the meantime, these were printed on maps by benefiting from various maps of Anatolia, Palestine, Syria, Iraq, Egypt, Iran and the Caucasus made by the foreigners.

Since the rapid production of the necessary maps for the state defense required a wide organization, the Mapping Department and the Commission of Mapping connected to this department, as in the other European countries, were arranged on October 28, 1918 as an independent mapping department of the Ministry of Defense, which had triangulation, topography, reconnaissance, cartography and its central offices, a surveying battalion and a surveying school in its organization.

Topographer field units which were making 1/25,000 scaled maps in the İzmir region could not have the opportunity to work because of the occupation of İzmir by the Greeks in May, 1919 and came back to Istanbul. For this reason, they put an end to the field works and dealt only with the studies of drawing and cartography.

TURKISH INDEPENDENCE WAR

In 1920, the beginning year of the Independence War, there was not any opportunity for the survey field units to get on the field. However, the transitions from Istanbul to Ankara started individually and collectively to participate in the operation in Anatolia. At the beginning of the February of 1921, first group consisting of 22 officers at the ranks of the first lieutenant and lieutenant colonel took some maps, instruments, tools and documents with them on the way from Istanbul to Inebolu.

Necessary instruments were taken out of the building by opening the offices with the keys under the supervision of Gen. Staff Lt. Colonel Abdurrahman, who was authorized personnel of the Mapping Department, and removing roof tiles of the store under the control of the French occupation units. Since the weather condition was not good and a vehicle could not be provided, the Survey Group had to stay in Inebolu till the end of March, 1921.

The Survey Group was able to come to Ankara on April 12, 1921 and in the meantime, they made the route map of the Inebolu-Ankara road. This group coming to Ankara settled in the Attarbaşı Khan in Koyunpazarı and with some other officers joining later on, it became an organization which would support the National Struggle as an office of the Mapping Department.

General Mehmet Şevki was ordered to come to Ankara with a telegraph sent by General Fevzi (Marshal Fevzi Çakmak), the Minister of Defense, on July 11, 1921. According to the telegraph, Brigadier General Mehmet Şevki, the president of the Mapping Department, came to Ankara on December 17, 1921 and started his duty by completing the preparations.

TURKISH CARTOGRAPHY DURING THE SAKARYA WAR

During this period; when it was decided that our units would constitute a defensive front to prevent the Greeks from moving forward and to make a major battle with a certain result, the

First Group of Survey Officers Joining to the Turkish National Struggle

Disembarkation of Mehmet Şevki to Samsun (December, 1921)

A Group of Survey Officers in Front of Attarbuşi Khan
(The Headquarters of the Mapping Department, Ankara - 1921)

1 / 100,000 Scaled Map of Sakarya

Officers of the Cartography Department
Joining to the Turkish National Struggle (Ankara)

Brig.Gen. Mahmut Şevki
In His Working Room During the Independence War

trouble of missing maps on a sufficient scale and accuracy was experienced. For this reason, after deciding to make 1/100,000 scaled map of the region right away, a map team consisting of 8 officers was sent to the region from Ankara. Atatürk paid much attention to this topographical survey and he assigned his private railway car to the topography team for drawing and increasing the maps. This study, which occupies a particular place both in the Independence War and in our history of cartography, was the field work during the day-time and the drawings and combination of these field works under the light of candle during the night-time and lasted 20 days.

Second event was that it became an urgent issue to let Kayseri be the capital because of the Greek Forces' getting closer to Ankara. For this reason, the personnel of the Map Department, the printing machines, the tools and instruments were sent to Ankara in July, 1921 and only the president of the department and the headquarters of the presidency were left in Ankara. After the Sakarya War had resulted in our victory, they returned to the Attarbaşı Khan in Ankara. However, on the way of coming back, because of the limited locations in Ankara, a section of the Cartography Department and the photo-studio were placed in Keskin. The headquarters of the presidency and the press carried on their works in the building of Mekteb-i Sultani which was also used as the Ministry of Defense.

THE FIRSTS IN THE TURKISH CARTOGRAPHY OF REPUBLIC PERIOD

ESTABLISHMENT OF THE GENERAL DIRECTORATE OF MAPPING

The Mapping Department, which moved to Ankara from Istanbul after the Independence War, settled in the Attar Başı Khan in Koyunpazarı and the press section also started its studies in the building which is the Art School in Ulus today. In 1924, the department, which is still inside the General Directorate Garrison, moved to the hut-shaped buildings with single floor between the Military Sewinghouse and the General Directorate.

On the other hand, the production of maps and plans, which were to be used in development services carried out in parallel to the revolutions starting with the declaration of the Republic and following each other, was considered to be based on a legal arrangement. Because of the necessity of an urgent legal arrangement, the bill of law concerning to the General Directorate of Mapping, whose preparations were initiated by Lieut. Gen. M. Şevki (Ölçer) who knew the importance of the subject, was sent to the Ministry of Defense at the beginning of 1925. After the approval of Ministry of Defense, the bill, which was sent to the Prime Ministry, was discussed in the Council of Ministers and presented to the Grand National Assembly of Turkey.

As a result; the Mapping Department was re-organized as the General Directorate of Mapping affiliated with the Ministry of Defense with the law bearing the number 657 on May 2, 1925 in order to do all mapping works and meet the needs of maps and plans of all ministries, institutions and organizations.

Its re-establishment had the following foundations:

- The headquarters of the General Directorate of Mapping,
- Astronomy and Triangulation Department,

Settlement of the General Directorate of Mapping, 1927

Front Side of the General Directorate of Mapping in Cebeci, 1962

Mess Hall of the General Directorate of Mapping

Current Appearance of the General Directorate of Mapping, 1998

- Topography Department
- Plan and Cadastral Department
- Levelling Department
- Photogrammetry Department
- Geology Department
- Cartography Department
- Mapping Battalion
- Surveying School and the Committee of Science

In the headquarters of the General Directorate are the sections of Private Secretariat, Personal Matters, General Documents, Archives, Workshop of precise instruments, Accountancy and Quartermaster Corps. Because of its extending organization, the construction of its current building was started in 1925 and activated in 1927, based on the project which had the first place as a result of a competition and a prize of 1500 TL. The building cost 146,000 TL. including all expenses. The General Directorate of Mapping was charged not only with making the plans about the national defense, but also making various maps for the national development with the law bearing the number 203.

After the construction of the building of the General Directorate of Mapping, the construction of another building for resting and social activities was considered but it could not be carried out because of insufficient subsidy. Current outdoor cafe of officers is such a building constructed by soldiers with the money given by the employees voluntarily from their salaries.

This outdoor cafe served the cartographers and people living in Ankara as a wedding hall for years.

The needs of the maps, plans and air photographs of various Ministries related to the development were determined with a plan by the Institution of Coordinating and Planning Cartographic Works among the Ministries established on January 2, 1961 with the law bearing the number 203 which was added to the law bearing the number 657.

LIEUTENANT GENERAL MEHMET ŞEVKİ

P.[1302 (1886)-4]

FIRST GENERAL DIRECTOR OF MAPPING

Lieutenant General Mehmet Şevki, who is known as the founder of the General Directorate of Mapping in the history of the Armed Forces, was born in Istanbul in 1866 as the son of a military doctor whose father is Ahmet Bican. He entered the Military Academy on September 1, 1883 and graduated as an Infantry Lieutenant on June 15, 1886 and as a Gen.Staff Captain on May 1, 1889. Before going to Paris to have an education in the French Military Academy on December 19, 1890, he had taught astronomy, analytical geometry and scientific weapon in the Artillery School and the Military Academy. After graduating from the French Military Academy, he had a private education about technical cartography in the French Geography Department and an internship about astronomy in the Mont-Souris Observatory in Paris. After coming back to homeland on July 15, 1894, he taught in military schools. At the same time, he had duty in the Commission of Mapping, which had been established as a connection of

Dr.Lt.Col. Ahmet Bican, 1875
(Father of Mehmet Şevki Pasha)

Mehmet Şevki Pasha, 1885
(Student of Military Academy)

General Staff Mehmet Şevki Pasha
(In Education, Paris)

Brig.Gen. Mehmet Şevki While Visiting German Mapping Department (1917)

the 5th Department of the General Staff Presidency, and charged with the works of modern cartography.

When he was a major, he became successful in rectifying and combining the 1/210,000 scaled maps of Rumelia and 1/200,000 scaled maps of Western Anatolia in 1895 and as a member of the Commission, together with the new president of the Commission of Mapping, General De Forj, he measured a base in Eskişehir firstly in Turkey and participated in astronomical observations and established I. order triangulation expanding network in this city.

He continuously worked on meeting the needs of military mapping by surveying practically on the field and because of his attempts, in 1909, he became the director of Geodetic Department of the Commission of Military Mapping affiliated with the General Staff Mapping Department when he was a colonel. Mehmet Şevki prepared the "Bonn" Projection method and its calculations for the Turkish maps which had been designed previously. According to these calculations, the intersection point of 44 grade geographic latitude and the meridian circle passing by the dome of Hagia Sophia became the beginning of the X and Y axis.

When he was a major as a brigadier in 1911, he enlarged his working area and carried out the studies related to 1/25,000 and 1/50,000 and 1/200,000 scaled reconnaissance maps based on a triangulation in order to supply map to the country right away and prepared the necessary technical instructions. In the same year, he wrote his work named "Field Division" and established a Surveying School in 1916 to educate young and technical officers.

General Mehmet Şevki, who had solution proposals for the unmilitary needs following the developments and innovations in the European science and technique, expanded the Commission of Mapping with the name "Independent Mapping Department" affiliated with the Ministry of Defense. During the period in which the studies were stopped temporarily because of the I. World War, he wrote the book including ten-year historical summary. This work was translated into Italian by the Geographic Department of Italy and introduced as the Turkish scientific work.

In the years following the I. World War and during the occupation of Istanbul, he accepted the invitation sent by the General Staff Presidency of the Turkish Grand National Assembly to charge him in the Anatolia on August 17, 1920 and together with his 35 map officers in the Map Department and 100,000 sheets, he provided 172 chests of instruments and materials of general mapping to be sent to Anatolia.

He was promoted to the rank of Lieutenant General in 1925. He struggled to make the current law dated May 2, 1925 about the establishment of the General Directorate of Mapping. He retired on July 1, 1926 and worked for Istanbul Cadastral Department for a short time and died on May 9, 1927. His grave is in the Merkez Efendi Cemetery. He was rewarded with 12 various Ottoman medals, the war medals for the Ottoman-Greek War in 1897 and I. World War in 1917 and an independence medal for his success in the National Struggle. He has 8 scientific and historical works, one of which is a translation.

BRIGADIER GENERAL

ABDURRAHMAN AYGÜN

P.[314-21]

He was born in Mudanya on December 29, 1878. His father was Mehmet Aga and his mother was Asiye. After completing his elementary and secondary education in Mudanya Middle

Brig.Gen. Mehmet Şevki in Inebolu to Participate In the National Struggle, 1921

Brig.Gen Mehmet Şevki Examining a Mapping Instrument, 1921

Lt.Gen. Mehmet Şevki, 1925 (General Director of Mapping)

Lt.Gen. Mehmet Şevki With His Colleagues, 1923

School (junior high school) and high school education in Bursa Military School on March 19, 1896, he entered the Military School. After an education period of 3 years, he graduated as a Infantry Lieutenant in 1898 and was selected for the class of Staff. He graduated from the Military Academy as a Staff Captain on January 9, 1902.

He was charged in the Mapping Department of the General Staff between March 14, 1906-October 2, 1912. He taught topography in Monastery Military Academy between April 29, 1906-March 14, 1909.

He was appointed to the Military Attache of Sophia on January 28, 1917 and carried on this duty up to the armistice and he was appointed to the service of Mapping Department on February 18, 1920 for the second time. With the order of Mehmet Şevki Pasha, president of Mapping Department; he worked in the Mapping Department of Istanbul to meet the mapping needs of the army during the Independence War and he carried on his duty in Ankara after April 28, 1922.

While he was working for the General Directorate of Mapping, he taught mathematics, geometry, geodesy and astronomy in the Surveying School.

He appointed to the Directorate of Photogrammetry of Mapping Department in April, 1925 and to the Directorate of Astronomy and Geodesy in June.

He went to Paris in May, 1928 to examine the Triangulation and Projection studies and made researches and calculations about Lambert Projection which would be used for the country maps in 1930-1931 and became the vice-director of mapping in 1932. He represented Turkey in the Congress of Photogrammetry in Rome in 1938.

He rose to the rank of Brigadier General on August 30, 1939 and retired in June, 1941. While he was working for the Armed Forces, he got various medals.

Brig. Gen. Aygün also had a private education about the astronomy branch of cartography and wrote 55 works which are mostly about cartography.

He knew French and German. He was married and had four children. He died on May 9, 1943 and his grave is in the cemetery of Zincirlikuyu.

SURVEYING ACADEMY

In accordance with the 8th article of 657 numbered and May 2, 1925 dated law related to the establishment of the General Directorate of Mapping (the General Directorate of Mapping will establish a surveying school to educate necessary technicians for Mapping and Cadastral Surveys), the Surveying Academy was inaugurated on October 1, 1925 as a connection of the Surveying and Drawing School. This school began its function in the building rented near Çiftefırınlar at Demirciler Street in Ulucanlar, Ankara and moved to the building of the General Directorate of Mapping in 1928.

In fact, the school was thought to have 5 sections. Meanwhile, the necessary personnel was met with 30 young officers brought from the army until the graduates, who would graduate in 3-5 years, came. According to the program, the graduates of the second section were thought to work for the Cartography Department, the graduates of third section to work for the Topography Department and the graduates of fifth section to work for other departments.

At the beginning of 1927, one of these sections was shut down with the order of the Ministry of Defense and the school continued with two sections. At the beginning, there was not any change in the names of the sections and later on, with the 6484 numbered and April 25, 1928 dated decree of the Council of Ministers, the instruction arranged for the education of Military

Abdurrahman Bey (1921)

Abdurrahman Bey (1926)

Abdurrahman Bey (1928)

Abdurrahman Bey (1931)

The Leaders and Founders of the Mapping Department in March, 1932

Abdurrahman Bey (1935)

Survey Engineers went into effect. According to this instruction, it was approved that the volunteers were able to be the assistant of survey engineers if they graduated from a high school and had an education for one year. This school graduated the students of two terms.

Since the number of the staff educated in this school was sufficient, the Surveying Academy was shut down in 1929.

Beginning from 1929, various courses have been opened at the General Directorate of Mapping to obtain and search about cartographic information. The elected officers passed to the Surveying Section at the end of an internship period of 14 months. This internship period of 14 months comprised 2 months in cartography section, 6 months in triangulation section and 6 months in topography section. These courses were rearranged with the 497 numbered and December 14, 1937 dated instruction for courses of the General Directorate of Mapping of the Ministry of Defense.

For the first time in 1938, the students of Military High Schools were admitted to the Surveying Section of Military Academy. The officers, who graduated from the Military Academy in 1940, came to the Surveying School after 2-year education at the Artillery School. These officers took a 8-month preparatory course. The officers, who were successful in this course, worked as an intern at the Technical Departments of General Directorate. The ones, who were successful during the internship, continued in the Mapping Section.

Therefore, the officers, who graduated from 2-year Military Academy and 2-year Artillery School with success, constituted the source for the Surveying Section. This system continued including the graduates-1947 of the Military Academy. However, even if the education period of the graduates of the Surveying Section in the first three terms was shortened in the Military Academy of Land and the Artillery School because of the World War II, the education period was turned into its usual form beginning from the graduates of forth term.

In 1948, the education period of the Military Academy was increased to three years whereas the education period of the Artillery School was reduced to one year. Therefore, the officers, who graduated from 3-year Military School and 1-year Artillery School with success, constituted the source for the Mapping Section. This system was exactly applied for the graduates between 1948 and 1958.

However, beginning from the graduates-1960 of the Military Academy, the education period of the Military Academy was reduced to 2 years by eliminating the third section which was for education of the officers.

Additionally, the ones, who graduated from the Military Academy as Survey Officers in 1959, 1960, 1961 and 1962, were directly sent to the Surveying School instead of the Artillery School.

The Military Academy did not have any graduates in 1963 and 1964. Also, any officer, who graduated from the Military Academy in 1965-1966 and 1967-1968, was not elected for the Surveying Section. For this reason, in order to meet the officer deficit, the Artillery officer , who passed the examination in 1966-1967 and 1968-1969, were transferred to the Surveying Section. Beginning from the graduates-1969, the election of officers from the Artillery School ended in 1970.

In accordance with the 8 numbered and December 18, 1969 dated decision of the High Military Council, it was approved to change the name of the Surveying School as "Survey Engineering School of the Ministry of Defense".

A Certificate Belonging to Senior Major Kemal DENKER (1928)

Surveying Group of Students
Working on Field in Ankara (1923)

Ankara Surveying School
Educating Survey Officer Between 1928-1963

1973 Graduate Officers During Field Work

Survey Engineering School (1998)

Student Officers in the First Order Triangulation Works

The education period of the Survey Engineering School was determined as three years after the Military Academy education by coordinating with the Ministry of Defense. 3-year education was firstly applied by the Survey Engineering School in 1970.

Meanwhile, at the beginning of the education year 1969-1970, the education period for the students of the Military Academy was increased to three years and this school had its first graduates in 1972.

With the 47/2 numbered and August 12, 1971 dated article of the Presidency of Instruction and Training Section of the Ministry of Education, Survey Engineering School of the Ministry of Defense was registered as 3-year high school after the Military Academy.

The Surveying Section was opened in the Military Academy of Land at the beginning of the education year 1977-1978. The graduates of the Surveying Section of 4-year Military Academy of Land have studied in 2-year education of the Survey Engineering School since 1980.

FIRST MEMBERSHIP
IN AN INTERNATIONAL ORGANIZATION

International Society for Photogrammetry and Remote Sensing
(ISPRS)

ISPRS (International Society for Photogrammetry and Remote Sensing) is an organization founded to provide international cooperation in the developments related to photogrammetry and remote sensing and their applications in various fields.

This organization defines the photogrammetry and remote sensing as a science , art and technology dealing with collection, process, registration, measurement, analysis and presentation of reliable information about the earth and its surroundings and other physical materials.

Based on the activities for its aims above; ISPRS arranges a general congress including all subjects in every 4 years. These congresses comprise scientific meetings, technical tours, technological exhibitions and social activities.

There are five different kinds of membership in ISPRS, which includes seven technical commission presidencies in its organization. These are;

- National membership
- Associate membership
- Regional membership
- Sustaining membership
- Honorary membership

The requirements for national membership, in which every member country is represented by a national delegate and has the right to vote for the decisions developed at the Meetings of General Assembly of ISPRS, are carried out by the National Societies for Photogrammetry and Remote Sensing of member countries and membership fees are paid by these societies. The annual fee varies based on the membership categories. For example; Turkey and Greece are in the eighth category whereas USA and Germany are in the second category. These


1910
ISP
1980
ISPRS
2000
isprs
information from imagery

categories are determined depending on the activities related to photogrammetry and remote sensing and the number of personnel working on this field.

In 1928, Turkey became the member of ISPRS which was founded in 1910 and have been arranging congresses in every 4 years since 1913. It has currently 108 member countries. These congresses, which 3000-3500 persons from various countries attend, are the important organizations for the countries to introduce themselves to the world in terms of culture and tourism; also technological and professional developments and scientific activities are exhibited in these organizations.

FIRST CARTOGRAPHER MARTYRS

Land Martyr

LIEUTENANT COLONEL

HAFIZ MEHMET ŞÜKRÜ BAYKA

(1906-43)

(1885-Sep 7, 1936)

Lieutenant Colonel (LTC) Bayka was born in Bursa in 1885. His father's name was Abdullah and his country was Daghestan.

LTC Bayka, who joined the army on January 14, 1903, promoted to the rank of second lieutenant on September 26, 1906, lieutenant on April 27, 1911, captain on December 14, 1916, senior captain on September 14, 1922, major on August 30, 1927 and lieutenant colonel on August 30, 1934.

LTC Bayka attended the Albanian War between May 12-October 8, 1910, Balkanian War between May 31-October 17, 1912, I. World War and the Independence War between June 26, 1921-August 23, 1923.

When he was the post commander of mapping in Soma, LTC Bayka, who had joined the General Directorate of Mapping on March 22, 1914 and worked as a topographer, fell down from horse and died on the paved road of Bergama while going to Çerkez Hamidiye Village to inspect the surveying officers on September 7, 1936. LTC Bayka was married and had four children.

Air Martyrs

3 survey officers, whose curricula vitae are given below, and 1 pilot, who was a noncommissioned officer of the Air Forces, died in the Koolhoven model of airplane which took off for a topographical survey on September 9, 1942, but fell down near Kandıra because of bad weather. This plane began to work for the General Directorate of Mapping in 1938.

LIEUTENANT COLONEL
HAFIZ MEHMET ŞÜKRÜ BAYKA
(1906-43) (1885-Sep 7, 1936)

CAPTAIN
NEBİL BAYRAKTAR
(1929-9) (Feb 14, 1907-July 9, 1942)

CAPTAIN NEBİL BAYRAKTAR

(1929-9)

(Feb 14, 1907-July 9, 1942)

Captain Bayraktar was born in Istanbul on February 14, 1907. His father's name was Hüseyin Galip.

Captain Bayraktar promoted to the rank of lieutenant on December 26, 1922, first lieutenant on August 30, 1937 and captain on August 30,1941.

Captain Bayraktar entered the Mapping School on November 2, 1927 and began to work for the General Directorate of Mapping on June 26, 1929. He died when he was the officer of Flight Unit in the Photogrammetry Department. Captain Bayraktar was married.

CAPTAIN İBRAHİM HAKKI ÖRGİN

(1921-10)

(March 7, 1903-Sep 9, 1942)

Captain Örgin was born in Manastır on March 7, 1903. His father's name was Muhittin Nuri and he was from Besiktaş, Istanbul.

Captain Örgin promoted to the rank of second lieutenant on November 30, 1922, lieutenant on April 15, 1923, first lieutenant on August 30, 1928, captain on August 30, 1933 and senior captain on August 30, 1939.

Captain Örgin, who attended the Independence War, worked for the Photogrammetry Department of the General Command of Mapping. Captain Örgin was married.

CAPTAIN OSMAN CEVAT DAĞGEÇEN

(1931-67)

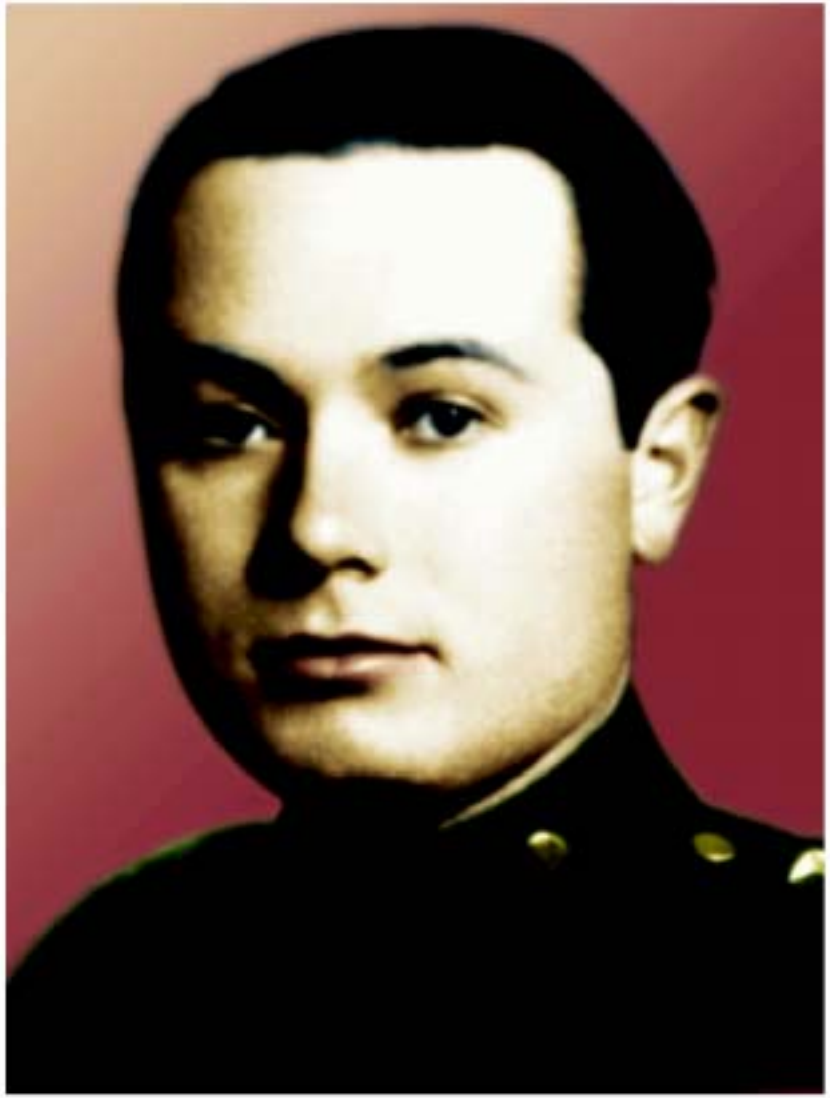
(Sep 30, 1911-Sep 9,1942)

Captain Dağgeçen was born in Çorlu on September 30, 1911. His father's name was Mehmet Şükrü.

Captain Dağgeçen entered the Military Academy on May 1,1929 and graduated as a second lieutenant on April 30,1931. He promoted to the rank of lieutenant on October 29, 1931, first lieutenant on August 30, 1935 and captain on August 30, 1940.

Captain Dağgeçen began to work for the General Directorate of Mapping on July 20, 1935 and died when he was the officer of Flight Unit in the Photogrammetry Department. Captain Dağgeçen was married and had one child.

CAPTAIN
İBRAHİM HAKKI ÖRGİN
(1921-10) (March 7, 1903-Sep 9, 1942)



CAPTAIN
OSMAN CEVAT DAĞGEÇEN
(1931-67) (Sep 30, 1911-Sep 9,1942)

Monument of Martyrs

ESTABLISHMENT OF THE FIRST NATIONAL PROFESSIONAL UNION WITH AN INTERNATIONAL ALIGNMENT

International Union for Geodesy and Geophysics (IUGG)

In the 19th Century, besides coordinating the studies in international platform and providing mutual assistance and encouragement in researches, the standardization that was wanted to be obtained in geodetic and geophysical values forced those concerning to this subject to act in union.

In order to meet this kind of needs, the Middle European Society for Grad Measures, which constituted the first stage of International Union for Geodesy and Geophysics, was established by Prussian General Bayer in 1862.

The society, in which Prussia, other German states, Austria, Belgium, Denmark, Netherlands, Russia, Sweden and Switzerland participated at the beginning, got the name "European Society for Grad Measures" after the participation of Spain and Portugal in 1867.

This society, in which also France participated later on, got the name "International Society for Geodesy" in 1886.

This society improved its international content because of the participation of the USA and England and it became an informal organization for the studies of geodetic scientist from various countries.

This society was dissolved because of the general meetings that were not carried out during the First World War. After 1918, the society was re-organized firstly in 5 commissions, and then in 7 commissions. It was decided to carry out the Union meetings once in 3 years. the Conference of Rome was made in 1921, Madrid in 1924, Prag in 1927 and Stockholm in 1930.

During the Second World War, the activities of the Union paused temporarily and an extraordinary preparation meeting was made in Sweden in 1946.

The Turkish Republic Government became the member of IUGG in 1948 with the decision of the Council of Ministers bearing the number 3/5774 and dated May 5, 1947. The General Command of Mapping was entitled to represent the Turkish Government in the IUGG with the order of Presidency bearing the number 468/7640 and dated December 1, 1954.

The Union got its regular working system with the Oslo Meetings-1948, in which Turkey participated as a member for the first time. Other meetings of the Union were carried out in Brussels (1951), Rome (1954), Toronto (1957), Helsinki (1960), Berkeley (1963) and Zurich (1967).

The General Command of Mapping frequently presented a report about the geodetic studies in our country. It was decided in 1967 to arrange these meetings, which had been carried out once in three years until 1963, once in four years and it was accepted to make the meeting of 1971 in Moscow as a response to Soviet Russia's offer. The next meeting of IUGG will be carried out in Sapporo (Japan) in 2003.

Turkish National Union for Geodesy and Geophysics (TNUGG)

It was occasionally desired to participate in scientific activities carried out in 7 commissions of IUGG coordinately according to a country-wide program, to put the scientific results into practice in favor of the country and to establish an encouraging and associating organization for geodesy and geophysics in the country.

Therefore, the General Directorate of Mapping prepared and instruction draft about the establishment of an organization under the name "Turkish National Union for Geodesy and Geophysics (TNUGG). This instruction draft was approved by the 6/10612 numbered decision of the Council of Ministers and went into effect by being published in the 13002 numbered Official Gazette dated September 16, 1968.

According to the instruction of TNUGG, the General Directorate of Mapping was entitle to represent the Government in IUGG and to act as a contact agency for the Union.

The first meeting of the General Assembly and Council of TNUGG, which was made every year as a requirement of the instruction, was made in Ankara in 1969. The administrative matters were discussed generally at the first meeting and the membership of the candidates presented by the universities, high schools and institutions was approved. Later on, TNUGG continued its progress with the Council and General Assembly Meetings that were wanted to be carried out systematically. With the new regulations made in 2001, it had its current organization.

ASSOCIATION OF SURVEY AND CADASTRAL ENGINEERS

The association of Survey and Cadastral Engineers is an institution of profession possessing Public Juristic Personality established in accordance with the 135. article of the Constitution of Turkish Republic and the law of Union of Turkish Engineers and Architects bearing the number 6235 in 1954.

The purpose of its foundation has been summarized in the law as;

- to meet the common needs of the engineers and architects, to facilitate the professional activities, to provide the development of the profession appropriately for general interests, to keep the professional discipline and morality in order to dominate the honesty and trust of the professional members in their relationships with each other and with public.
- to help and work with official institutions cooperatively in professional affairs and to make suggestions, to examine all topic, norms and technical contracts related to profession and to inform them know about opinions and thoughts.

The Association of Survey and Cadastral Engineers is one of the ten associations established at the first general assembly of the Union of Turkish Engineers and Architects held between October 18-22, 1954. This association, which had 62 members when it was established, currently has 8500 members.

As from 2001, the Association of Survey and Cadastral Engineers completed its horizontal organization with a Central Office, 10

Departments, 3 representatives affiliated with central office and 170 province/district representatives.

The Association of Survey and Cadastral Engineers continues its studies related to professional discipline in an institutional structure in accordance with the law and status of TMMOB bearing the number 6235 and the regulations and instructions of the Association of Survey and Cadastral Engineers.

The Association of Survey and Cadastral Engineers attempts to provide professional benefit by considering public interest and social superiority in accordance with the services of Survey and Cadastral Engineering.

By this way; it carries on the studies related to professional education in communication with the universities, in addition to some activities such as symposium, panel discussion, and seminar in scientific and technologic field in our country.

The Association of Survey and Cadastral Engineers, which is an professional public institution, carries out necessary activities for the consciousness of duty and responsibility and public interest in accordance with Democratic Public Organization, in addition to the studies related to professional discipline.

40% of its members are employed in Public Foundations and Institutions, 25% in their own companies and offices and 35% in private companies.

THE MAPPING MUSEUM

The Mapping Museum of the General Command of Mapping was inaugurated in 1971. At that time, only relief maps and each of old and new instruments and materials, which had been used in mapping, were exhibited.

It was reorganized to address to the personnel of the General Command of Mapping and the personnel of other governmental agencies. It was reopened in 1978 without changing the capacity of the museum, but an art gallery was added.

The museum was started to be arranged in 1987 to reflect the culture and history of Turkish mapping. By these arrangements, it became possible for citizens ,scientists and professions to benefit from our museum, and also to inform young generation about the stages of Turkish mapping. The museum was reopened on May 2, 1990.

Because of these arrangements, the museum was enriched with old surveying instruments, materials and maps which were obtained from archives, domestic and international sources.

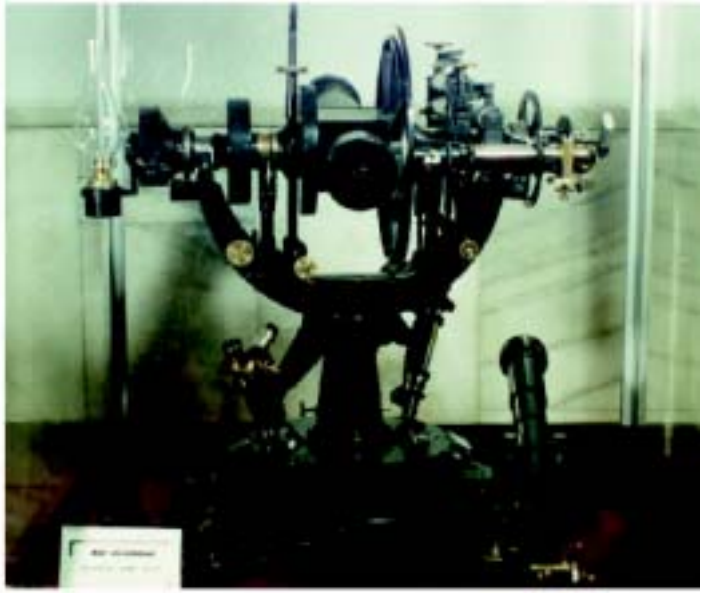
Today, the Mapping Museum has its own building with an examining room, in which atlases, maps and all books related to mapping are exhibited. A relief map stand, with relief maps that were produced for the first time by Turkish cartographers in 1880, was added to the museum. The art gallery, in which the paintings of Turkish cartographers and professional painters are exhibited, has been extended.

The Mapping Museum, in addition to its modern museum concept, has the responsibility of research and examination functions of its historical mission rightfully.

Necessary measures were taken to constitute an appropriate atmosphere for the best maintenance of instruments, books and maps which are being exhibited in the museum. Additionally, the information about existing books, atlases and historical maps are going to be recorded in digital medium.

The Mapping Museum can be visited on Tuesday and Thursday, from 9.30 to 12.00 and from 14.00 to 17.00, by getting the permission of the General Command of Mapping.


HARİTACILIK MÜZESİ



CLASSICAL CARTOGRAPHIC ACTIVITIES IN THE REPUBLIC PERIOD

GEODETIC STUDIES

The word 'Geodesy' is formed by the Latin words 'geo' which means the earth and 'desy' which means measuring. Geodesy is a branch of science dealing with the determination of the shape and the size of whole or a part of the earth, three-dimensional locations of the points on earth and gravity area in the time-variant space with conventional and space techniques. The General Command of Mapping performed the geodetic activities given in the following historical progress in order to meet the needs of every kind of geographical information and documents for all public institutions and other users, especially for the Turkish Armed Forces.

The Mareograph station of Antalya was established and activated in 1935 to determine the average sea level which is the beginning of the height system. The formation of I. and II. Order Fundamental Levelling Network of the Country was completed with the studies between 1936-1970. The re-establishment and re-measurement studies of the present network have been carried out since 1973.

The activities for establishing the Fundamental Triangulation Network of the Country were initiated in an organized and planned way in 1942 and "the Turkish National Fundamental Triangulation Network", which was formed by the I. and II. order triangulation points, was established in 1953. In the following years, the studies related to the intensification of II., III. and IV. order triangulation were carried out based on this network. Observations were made with Wild T3 and Tavistok theodolites as 24 series for the I. order, 12 and 8 series for II. order. These series were made with Zeiss TSG signal lanterns at nights and heliograph in the day-time.

Gravity studies beginning in 1947 were put in an organized form and "the I. order Gravity Network" with 24 points was established in 1960. Later on, II. order network having 5-10 km intervals throughout the roads was constituted based on this network.

The magnetic measuring studies were initiated all over the country in 1960 to determine compass deviation and its change depending on time which were needed for the production of the topographic maps and the Fundamental Magnetic Network of the Country and the Magnetic Intensification Network were established.

The measurement and evaluation of the GPS (Global Position System) were started in 1988 in order to determine the geodetic datum and the movements of the earth crust and to form the three-dimensional fundamental geodetic network. The establishment of Ankara GPS test network was initiated in 1990 and completed in 1995.

The permanent GPS station of Ankara was established and activated in 1991. The process of GPS measurements, which were done for various purposes between 1988-1999, resulted. In the period of the years 1997-1999, the Turkish National Fundamental GPS Network, which is used as the fundamental plate network in our current GPS studies, was established with great sacrifices in a short time.

Turkish National Fundamental Triangulation Network

First studies to form the points on the field, whose horizontal coordinates were known, and to establish the fundamental horizontal triangulation network were initiated in 1942. As the

A View from Base Studies

Reflecting Light with Heliotrope for Daytime Observation

Observation of Triangulation with Wild T3 Theodolite

Observation with Wild T2 Theodolite

result of the measurements of horizontal and vertical control networks, which were carried out in parallel processes, the horizontal control network constituted by 27 polygon chains which spread out all over the country, was established in a short period like 10 years. The horizontal coordinates were calculated by adjusting the angle, base and astronomical measurements in USA in 1954 and the Turkish National Datum-1954 was constituted.

Afterwards, the point coordinates of TUD-54 were turned into the European Datum (ED-50) by making use of 8 common points in the western Turkey. After TUD-54 had been constituted, the map production studies were initiated by intensifying this datum with II., III. and IV. order points.

Turkish National Vertical Control Network

The geodetic studies to determine the height of the points were initiated in Turkey through the end of 1930's. Turkey was separated into parts with the I. and II. order geometrical levelling routes formed throughout the main roads. The gravity on the vertical control points were not measured during the measurements carried out till 1970 because the studies related to the gravity network started in 1956. From the beginning to 1970, 19.800 km. of I. order and 8.900 km. of II. order vertical control network, 28.700 km. in total, were established.

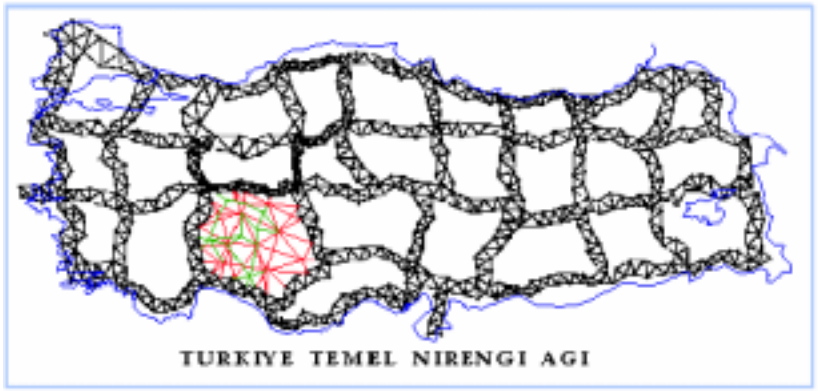
Between the years 1973-1993, the destructed lines of the vertical control network were replaced with the new ones and the gravity was measured on the vertical control points and by this way, 18.560 km of I. order and 3.770 km of II. order route measurements were renewed. The Turkish National Vertical Control Network-1999 was constituted by completing the evaluation of the geometrical levelling measurement and the gravity measurement together.

Studies About The Observation Of Sea Level

A mareograph station was established in Antalya by the General Command of Mapping in order to determine the beginning of the height system of the country and to observe the long period changes in the sea level. One year later, this station was turned over to the General Directorship of State Meteorology Supply and 10 more station were established and operated in various coasts of Turkey at different times by this institution. The responsibility for these stations, which had failed to be operated at the end of 1970's, was re-undertaken by the General command of Mapping in 1983. The present mareograph stations were shut down and they were replaced with the new ones established with new materials and activated in Antalya, Bodrum, Menteş and Erdek in 1985.

Turkish National First Order Gravity Network

The planned gravity measurements were initiated in 1956 in order to reduce the measurements of the horizontal control network, to determine the suitable heights and to be used for geophysical purposes. The measurement of 24 first order gravity points established in the airports between the years 1956-1958 were completed. The absolute gravity values of the I. order points in POTSDAM Datum were calculated with the connection measurements carried out in 1960. In the following years, based on the I. order the network, the II. order network formed by the points with the interval of 5-10 km was established throughout the main roads. That the first separate studies on this subject were initiated under the supervision of French experts in 1896 during the measurements of Eskişehir Base is understood from the historical records.



Turkish National Fundamental Triangulation Network

Turkish National Vertical Control Network

904 first order point

1,483 second order first step point

1,828 second order second step point

95,000 third order point

350,000 fourth order point

5 mareograph station

Leveling line in the length of 28,700 km

25,451 bench mark

T3 Theodolite

Pyramid

The new "First Order National Gravity Network", which has the accuracy and distribution to meet today's needs, was established with the studies initiated in 1993. The absolute gravity measurements were carried out on 13 points of this network. In order to determine the Turkish National Gravity Datum, absolute gravity measurements were carried out in association with IfAG/Germany in 1996.

Turkish Geoid

A long preparation period was spent for collecting and arranging data and obtaining and preparing the convenient software in order to determine the geoid which is needed deeply for the GPS studies in our time. During this preparation period, the Turkish topography was digitalized at the nodes of 15" x 15" network with the study started in 1985 and developed by spending great manpower, based on the 1/25,000 scaled maps. Later on, the gravity measurements, which were carried out by various institutions and arranged by the Institution of Mineral Research and Exploration (MRE) and spread out all over country in the frequency of 3-5 km. of almost 70,000 points, were provided.

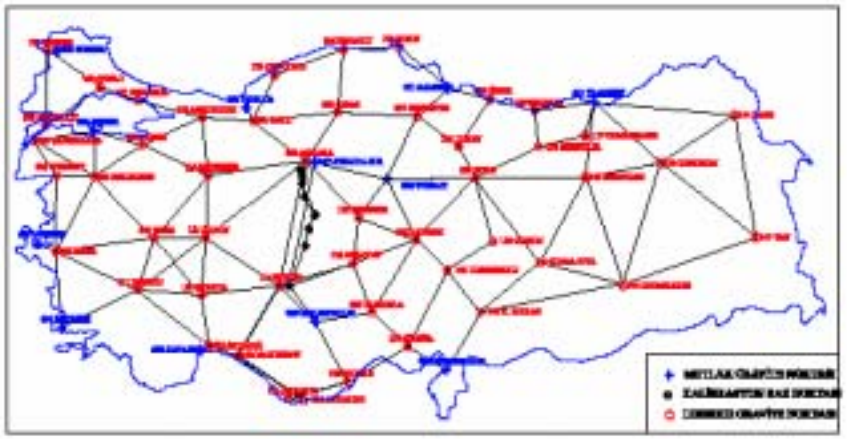
With Turkey compatible geo-potential model of GPM2-T1, the Turkish Geoid-1991 (TG-91) was calculated by collectively evaluating the topographical heights and the gravity values with the collocation method of the smallest squares. The accuracy of the TG-91 data is in the rank of a few dm and differs from region to region depending on the frequency and accuracy of the measurement.

Astronomic Studies

Besides the fundamental geodetic problems like positioning and orientation of the Fundamental Horizontal Control Network of the Country and the determination of the plumb line deviation (defining the astrogeodetic geoid), the astronomical measurements of latitude, longitude and azimuth have been carried out in order to observe the latitude changes caused by the studies of intensity changes on earth crust and mount, polar wandering, tectonic movements, etc.

For the first time, geographical latitude and real district angle were determined near the Eskişehir Base in 1896 by using sensitive instruments with the help of French experts. In 1909, with a Gautier-formed theodolite, a geographical latitude and a district at the southern end of Istanbul Base were measured with a secondary sensitivity. Additionally, a geographical latitude at the eastern end of İzmir Base (1916) and a geographical longitude near the Courthouse of İzmir (1929) were determined based on Greenwich. A Hildebrant model of universal theodolite was bought in 1932. Some geographical latitude and district angle measurements were made at the southern end of the Balıkesir Base in 1933 based on Greenwich. Askanian-made meridian measuring device having 90 mm. lens was bought in 1933.

Based on the explanation above, first astronomic observations were carried out on the base ends which the triangulation networks formed recently was based on. Later on, in 1942, astronomic geographical latitude, longitude and district measurements on 96 points (Laplace point) were carried out with Wild T4 and Askania Pasaj instruments till the end of 1953 based on the Turkish Fundamental Triangulation Network which was started to be established systematically. Later on, these astronomic studies were stopped till 1975. The studies, which were restarted, lasted till the end of 1988. Also during this period, the latitudes and longitudes

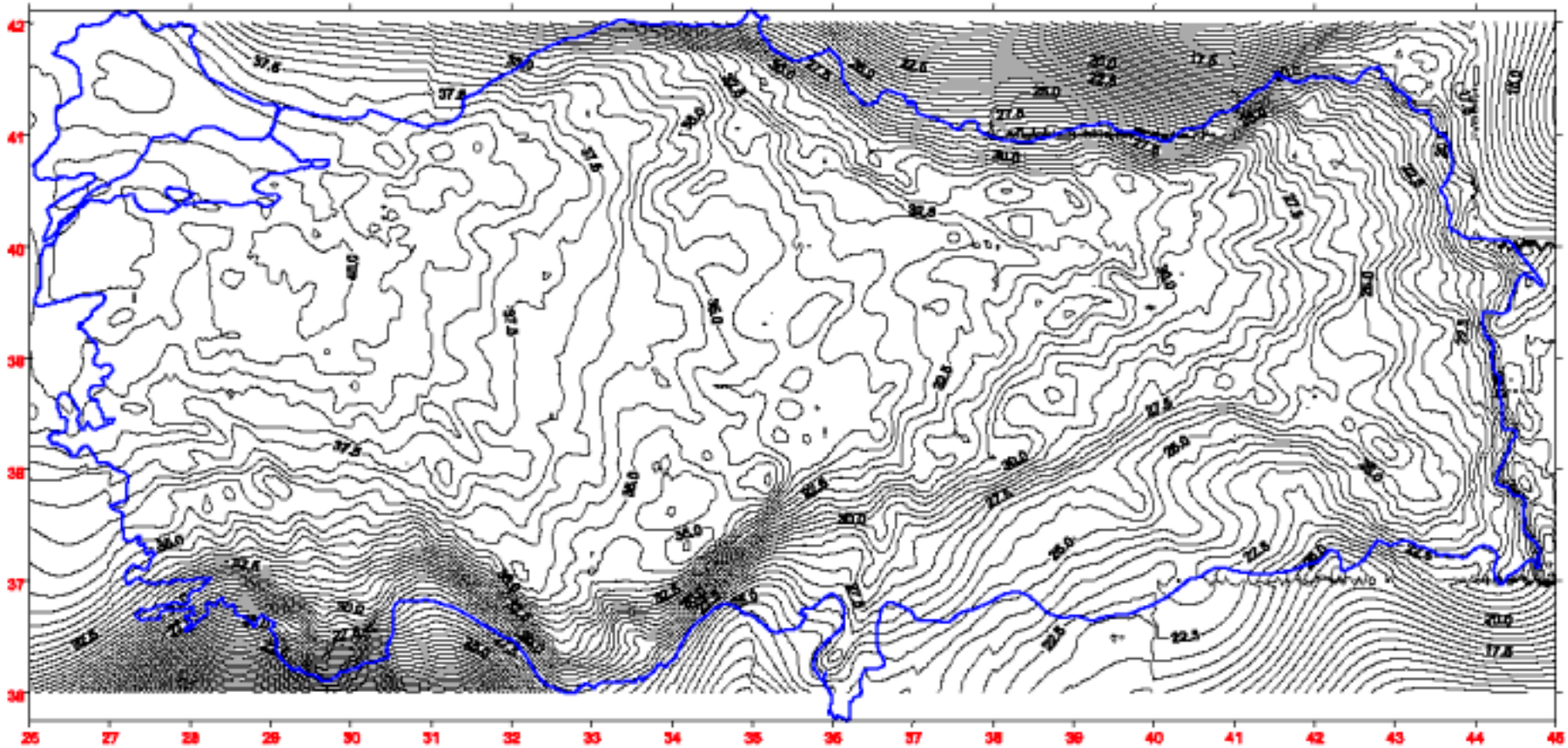


Turkish National First Order Gravity Network

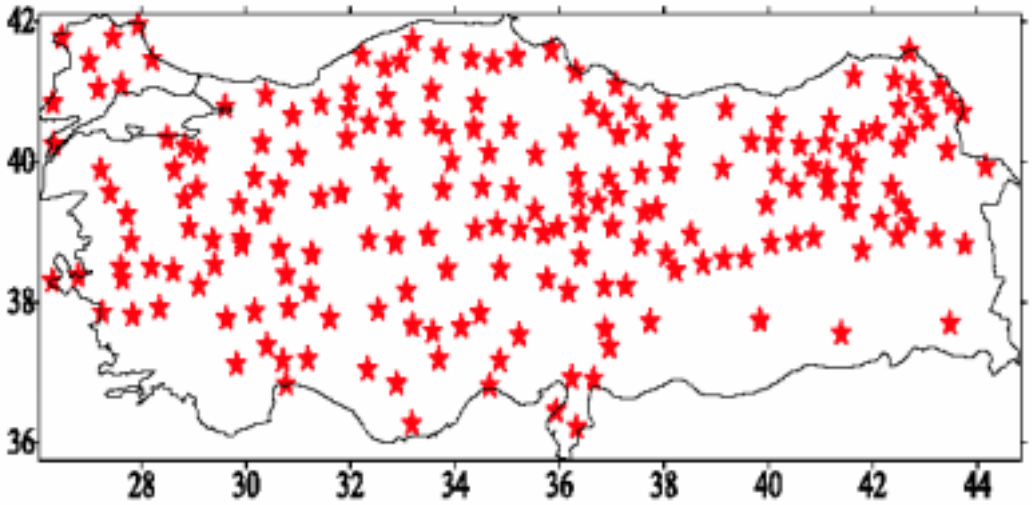
Absolute Gravity Measurement

Relative Gravity Instrument

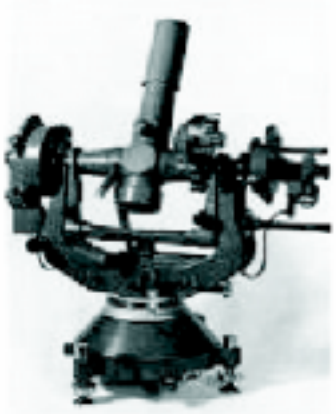
Absolute Gravity Instrument



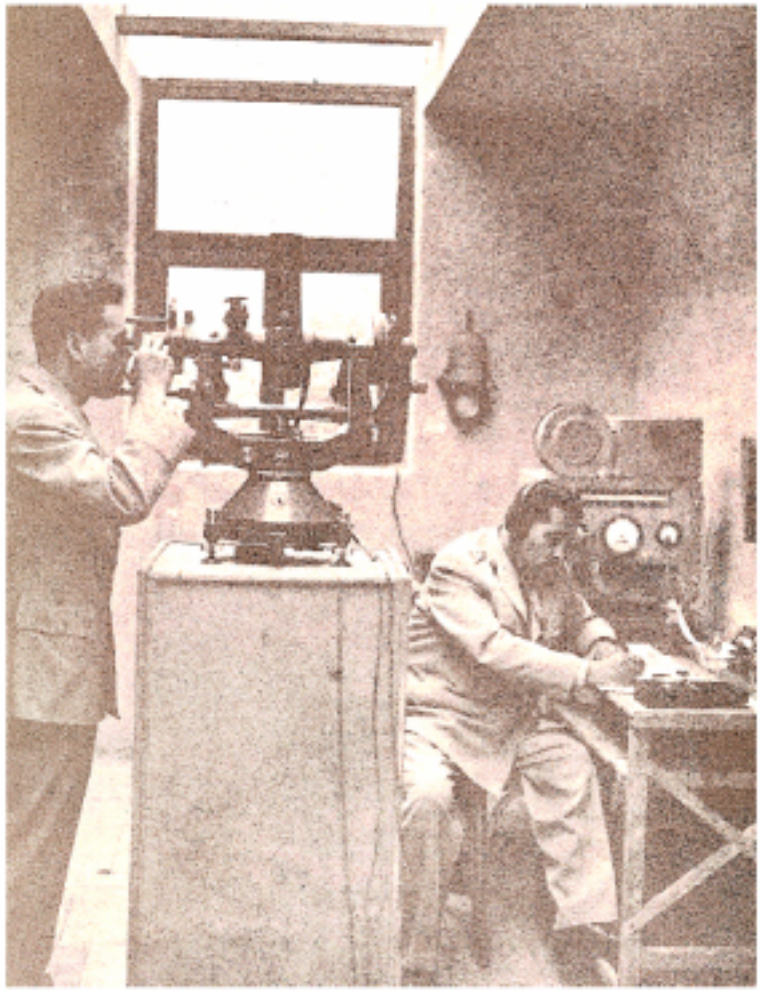
The Geoid of Turkey



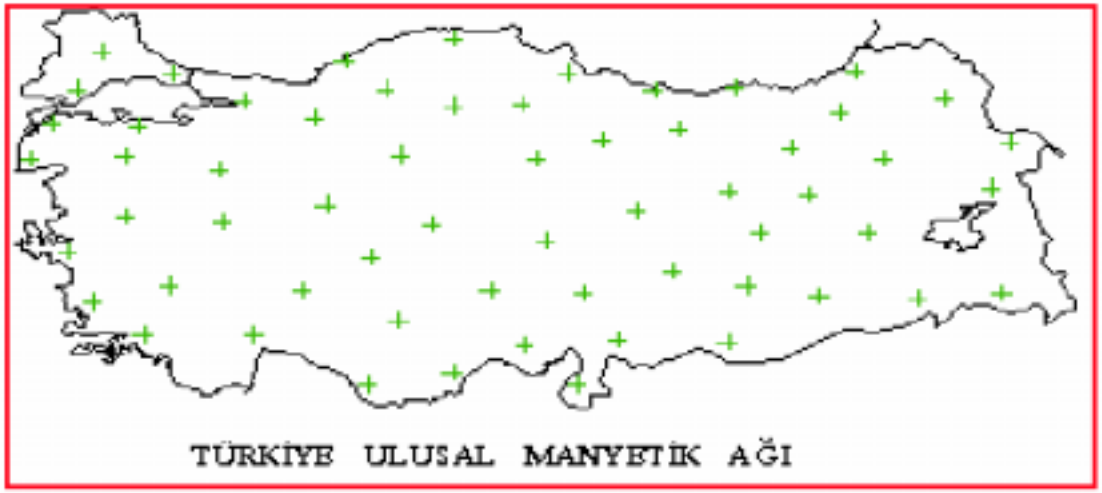
Astronomical Points



T-4



Astronomy Observation



Turkish National Magnetic Network

FM-300
Magnetometer

Turkish Doppler Network

TRANSIT-Doppler Receiver

were calculated from the altitude measurements of fixed star with the astrolabe apparatus which as compatible with Wild T3.

Turkish National Magnetic Network

The Turkish National Magnetic Network consists of 85 secular points (having intervals of 100 km.) and 200 intensifying points (having intervals of 25 km.). The changes of the magnetic fields on the secular points are observed with the periodic measurements carried out once in ten years. It is known that the first studies on this field were initiated in 1933 in parallel to the astronomic observations and the first measurement calculation of magnetic deviation was made at the southern end of the Balıkesir Base.

Turkish Doppler Network

The Doppler measurements were carried out on 253 points spread out all around the country between the years 1983-1991 in order to improve the horizontal control network and to determine the geoid and these measurements were completed in 1992. The Turkish National Doppler Datum-1992 (TDNN-92) was constituted by adjusting these measurements.

PHOTOGRAMMETRIC STUDIES

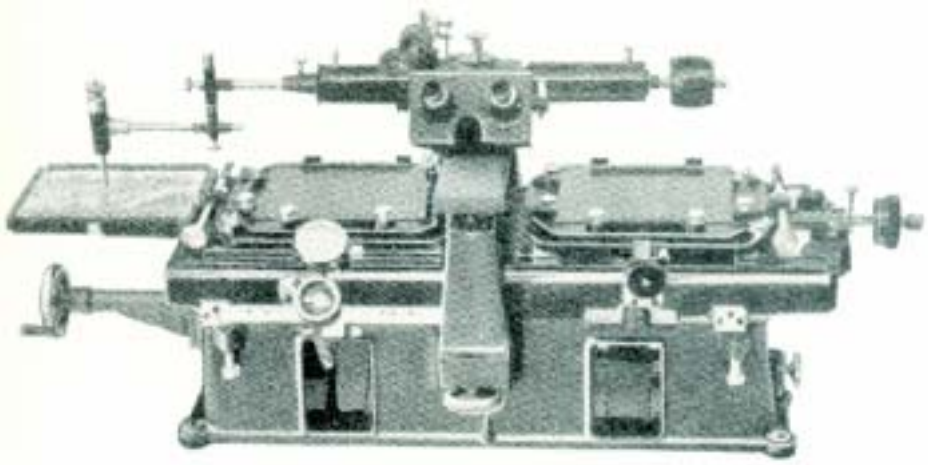
Photograph was invented in 1839, but it was not able to go beyond the thought of use in topographical map production till the end of 1800's. The studies related to this subject focused on the stereo measuring technique in 1890's.

After Prof. Dr. C. Pulfrich had put forward the fundamentals of photogrammetry and made the first stereo comparator in 1903, which was called like his name, the developments in photogrammetry gained speed in the World and made a great progress especially in the last quarter of last century because of the support of computer technology. Each stage of these developments in photogrammetry was closely followed in Turkey without wasting time and took its inevitable position in modern cartographic studies.

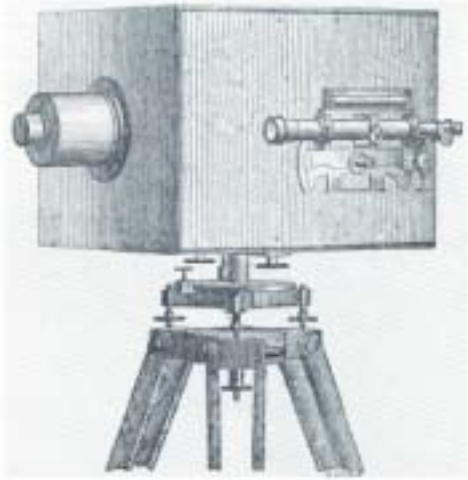
Therefore, although the Commission of Mapping established in 1909 thought that country maps were made more perfectly, economically and quickly with the method of photogrammetry like those in the developed world countries, it could not be put into practice regularly because of the Balkan War and the I. World War. However, even if they were separate, some project-based trial works related to this subject had a remarkable importance.

Applications of Terrestrial and Aerial Photogrammetry

During the infancy period of stereophotogrammetry, some trial works were carried out in Turkey and these studies attracted the attention of people in that profession. During the Baghdad railway works on the Taurus in 1910, the 1/500 scaled surveys were compared to the tacheometer works. The phototheodolite of Zeiss and photographic glass plates taken in the dimension of 9x12 cm. were evaluated by a German Photogrammetry expert named "Dr. Loşer" with a stereocomparator apparatus and the results were drawn point by point with the drawing apparatus 'Pulfrich'. Since it was possible to draw the contour lines with the stereoautograph apparatus of Zeiss-Orel at that time, this style of drawing (point by point) was only used in some special subjects. The Mapping Department of Egypt took the aerial photographs of the Gallipoli Peninsula in 1915. After the war, in 1918, the Turkish

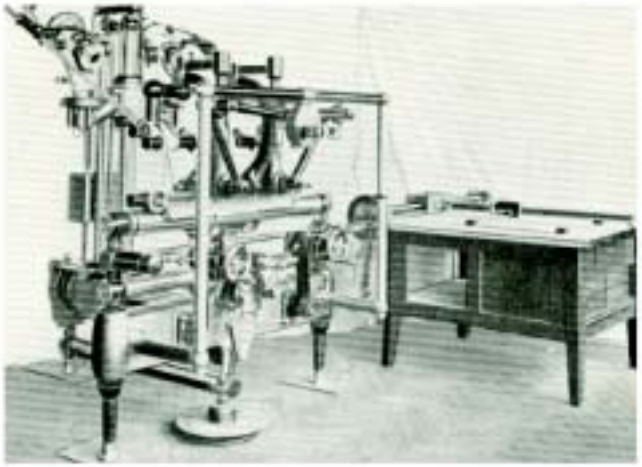


Stereocomparator, Pulfrich



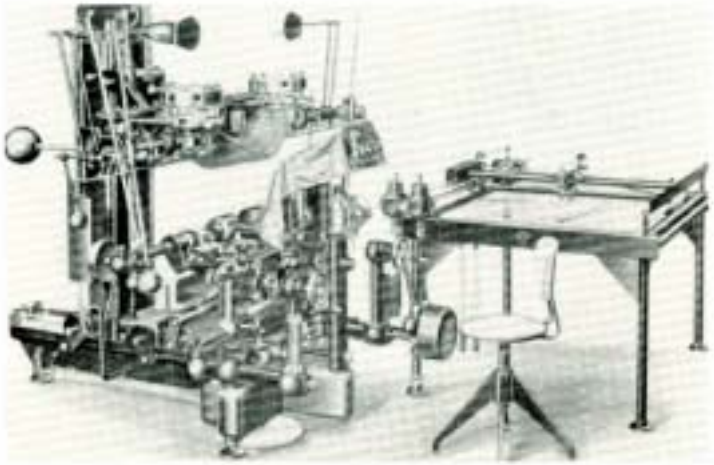
Iconometric Equipment, Laussedant

Carl Pulfrich (1858-1927)



Stereoplanigraph C1

Stereoplanigraph C4



Stereoplanigraph C4

Photographic Plane Table, Chevallier

Government wanted Austrian Engineer Captain A. Miksch to make a 1/12.500 scaled plan of river Kızılırmak near Ankara for the irrigation project. During these photogrammetric field works which lasted 7 weeks, the length of this river from 385 km. (Kula) to 430 km. (Riheleci) and the 80 km. length of river Delice, which joins to the river Kızılırmak in Kula, up to Budaközü and an area of 220 km², which has a width of 2-3 km, were evaluated with the stereoautograph apparatus of Zeiss-Orel in Vienna.

Like those in all fields, new attempts and efforts were seen also in photogrammetry with the establishment of Republic after the Independence War. In 1925, which was the establishment date of General Directorate of Mapping, the stereocomparator apparatus belonging to the German company, Zeiss-Orel, was ordered and received in 1926.

Meanwhile, with the order of the Ministry of Defense, a photogrammetry expert named "Çorer" was brought with a salary of 580 TL. from Germany through the end of 1926, but the General Directorate of Mapping did not know about this. After a while, it was understood that this person was an aerial photographer, but not a photogrammetry expert and he did not know the fundamentals of the science of photogrammetry and even trigonometric calculations. He went back to his country in January, 1929.

Captain Niyazi and (Otmanbölük) and Captain Ömer Kadri (Koray), who had been educated in Germany and partly in Austria previously and returned to homeland before completing because of the armistice, were selected to taught about the science of photogrammetry in the foreign countries. These two officers went to Germany together with General Director Kazım Pasha, Lieutenant Colonel Ahmet Nuri (Denkmen) and so-called expert, Çorer, who were going to the International Photogrammetry Congress assembled in Berlin in October, 1926.

Captain Ömer Kadri and Niyazi started their photogrammetry education by staying in Germany after the Congress. While coming back to homeland, General Director Kazım Pasha brought two German photogrammetry expert, Dr. Loşer and Zorting, who had once worked on Baghdad railway project previously in 1910. It was later understood that also Zorting was not an expert.

In 1927, an F 13 Junker airplane, which cost 45.000 TL., a hand picturing camera from Zeiss-Jena (HMK C/12, 13x18 cm., f=21 cm.), a plotting apparatus from Zeiss-Stereoautograph, one automatic serial photo-camera (RMK C/3, 18x18 cm., f=21 cm.) and a rectifying apparatus (SEG C/3, 18x24 cm.) were purchased.

In 1928, Colonel Abdurrahman (Aygün) was sent to Europe to examine the cartographic studies. Even if he was only a geodesy expert, he also observed the subjects of photogrammetry and gave a detailed information about the situation in France, Switzerland and Germany in his final report. With the order of General Staff Presidency in the same year, it was wanted to carry out the map producing studies depending on the principles of photogrammetric method.

The first application of photogrammetry was made in Kayaş, Ankara with the Wild Autograph plotting apparatus which was purchased in that year. Captain Ömer Kadri and Captain Niyazi came back from their photogrammetry education in Germany. Major Halit and Major Nüzhet were sent to France for photogrammetry education and Captain İshak and Captain Bahri were sent to Germany. Captain Ahmet (Denkmen) and Captain Ömer Kadri attended the Congress of Photogrammetry assembled in Berlin.

The surveys of an area of 17 sheets near Çandarlı (1929) and an area of 12 sheets near Ayvalık (1930) were made with the method of terrestrial photogrammetry.

Kâzım Pasha
Third Chief General Director (1926)

Zeiss Apparatus Used for Correcting Oblique Photographs and Change Them into Its Necessary Scale (1927)

Map Plotting Instrument of Zeiss Firm For Ground Photographs (1927)

F 13 Junkers Measuring Plane Bought for Turkish Aerial Photogrammetry (1927)

In 1931, photographic studies were carried out for the production of 1/25.000 scaled map of Ankara-Dikmen sheet from an altitude of 4200 m. by firstly using an aerial camera belonging to the Wild company and this sheet was utilized in 1933. Because of achieving good results, during the photographic studies on 12 sheets in Bursa, Mudanya and Karacabey regions, the terrestrial photographic studies were carried out for an area of 6 sheets near Bursa.

The Multiplex apparatus, which had been purchased by the Ministry of Agriculture, was turned over to the General Directorate of Mapping. The photograph of an area of 150 sheets in the dimension of 60x80 cm per each was taken from a flight altitude of 500 m. for the city plan of Istanbul. Prost, French urban planning expert, used these plans for arranging various regions of the city.

The F 13 Junkers airplane was kept in service till 1936 and it had an accident while flying from Kayseri to Ankara on August 19th, 1936. The airplane was left out of service since it could not be repaired.

In 1937, the Stereoplonigraph C5, the wide angle RMK P10 picturing camera and a 'Dragon' model airplane instead of the one which had an accident were bought from the Zeiss-Aerotopograph company.

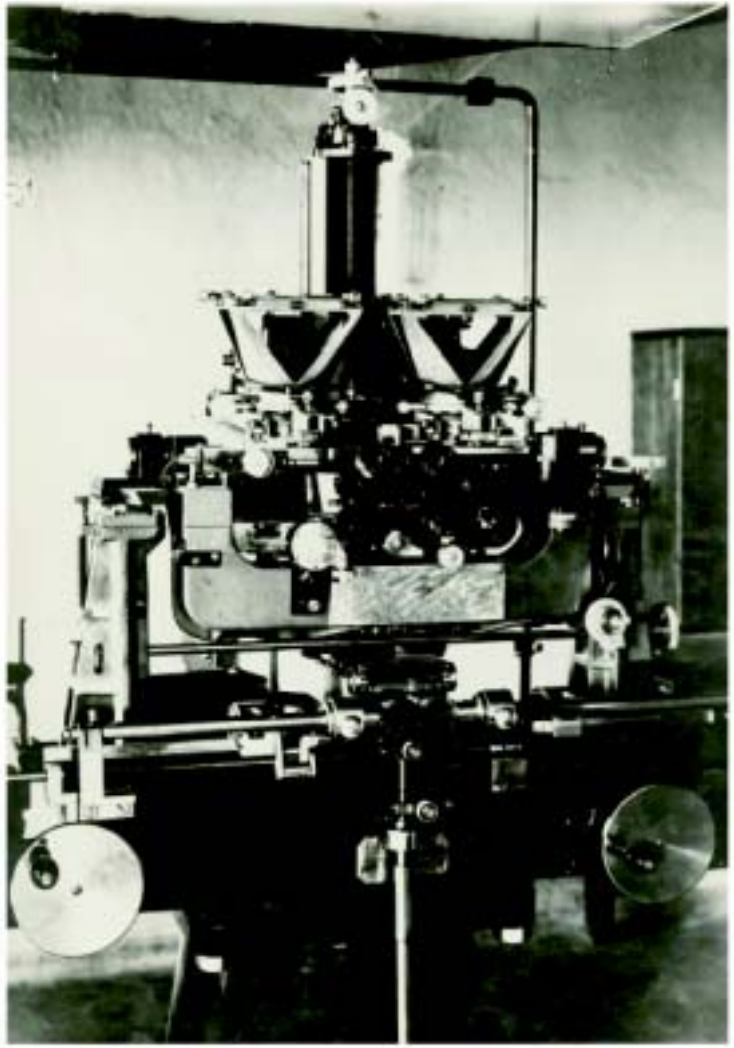
The second plotting apparatus of Zeiss-Stereoplonigraph and a Dutch-made airplane for monoplan, which cost 56.000 TL., were purchased in 1938. The main features of his airplane were two Koolhoven-systematized engines and 310 HP per each, a range of 4,5 hours, speed of 200 km. per hour and an altitude of 6300 m. It could carry 4 personnel, except the pilot, and had a dark room assembled in it. After this date, all studies related to map production were carried out with the method of aerial photogrammetry by quitting the method of terrestrial photogrammetry.

Two more stereoplonigraph apparatus were bought from Zeiss-Aerotopograph company and the studies related to plotting 1/25.000 scaled maps with 10 m. contour interval were carried on depending on the 1/30.000 scaled aerial photographs taken with RMK P10 aerial camera. While the studies were continuing in two shifts, the production speed of 250 km² per apparatus and per month was provided.

The pilots of the surveying airplanes were supplied by the Air Forces at the beginning. Afterwards, both the airplanes and pilots were supplied by the Command of Air Forces for a while. However, in 1967, the General Directorate established its own Flight Unit of Mapping and started to use German-made Dornier Skyservant (D0-28) type of airplane. The Flight Unit was turned into the Air Group Command of Mapping in 1990.

All members, including pilot/navigator, flight technicians, photo operators, have been supplied with General Directorate's own personnel since 1967. Pilots and airplane technicians of the Group Command of Air are educated in Kara Kuvvetleri Kara Havacılık Okul Komutanlığı (Land and Air School Command of Land Forces) whereas photo operators are educated in Group Command of Air. Two USA-made Beechcraft B 200 type of airplanes were put into service in 1993 and 1995, and taken out of service after 2000. The second airplane was obtained from the Ministry of Finance by transferring and it was originally 1991 model.

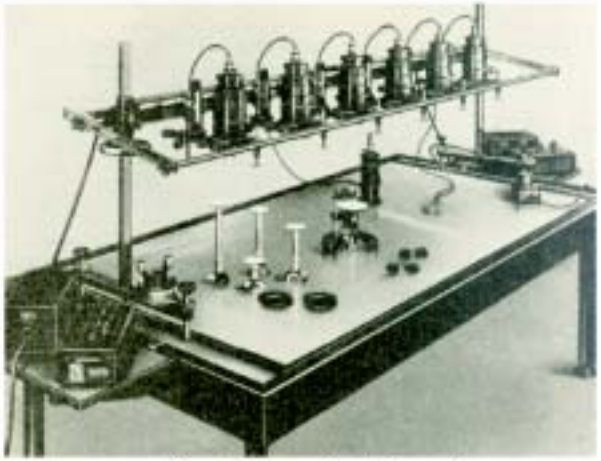
The duties related to aerial photograph survey were carried out by using the most contemporary technology and methods.



Photogrammetry Instrument Utilizing the Aerial and Ground Photographs Belonging to Wild Firm (1928)

Second Class Students of Mapping School, in Photogrammetry Lesson, Among Their Teachers (January 15, 1928)

Photogrammetry Photograph of Ankara City Station,



Stereo Cartographic Instrument

Photogrammetric Image of the City Ankara, the Vicinity of General Directorate of Mapping And the Hospital, Taken from 4000 Meters Height (October 13, 1932)

Stereoplanigraph, Jena (1955)

The Photograph of Ankara Grand National Assembly and Its Garden, Taken from 800 Meters Height (October 29, 1932)

The Aerial Post of Photogrammetry

The Families and Children's of Photogrammetry Officers Working in Uludağ (August 16, 1933)

In front of the Plane Junkers, Whose Ascending Power was Increased with Jupiter Engine (1934)

An Impression from the Field Survey's of Ground Photography Post (1935)

Photo-Laboratory Studies

After the official establishment of General Command of Mapping in 1925, the black-white technology and manual methods were used in the bath processes of the photographs taken with the methods of terrestrial and aerial photogrammetry for a long time. The same technology was used also in enlarging and narrowing processes of contact print for years. Automatic systems were put into use in the bath of roll aerial films after 1982. During the same

years, because of the initiation of the analytic orthophoto production, some semi-automatic systems were purchased for the bath of orthophoto films but they were kept in use only for a short time because of not being economic. The automation was used in contact printing and other laboratory processes after 1996. The colored infrared automatic bath and positive film systems of card and filmslide were added to the production methods in 1998. The colored photographs are used in orthophoto production for the settlement centers whereas the colored infrared photographs are used for displaying the forested areas aimed at the needs of General Directorate of Forestry.

First Photogrammetric Triangulation Studies

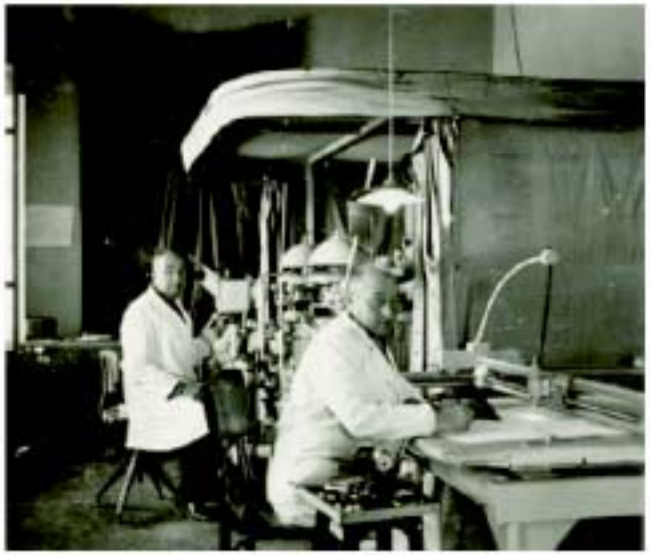
Besides the method of Aerial Photogrammetry, the method of photogrammetric triangulation is also used in topographical survey. With this method, the height and the coordinates of the certain points on the earth are determined by using the measurements and the calculations made on the common regions of the %60-65 forward and %30-35 lateral overlap pictures taken from the air and therefore, the establishment and measurement of fewer triangulation points are needed.

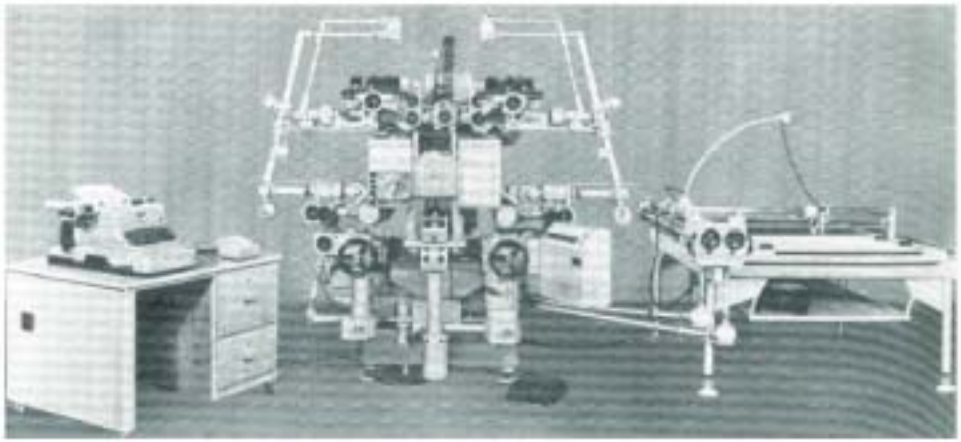
The method of photogrammetric triangulation was started to be tried in 1935 and successful results were achieved on two sheets of the Southeast Region of Turkey between the years 1940-1945. These studies were carried out with the "Radialsecator" apparatus.

The first measurement studies were initiated with Zeiss C8 universal analog plotting apparatus in 1968 and strip coordinates were obtained by forming strip continuously and the polynomial strip adjustment was made by using these coordinates and their software. During the studies of the years 1968-1969, the 1/25.000 scaled map of a region of 100 sheets was made by using this method and additionally; with this method, positive results were achieved also in the production of 1/5.000 scaled maps. Because of achieving success on this, systematic studies were initiated.

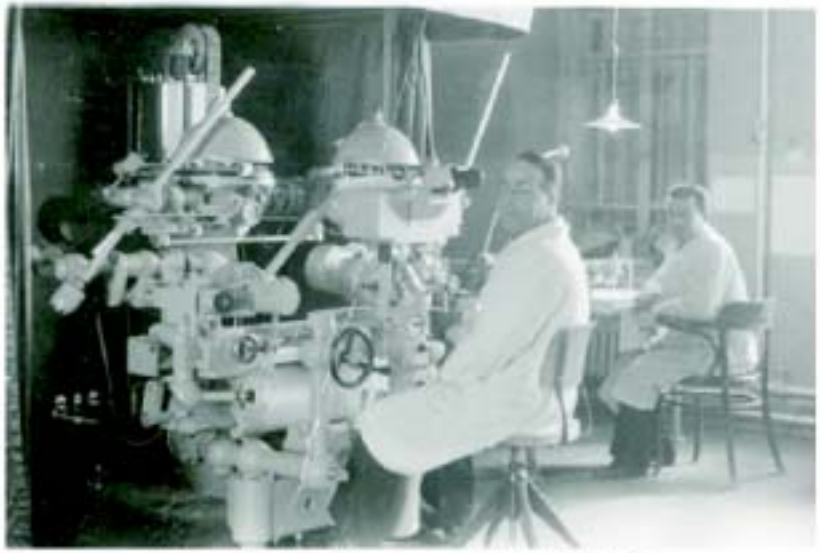
PSK stereo comparator was used for photogrammetric triangulation measurement up to 1981. At the beginning of 1970's, two PSK instruments were purchased for this purpose. These were PSK 1 and PSK 2. There were also two card punch devices connected to these instruments. Therefore, coordinates of fiducial points, control points and tie points measured were recorded to computer cards directly and transferred to computer via card reader. Polynomial strip adjustment, which was very famous and easy usable adjustment software and also was used in analog device measurements, was used and this software is also known as SCHUTT Polynomial Strip Adjustment Method.

The strip coordinates which is necessary for strip adjustment were obtained from model coordinates. Model coordinates were obtained from analytical relative orientation which is called "RELOR (relative orientation)". When considered step by step, firstly the software called "Clean" and the photo coordinates, whose systematic errors such as lens distortion, refraction, film shrinkage, were obtained from the comparator coordinates measured. The

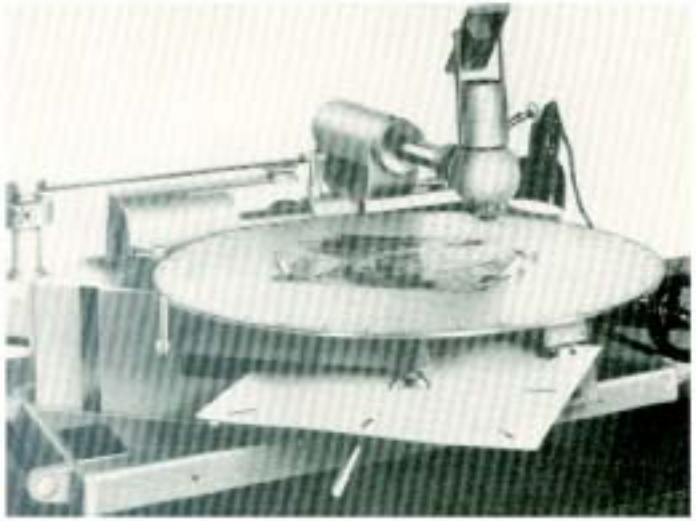




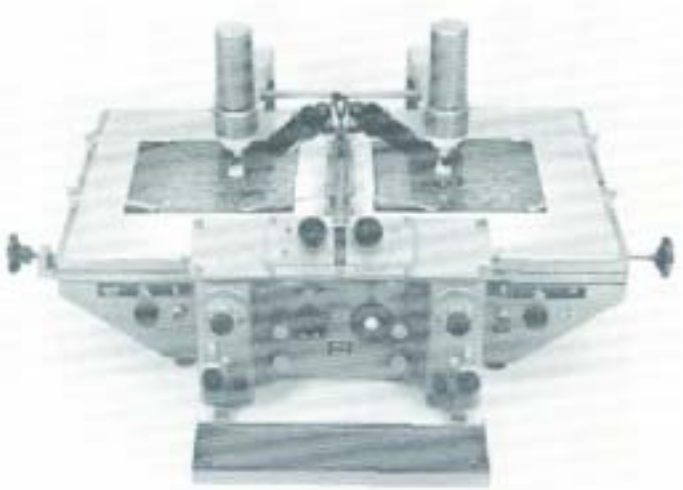
Stereoplanigraph C8 (Electromagnetic Recording Unit)



Impressions from Photogrammetric Studies (1939)



Radialsecator



The Wild PUG4 Point Transfer Device

Stereocomparator PSK, Belonging to the Zeiss Firm

During the Photogrammetric Triangulation Research with Stereocomparator Instrument Belonging to the Zeiss Firm

PM1 Point Transfer Device, Belonging to the Zeiss Firm

model and strip coordinates were calculated after obtaining photo coordinates. This process lasted up to 1981. Later on, because of the change in method, PSK 2 instrument and a C-5 analog instrument were donated to Pakistan in 1989.

Because of the change of adjustment method in 1982, the strip adjustment method was replaced with block adjustment. The method of "Block Adjustment With Independent Models", which was developed by the members of the Photogrammetry Department for a short time, was used. The model coordinates were got from RELOR analytical relative orientation software as offline.

This method did not continue for a long time and ended with purchasing analytical instrument to organization in 1983. Leaving of old PSK from production influenced the change in method. At this step, with Planicomp C 100 analytical instrument, worldwide known PAT-M Block Adjustment With Independent Models Software was used. This method lasted up to the period of Digital Photogrammetric Workstations.

CARTOGRAPHIC STUDIES

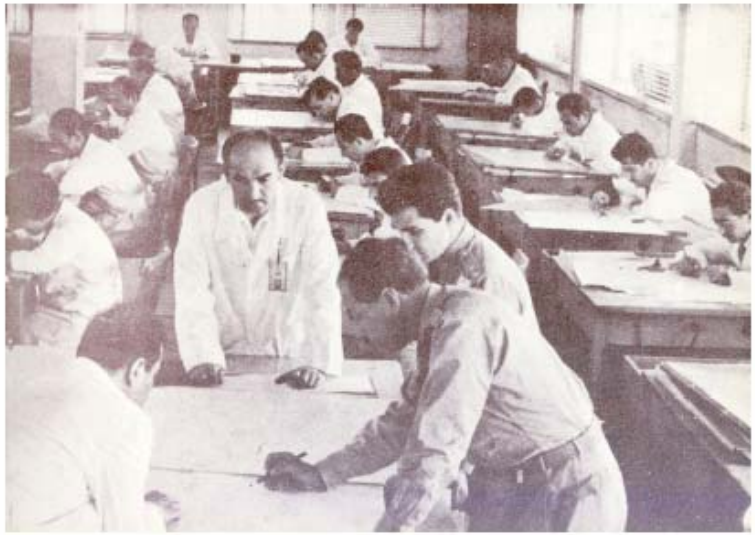
The production of 1/200,000 scaled maps, which was initiated by the General Command of Mapping in 1911, were accelerated in 1925 and completed in 1930. These maps, which were made with the terrestrial method and in the 40x50 dimensioned Bonn Projection, are based on serial triangulation. They are contour-lined and 124 sheets overall. The beginning of its longitude is the dome of Hagia Sophia. M. Şevki Pasha wanted to transfer the beginning meridian to the Liberty Hill from the Hagia Sophia but it could not be possible because of the wars. In 1932, Kandilli Observatory was wanted to be the beginning but it also could not be possible.

The Commission of Mapping, which was re-organized in 1909, decided that the basic map scale of the country would be 1/25,000 and the production would be made with the Clarke Ellipsoid and Bonn Projection Systems and the method of plane table. The sheet which was made firstly is the sheet of Bakırköy. Later on, the sheets of Istanbul, Kağıthane, Bahçeköy, Kilyos, Çamlıca, Hisarlar, Kavak, Rumeli Feneri, Maltepe and Kınalı were also made. Between the years 1911-1930, the first 267 sheets were made with this method by using Alidade Nivelatris and Alidade Olimetric apparatus based on different starting points such as Kandilli, Hagia Sophia, Balıkesir and Söke.

Terrestrial photogrammetry surveys were initiated as the test works in 1927. The "Gauss-Kruger (UTM)" Projection System was activated by using Hayford Elipsoidi after 1931 and 680 more sheets were produced with the methods of plane table and terrestrial photogrammetry based on the starting points mentioned above.

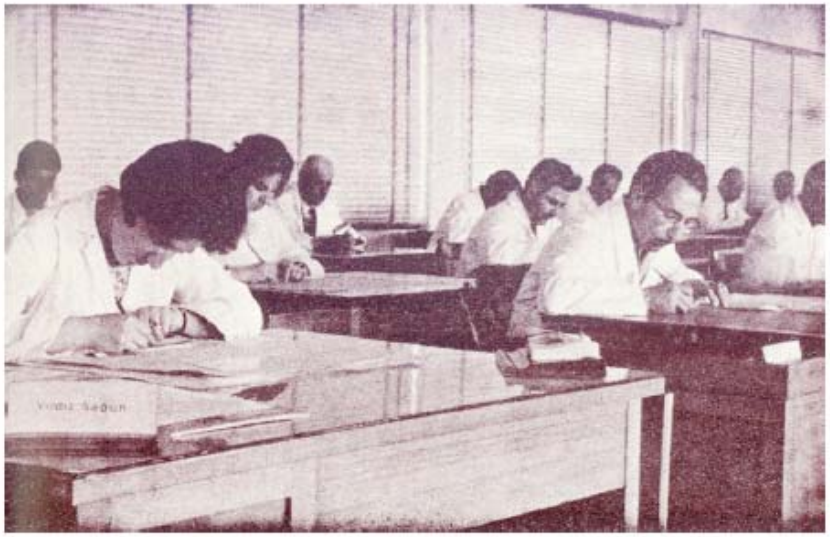
The application tests of aerial photogrammetry were initiated in 1932 and because of achieving positive results on these studies which lasted till 1937, the certain applications of aerial photogrammetry were activated in 1938 and "Europe" was accepted as the starting point and the production was carried out with the method of aerial photogrammetry and according to the international standards.

The production of 1/25,000 scaled basic map series, which was constituted by 5547 sheets, of the country was completed in 1972. The sheets, which were not appropriate to the international standards, were renewed and planned updating studies, which are still continuing, were initiated for other regions because of different projection system and production methods, differences in printing plates and old style of production.

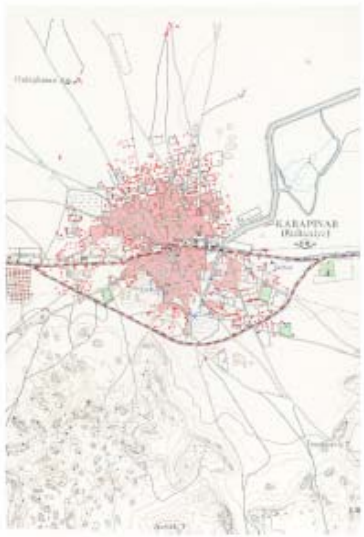


A View from Studies of Drawing

Working in the Drawing Room



The Preparation of Drawing Plates



1 / 25,000 Scaled Map Sample

Cartographic Drawing

Preparing the color plates of the 1/25,000 scaled maps, whose supplements were made on the field, and the 1/50,000 and 1/100,000 scaled maps prepared by transforming formed the fundamental of the cartographic drawing works. Additionally, the preparation of the drawing plates for printing every kind of large scaled city maps and plans and the small scaled thematic maps and atlases is one of the drawing and transforming techniques. A working method of scraping and drawing on the transparent plastic pad was used. The plates, which were available to be scraped, were processed separately according to the color plate of the map.

The topographical maps were prepared and printed in four colors. Besides the scraping plates, some information was prepared by being drawn by hand and glued directly on a transparent pad. The processes of scraping and drawing, which were shortly named as drawing, can be also defined as the studies requiring talent and patience in which the art and technique are connected to each other.

Cartographic Generalization

The maps are made in various types and scales depending on their purposes and where to be used. The 1/25,000 scaled maps were produced as the basic series of the country maps. Besides these maps, the smaller scaled maps which would meet the strategic necessities were needed. Like the 1/25,000 scaled maps, there was neither any opportunity nor any reason to produce small scaled maps with the photogrammetric method. The 1/50.000, 1/100.000, 1/250,000 and smaller scaled maps are obtained from the 1/25,000 scaled maps with the method of generalization.

The generalization studies were initiated in 1925. First of all, with the method of generalization, the 1/500,000, 1/800,000 and 1/1,000,000 scaled maps were obtained from 1/200,000 scaled maps. These studies lasted until 1950. After this date, the production of 1/50,000 and 1/100,000 scaled maps by generalizing from 1/25,000 scaled maps was initiated.

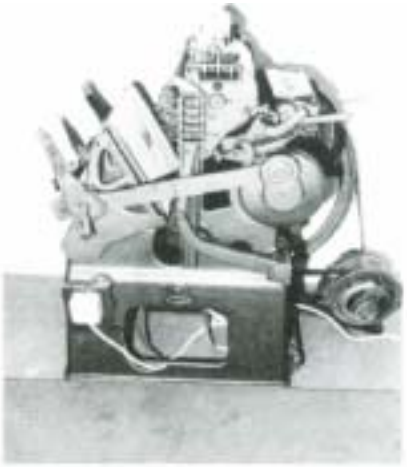
All small scaled standard maps (1/50,000, 1/100,000, 1/250,000, etc.), except 1/25,000 scaled basic topographic map series, are produced with the method of generalization under the responsibility of the General Command of Mapping according to present law and instructions.

Photomechanical and Printing Processes

The surveying officer group, who immigrated to Ankara from Istanbul during the Independence War, took the tools and equipment with them to carry out the printing processes.

The cafe under the khan was selected as the most suitable place for the printhouse and the hand-print table was set in it. The printhouse could not be activated for a while because the necessary litho stones had not been brought with the group. Later on, the print of necessary documents for mapping and Ministry of Defense was initiated by using 4 kg. litho stones bought from a printhouse.

After the first group had started their studies in Ankara, Brig. Gen. Mehmet Şevki (Ölçer), president of the Mapping Department, and his assistant, Gen. Staff Lieutenant General Abdurrahman (Aygün), who were always in touch with Ankara, made an evaluation of the situation and decided to take preventive measures to make Ankara give better service. During this evaluation, although it was considered to strengthen Ankara Department with officers, it



Victoria Mercury, Treadle Printing Machine The Instrument Carried off to Ankara (1910)

Our Talented Cartographer Lt.Col.Hacı Hamit Retired with His Own Desire (1931)

Colonel Rıfkı, Director of Cartography Department (1934)

Lt.Col.Fehmi, Director of the Printing House (1933)

was seen that this would not be sufficient and effective by itself because of small amount of printing machines, litho stones, paper and chemical elements which were all necessary for printing. Additionally, it was impossible to get these materials from Ankara. The most important issue was that the source materials and printing plates, which would meet the needs of mapping for national forces, were in Istanbul. For these reasons, it was decided to meet the needs of mapping for Ankara with the studies, which would be done in Istanbul, and also to supply personnel, tools and materials to the department in Ankara.

Therefore, the Mapping Department in Istanbul, with its president and vice president, entered into the service of Ankara Government officially.

The second group, which consisted of the directors of the Topography and Cartography Departments, 30 officers and senior officers selected from various departments, one civilian lithographer and one civilian calligrapher, was prepared to be charged in the Mapping Department in Ankara. One lithography machine, one typography printing machine and their spare parts and supplementary materials, one hand-print machine, one petroleum generator, sufficient amount of lithography stones and many tools were sent to Ankara with the group.

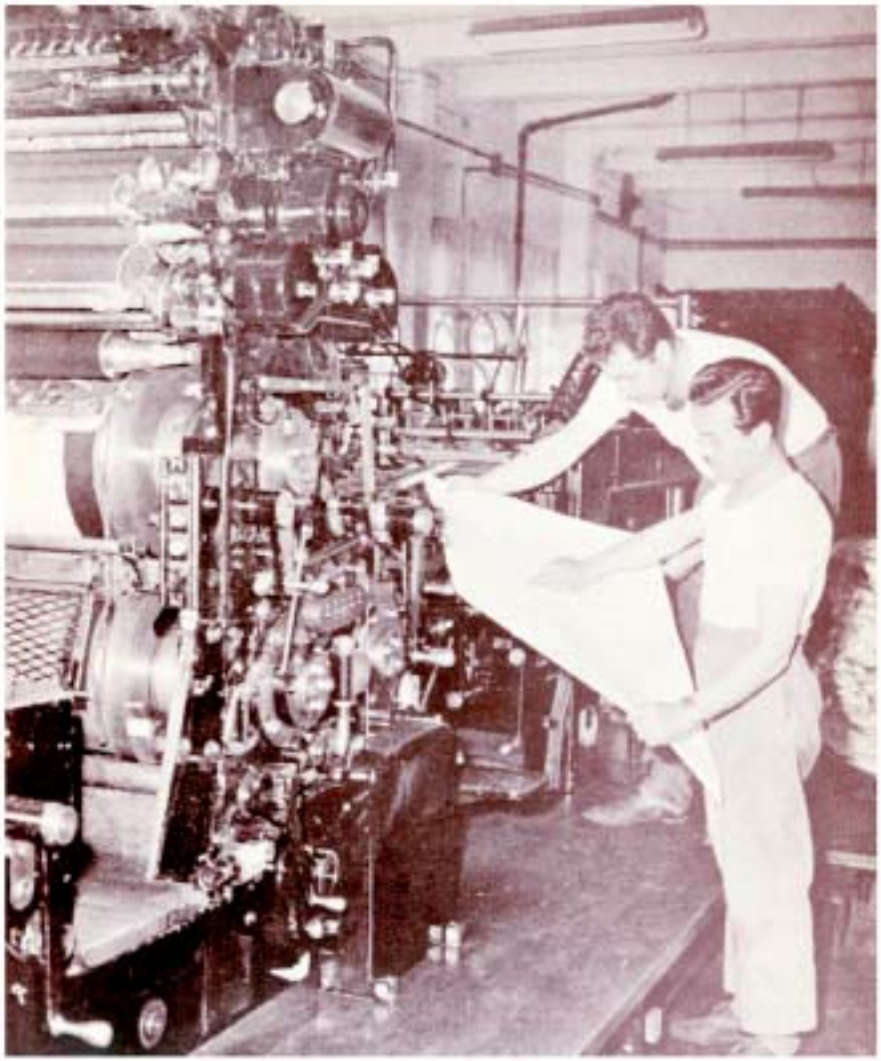
The second group, with the tools and materials, except the printing machines, departed from Istanbul in the middle of June, 1921 and arrived at Inebolu on June 23, 1921. Since Inebolu was under the control of Greek ships when they arrived, it was not possible to unload the printing machines which had been previously sent to Inebolu under the supervision of an officer.

By this way, the printing machines would be unloaded in Samsun and taken to Ankara in a delay of a few months. The officers, who landed in Inebolu, began to go to Ankara in groups and the last officer group arrived at Ankara on July 15, 1921. After these printing machines had reached to Ankara, the small printhouse under the Attarbaşı Khan moved to the Art School in Ulus.

After the official establishment of the General Command of Mapping in 1925, Colonel Abdurrahman (Aygün), the director of the Triangulation Department, was sent to a journey for an examination. During this journey, he had the opportunity to observe the geodetic and photogrammetric activities and also cartographic studies. He examined the cost of zincographic method and its usage in French Geography Department and brought the documents about this subject to Turkey. He thoroughly told about this subject in his report that he wrote after returning. Through the end of 1928, Captain Fenni was sent to Paris for photomechanical education and for the application of zincographic method in our country whereas Lieutenant Recep Kemal was sent to Germany for printing education. Lieutenant Recep came back in three months because of not being successful.

In 1931, Mehmet İbrahim was sent to Paris and Reşit Hilmi was sent to Berlin for lithographic education about printing. Mehmet İbrahim completed his education in 1935 and came back to the General Command of Mapping. However, Reşit Hilmi committed suicide in Berlin in 1933.

Afterwards, the typographic and off-set printing methods were used based on the developing technology. Therefore; Using the originals of the topographical maps produced with the photogrammetric method, the convenient pads to be scraped are obtained with the photomechanical method in order to form the color plates for the printed maps. The retouching processes are carried out on the films which form the color plates for printing from the plates obtained with the photomechanical methods after the drawing and transforming studies. The colorful map is printed after placing the zinc printing plates obtained from the



The Study on Harris Offset

A Photozinc Trial

Around the Chiefs of Cartography Department Personnel (April 19, 1936)

films of the main color plates, which have been retouched previously, on the offset printing machine. The printing process is carried out with standard colors on special map papers.

Relief Map Studies

One of the most important features of the map is the correct and understandable reflection of the relief which represents the shape of earth on a vertical plane. For this reason; drawing and production techniques, such as contour lines, hachures, color levels, shading and relief are displayed by using them separately or together.

Relief maps reflect the structure of the land in three-dimension as in the nature. These are the maps which are produced with various methods and made of cardboard, canvas, wax, the mixture of wax and resin, plastic and plaster. As if it is watched from a specific altitude, it seems to be three-dimensional.

At the beginning of 1880's, with the leadership of young topography and surveying teachers, especially the Military Academy of Land focused on the production of relief maps in order to help the cartographic education and meet the tactical needs.

After 1884, relief map production was improved because of the priority for tactical needs. This field was given much importance and this situation lasted till 1900. Later on, this importance decreased and the need of linear map was given more priority.

The last sample of our historical relief maps is the 1/25,000 scaled "relief map showing the Çanakkale Strait (the Dardanelles) and the wars" made by Brigadier General Halil İbrahim in 1919 for a special order in memory of the Çanakkale Wars.

These maps are the first original samples of the relief maps in the world. Like the beauty of a painting, they present the unique fascinating samples of the art of decoration with its calligraphy, frames and ornaments on the frame. On some of them, there are writings which tell about the historical events in important religious and historical places displayed in the oil paintings.

Some of relief maps were made in the form of separate maps belonging to specific geographical places such as Çanakkale Strait (the Dardanelles), Caucasus, Edirne, Crete and Rhodes Islands. Some of them were the group of sheets produced in the form of serial maps, which have the same scale, including a larger region.

It is known that there are 42 relief maps in the series including Rumelia, Greece, Bosnia-Herzegovina, Serbia, Bulgaria, Romania and partly Austria. However, only 36 of them could be found during the researches.

4 of these maps are in the Military academy of Land, 9 in Military Museum and Culture Site, 3 in Topkapı Palace Museum and 20 in the Museum of General Command of Mapping.

All of these maps are in a good condition, except two or three of them. The maps in the General Command of Mapping were repaired by the unique mastery of Eng. Captain Nusret Gülün when they were brought to Ankara from the Military Museum and later on, they had a continuous care. All of them are in a good condition, except the Relief Map of Edirne which was found recently.

All maps in the Military Museum and Culture Site, except the sheets of Plevne and the map of the Bosphorus whose edges are broken, are in a good condition. The relief maps in the Military Academy of Land are generally in a good condition.

Posturing Metal Plate with the Punomatic Chassis Machine

Relief Map of the Bosphorus
(General Command of Mapping Cartography Museum, 1 / 37,500 Scaled)

Any relief map, except some special studies, was not produced until the establishment of Relief Mapping Department in the General Command of Mapping in 1966. Today, this department is making relief maps needed by our country with well-educated military and civilian personnel, technological computer-based instruments and devices.

MODERN CARTOGRAPHIC STUDIES

LEGAL SITUATION AND PRINCIPLES

With the law of the General Command of Mapping bearing the number 657 and dated April 22, 1925 and the law bearing the number 203 and dated January 2, 1961 which changed some items of this law and because of the policy of the Commission of Coordinating and Planning Mapping Affairs among Ministries and the instructions of Obtaining and Using Map and Mapping Information; the General Command of Mapping was entitled to produce and increase the mapping information and the maps smaller than 1/5,000. The production of 1/25,000 scaled maps are carried out based on STANAG determining technical principles that let the NATO members use the maps of each other easily in a joint operation, besides the instructions, policy and status prepared by the General Command of Mapping in parallel to international standards.

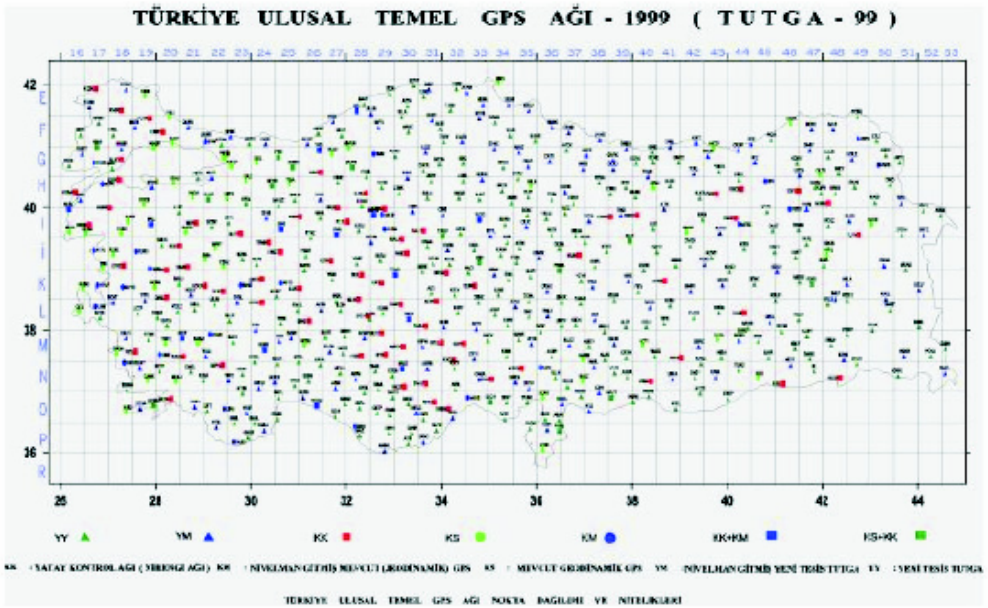
TURKISH NATIONAL FUNDAMENTAL GPS NETWORK (TNFGN)

In order to meet the needs of every kind of locations, reference information and target confirmation based on Global Position System (GPS) and to provide integration with international networks formed analogously, it was formed after three years of data collection and analysis effort and consists of 594 points having the intervals of 15-70 km all over Turkey.

All GPS data were processed by Bernese Software version 4.0 using IGS products. Combination of TNFGN data together with specific number of IGS global sites common in each year solution has been managed by GLOBK software with all previously measured data in Turkey. The station coordinates and velocities were computed in ITRF 96 (International Terrestrial Reference Frame 96). TNFGN's relative precision is 0.01 ppm and station coordinate accuracy is about cm. Besides three-dimensional coordinates in TNFGN points; orthometric height, geoid height and changes in coordinates based on time has been determined.

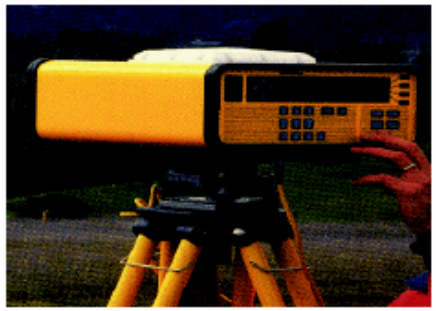
TURKISH NATIONAL NETWORK OF PERMANENT GPS STATIONS

Turkish National Network of Permanent GPS Stations serves with its continuous observations as a reference point for TNFGN which was established in 2000 and all GPS Works carried out in Turkey. It provides the opportunity of continuous and sensitive navigation for military and civilian users by producing momentary and real-timed Differential GPS-DGPS correction data. It is a network formed by the GPS stations which is carried out with the data tranfers and capable of making adequate number of records continuously by itself and has been distributed to the spesific centers all over the country and which can work in DGPS mode if needed.

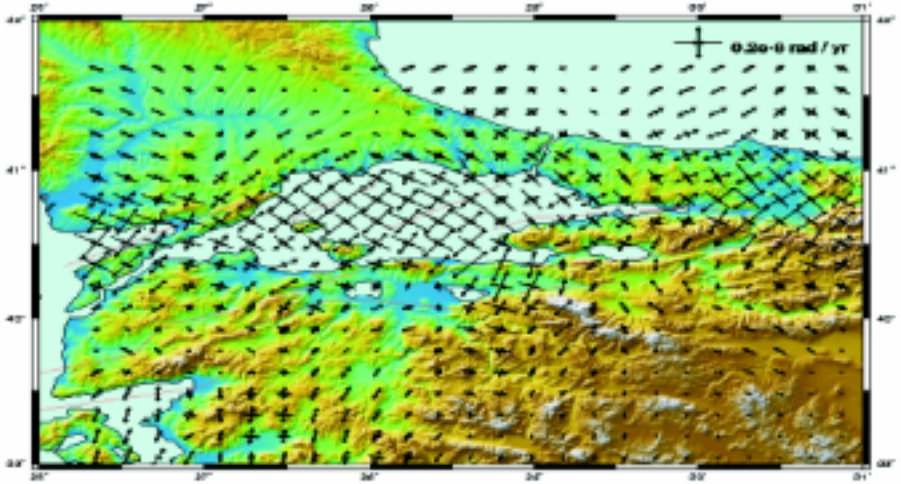


Turkish National Fundamental GPS Network (TNFGN)

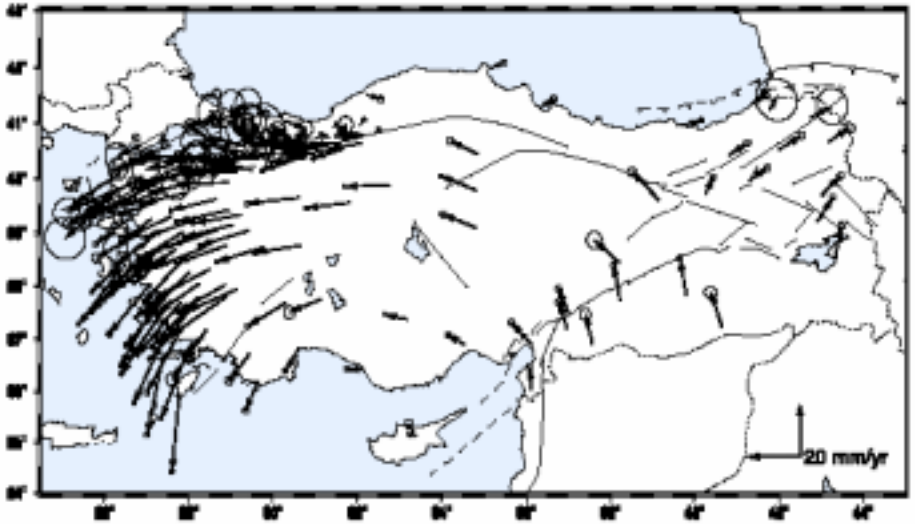
The Working Figure of GPS System



Turkish National Network of Permanent GPS Station (TNNPS)



Tension Directions of Expansion and Compression in the Marmara Region



Interseismic Velocity Field of Turkey

Permanent GPS Station, Ankara

According to the military applications of GPS, these points are used as precise reference points for target determination, photo discovery, directing guided missile, laying and scanning mine, secure transition, rescue and navigation. Additionaly, when these points are outfitted with the real-timed differential GPS equipment, they can meet the needs of momentarily-corrected location of military GPS users who have the devices used for sensing the DGPS correction data. Also, it provides a infrastucture for the vehicles and the personnel observing capacity of digital map-aided military application project of the Armed Forces.

Permanent GPS Networks supported by continuous GPS data are capable of fielding valuable tools in order to account for regional realization of international Terrestrial reference frame (ITRF) and monitoring deformations of the solid earth crust in the area of interest.

In the first analyses of data surveyed since 1999, the interseismic velocity field of the Turkish National Permanent GPS Stations was computed. Besides, in Ankara and Marmara Permanent GPS Stations, co-seismic displacements were computed due to August 17, 1999 İzmit and November 12, 1999 Duzce earthquakes.

TURKISH SEA LEVEL MONITORING NETWORK (TUSELN)

The Turkish Sea Level Monitoring Network (TUSELN) was established by modernizing the tide gauges of Antalya, Bodrum, Menteş and Erdek, which were established and put in service in 1985 with automatic and digital tide gauges in 1998. The stations established in Girne/TRNC in 2000 and in Amasra/Bartın in 2001 were included to this network and the studies to expand this network still continues in order to include especially the coasts of Western and Eastern Black Sea.

It is aimed to monitor the changes of sea level accurately, fast and economically with TUSELN. The atmospheric pressure, air temperature, relative humidity and wind direction and velocity besides sea level collected by acoustic sensor are measured at these stations according to the Global Sea Level Observing System (GLOSS) standarts. The measured data are collected at computer-controlled dataloggers and transferred to the data center in Ankara regularly by connection via telephone lines.

PHOTOGRAMMETRIC AERIAL TRIANGULATION

During the period of 1986-1998, the block measurements in photogrammetric aerial triangulation with independent model adjustment (PATM) by using Photogrammetric compilation equipment (Zeiss Planicomp C 115) were used effectively. With this application the number of control points, which were supposed to be established on the ground according to the “three control points for each models” method, were considerably reduced.

The workflow in photogrammetric aerial triangulation was also directed to the automation in parallel to the developments in computer science and digital photogrammetry in 1990's. In the same period, with the integration of GPS technology into photogrammetry, the kinematic GPS supported aerial triangulation started. As a result of this, the number of control points, which were supposed to be established on the ground were reduced approximately 90% according to the standard applications. These procedures have been carried out by the General Command of Mapping since 1996.

DIGITAL PHOTOGRAMETRY

With the usage of the digital photogrammetry workstations and software nowadays, besides the stereo or mono air photos and the digital map production from the satellite image, the automatic production of digital field models and orthophoto maps became easier and quicker.

In order to make the photogrametry compilation by analogous instruments, it's necessary to make the photographs have photo-laboratory processes (producing photo-carte print and dia-films) at first. But digital photogrammetric workstations do not need the production of photo-carte print and dia-films.

Since the digital photogrammetry workstations use digital image processing methods, it requires the data transformed into digital format. For this purpose, air photos are digitized by high soluable photogrammetric scanners and stored in raster data format.

These digital images are formed by small squares called picture element or pixel. In every pixel area, image brightness is represented by a number. In other words, each pixel has a gray value expressed by an integer. When this process is applied to each pixels, the photograph has been shown by a matrix formed by integers.

Photogrammetric arial triangulation and adjustment are done by using these images. In this stage, the production of pug points which is necessary for the absolute and relative orientation processes is not needed. The parameters that are necessary for absolute orientation are computed at that time.

After the automatic or manual interior orientation of the images taken into digital photogrammetric workstations, the models are created automatically. The relative and absolute orientation in analog compilation instruments are done by mechanical methods.

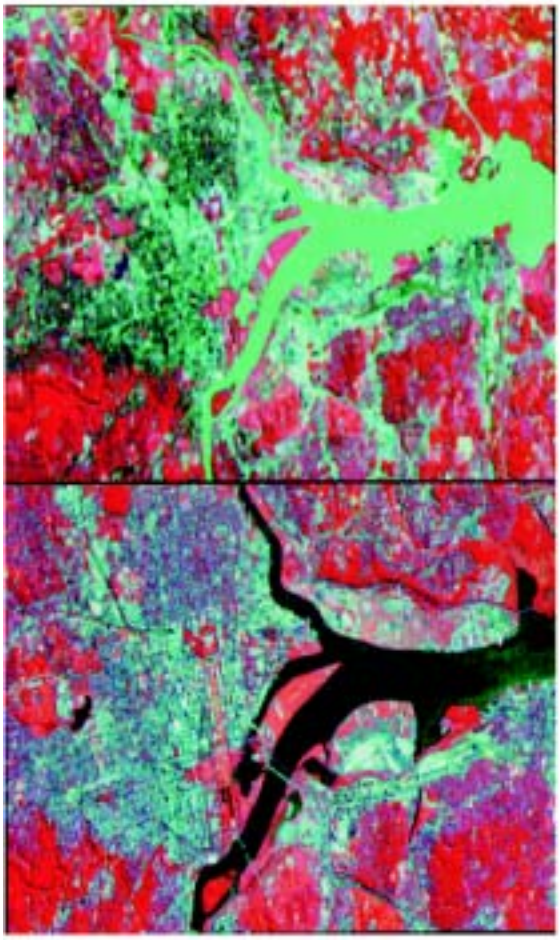
Digital photogrammetry provides speed, economy and accuracy at the same time by eliminating the mistakes originating from operators by means of automatic methods, production in digital means, forming a data base for revision and including automation in every step.

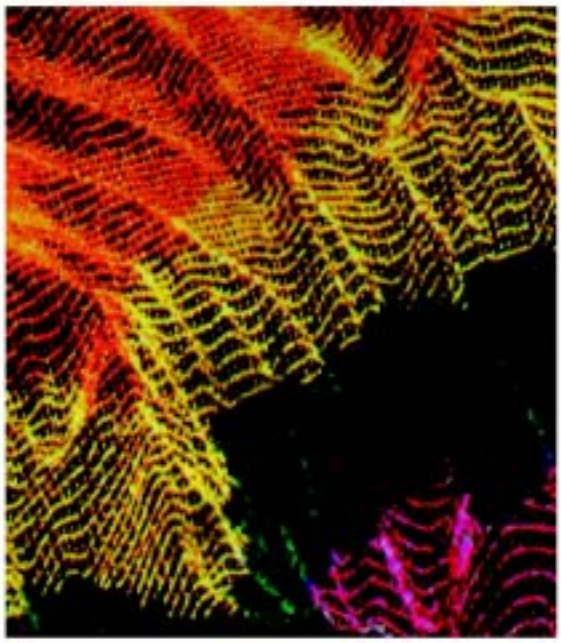
REMOTE SENSING

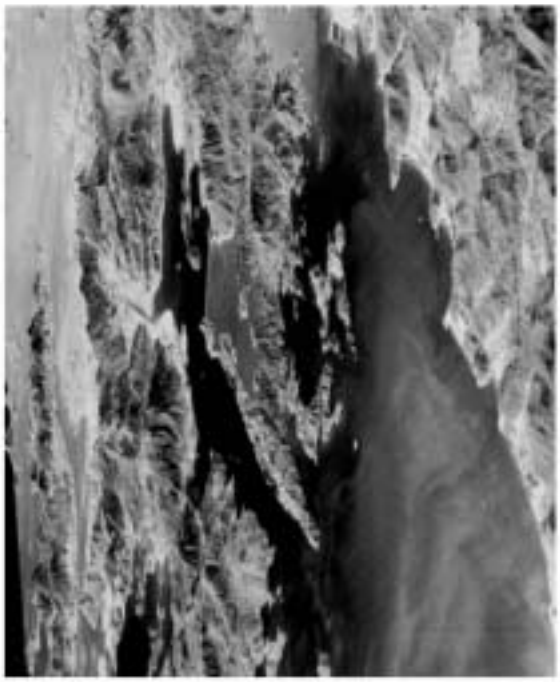
Remotely sensed images offer a unique perspective of the Earth, its resources, and human impact upon them. In less time than a decade, remote sensing technology has proven itself as a cost-effective source of valuable information for numerous applications including mapping, urban planning, environmental monitoring, agricultural management, oil pollution, market development and many others. In many ways, value of space images obtained with remote sensing has become obvious. They provide an overhead look at the objects on Earth surface and help to understand relationships among these objects.

The practical value and applicability of remote sensing data continue to grow rapidly as new and more advanced satellites are launched. With more satellites on the way, imagery will be available in an increasing selection of scene sizes, spectral resolutions, revisit frequencies, and spatial details.

Up-to-date maps are the basic need in many applications. The need for up-to date information drives the use of satellite imagery in mapping technology. Classical methods need years to produce a map, which is not preferable for the rapidly changing world. Remote sensing has become a solution for that problem and new technologies were developed through the up-to-date map needs. One of these technologies, which is very rapid and easy to use for mapping







purposes, is the digital orthoimage, a photographic image that has been orthorectified to meet the precision and accuracy standards of a map.

The development of the hardware and software of the image process gave the opportunity to produce the digital orthophoto maps and make the computer-aided classification from the SAR images such as RADARSAT and ERS, besides the electro-optical scanner systematized satellite images such as SPOT, LANDSAT, IRS and IKONOS.

DIGITAL PRODUCTS

The geographical product support, which was provided to the Turkish Armed Forces (TAF) as conventional printed products from 1925, foundation date of General Command of Mapping, to 1990's, turned into digital geographical product support in addition to the conventional products after 1990's because of the rapid development of the computer technology. In addition to digital elevation information representing topography produced in accordance with NATO standards, geographic product support provided to the TAF are carried out by collecting, evaluating, producing and distributing geographical materials, which are needed to be used in the operations and planning, such as digital topographic maps in various scales, land maps, aeronautical charts, military city plans, military geographical information and documents, field analysis products, geodetic data, gazetteer (geographical location names) and geo-referenced map images.

Additionally; the studies of constituting Cadastre and City Data System were initiated to be established by the General Directorate of Cadastre and Land Registry, Provincial Bank and municipalities of big metropolises like İstanbul, Ankara, Bursa, İzmir in the same period and the efforts of all other institutions dealing with map production to establish geographical data system are being carried on in an increasing speed.

TAF DIGITAL MAP AIDED MILITARY APPLICATION SOFTWARE

The project of Turkish Armed Forces Digital Map Aided Military Application Software has been completed and presented to the Turkish Armed Forces by General Command of Mapping. This project provides the applications of all units and headquarters, up to the level of company in the Armed Forces, on a printed map to be made easily and quickly in a digital medium and also provides saving for the software, hardware and personnel education which work on personal computers and require a high cost and which is formed by the digital map data and user's software prepared by General Command of Mapping and needed by the elements of Turkish Armed Forces for the usage of digital map data.


Ayarlar
Bilgi