**Mapping the Straits in Ottoman Military Institutions: A Survey for the XIXth Century**

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Vital in securing military victories and economic growth, geographical and cartographical knowledge was highly cherished by farsighted rulers throughout history. This was especially true for the Ottoman Sultan Mehmed II (r. 1451-1481) who owned manuscript copies of Ptolemy’s *Geographike hyphegesis* in his library as well as other maps.[[1]](#footnote-1) According to the Greek chronicler Kritovulos of Imbros, Mehmed II had charged the scholar Georgios Amirutzes of Trebizond to draw a clearer and more comprehensible version of Ptolemy’s map. Amirutzes, together with his son, also translated the entire *Geographike hyphegesis* into Arabic, and the job was completed around 1465.[[2]](#footnote-2) Mehmed II was interested in Ptolemy’s map probably because he was eager to position “his empire” in the world and to develop the necessary expansionist policies accordingly. At the end of the 16th century and under the reign of Suleiman the Magnificient (r.1520-1566), the empire reached its widest borders stretching on three continents, but surprisingly, early collections lacks Ottoman maps of the conquered lands. However, route maps showing the distance between localities and informing about their geographical features were available to the Ottoman land forces.[[3]](#footnote-3) The oldest available cartographic works made by the Ottomans date back to early 15th century: Ibrahim Kâtibî’s and Mürsiyeli İbrahim’s portolans are dated 1413 and 1461 respectively.[[4]](#footnote-4) The presence of a number of 16th century sea charts in museum collections led historians to consider the 16th century as the beginning of Ottoman cartography: There were also portolans produced by Ottoman sailors such as Pîrî Reis, Ali Macar Reis and by unknown authors. [[5]](#footnote-5) These depicted the Black Sea, the Sea of Marmara, the Aegean Sea, the Mediterranean Sea, the Atlantic coasts of Western Europe. Unfortunately little is known about how Ottoman sailors made their sea charts. Venetian and Portuguese charts were probably acquired in various ways and used to draw new charts. As Luigi Ferdinando Marsilli (1658-1730) put it in *Etat Militaire de l’Empire Ottoman*, each vessel of the Ottoman navy was provided with a sea chart, a compass and a telescope.[[6]](#footnote-6) Unfortunately few Ottoman maps survived from the 16th – 18th centuries in order to evaluate the cartographical work of Ottoman sailors and the military.

It is not clear when the Ottomans first drew a map of the Dardanelles and the Bosphorus which they annexed in mid-14th and mid-15th century respectively. The original copy of Piri Reis’s Kitab-ı Bahriye (1526) which is a guidebook for captains sailing in the Mediterranean is devoid of a map depicting the Bosphorus. However İstanbul maps including the southern part of the Bosphorus have been added to copies made in late 16th and early 17th centuries.[[7]](#footnote-7) One of the earliest Ottoman maps depicting Bosphorus at full length appeared in Müteferrika’s version (1732) of Kâtip Çelebi’s (1609-1657) geography book *Cihannüma* (lit. Cosmorama).[[8]](#footnote-8) This is a non-military map bearing the names of the settlements located along the shores of the Bosporus and the Golden Horn. The map bears the title “Şekl-i Halic-i Kostantiniyye” (The shape of Istanbul’s estuary).[[9]](#footnote-9)

In the absence of Ottoman maps in the collections, one can argue that European travellers and cartographers were earlier than the Ottomans in depicting both the Bosphorus Thracicus and the Dardanelles. Maps of the straits entered the travel books of European naturalists such as Pierre Belon (1518-1564) from mid- 16th century on.[[10]](#footnote-10) Belon was followed by personalities including the French diplomat and traveller Louis Dehayes de Courmenin who had travelled to the Levant in 1621[[11]](#footnote-11); the Venetian cartographer Vincento Maria Coronelli (1650-1718) and the Hungarian engineer Johann Baptist von Reben (18th c.).[[12]](#footnote-12) From the late 18th century on French engineers such as L. J. François de Truguet (1752-1839) and Achille Tondu (1760-1787) were instrumental in surveying and mapping the Straits.[[13]](#footnote-13)

***Cartography in the Navy***

The defeats of Ottoman land and naval forces by the Russians in 1770s resulted in the loss of large territories as well as in the destruction of the Ottoman fleet. Ottoman statesmen, compelled to take actions for modernising the military, backed the opening of a school (*Hendesehane*) in the Istanbul dockyards, where geometry and geography would be taught with the aim of training military engineers. Named *Mühendishane* (Engineering School) from 1781 on, and housed in a separate building in 1784, the school soon became a centre for technical training due to the reformist grand vizier Halil Hamid Pasha and the support of French authorities who were also eager to suppress the Russian ambitions in the Mediterranean. Thus, between 1782 and 1788, France sent to Istanbul French officers and engineers – accompanied by foremen-- who taught fortification, shipbuilding and navigation in the *Mühendishane* and contributed to the building of ships in the dockyards. Among them were the above mentioned naval officer and engineer L. J. François de Truguet and the astronomer Achille Tondu who mapped Dardanelles in 1785-1786.[[14]](#footnote-14) Two graduates of the École royale du génie de Mézières, André-Joseph Lafitte-Clavé (1740-1794) and Joseph Gabriel Monnier (1745-1818), besides teaching L’art de la Fortification in the *Mühendishane* at the dockyards, were instrumental in mapping the fortifications of the Bosphorus and the neighbouring coasts of the Black Sea.[[15]](#footnote-15) Following his two trips in the Black Sea, Lafitte Clavé sent 10 reports, 35 plans and 3 maps to the French Ministry of Defense through Choiseuil-Gouffier (1752-1817), the French ambassador to the Ottoman Empire.[[16]](#footnote-16) Monnier mapped the fortifications at the entrance of the Bosphorus, especially those which were on the neighbouring coast of Europe. The aim of the mapping mission was to provide France with the current topographic structure of the Bosphorus and the Black Sea and fortifications.[[17]](#footnote-17)

There is no clue whether French engineers did teach cartography or not in the Naval Engineering School. Giambattista Toderini (1728-1799) who has seen Turkish and French printed maps in the school between 1781 and 1786 does not give any details.[[18]](#footnote-18) Among the Turkish printed maps mentioned by Toderini were probably the five maps printed in Ibrahim Müteferrika’s press in 1720s which are believed to be copies made from European maps. Among these five maps was a map of the Marmara Sea which also depicted the Straits (1132/1719-20). This coarsely drawn map[[19]](#footnote-19) bears an Ottoman coat of arms bearing 12 canons and other weapons. Although it is scaled after French miles (*Françe mili*) it may well be an Ottoman production. The width of the Dardanelles is much larger when compared with that of the Bosphorus. The opening of the Bosphorus to the Black Sea bears the note “The Black Sea side” while on the opening of the Dardanelles to the Aegean Sea, one reads the note “The side of the Mediterranean”. These notes probably intended to help the reader to orientate himself. Another map printed in Müteferrika’s press, the Black Sea Map (1724-25) also included in its south western corner the Bosphorus and the opening of the Dardanelles to the Marmara Sea. The fact that many settlements / harbours of the southern and eastern coast of Anatolia are mentioned, points to the involvement of Ottoman cartographers in its preparation.

Cartography may have been taught together with mathematics and geography since the opening of the Hendesehane in the dockyards in 1770s.[[20]](#footnote-20) In 1797, however, a department for “Cartography and Geography” (*Fenn-i Harita ve Coğrafya Şubesi*) was established in the Naval Engineering School, the successor of Hendesehane.[[21]](#footnote-21) While Seyyid Osman Efendi was nominated professor, Parale (Barale, Barolet?) a French engineer/cartographer was charged to second him in teaching, especially in practicing with students.[[22]](#footnote-22) After Parale left, Ahmed Hoca and Gelenbevizade Mehmed Emin Efendi joined the department as Ottoman professors of cartography in 1804 and 1805 respectively. A few other Ottoman professors (Şakir Efendi, Yakup Efendi, Mustafa Efendi, Halil Efendi, Ruhiddin Efendi) worked there intermittently until 1817. The number of students was about 20 in 1797[[23]](#footnote-23), but reached 53 in 1833.[[24]](#footnote-24) A calligrapher to fill in the maps had also joined the staff. Little information is available about the activities of the department, except that Parale was charged with the practicums (*ameliyye*) and Mehmed Emin Efendi taught students how to use measuring instruments (*alat-ı hendesiyye*) such as compass, octant and *mikyas*, a kind of measuring rod.[[25]](#footnote-25) Students were also taken on board of war ships to practice map making.[[26]](#footnote-26) Seyyid Osman Efendi, professor at the department of cartography has also been attributed with the making of a small surveying table (*Mühendis seyyid osman efendikari hedefeli sagir mesaha tabilesi*).[[27]](#footnote-27) It is highly probable that Seyyid Osman Efendi used his surveying table to make maps but no maps of him are available in present-day collections. Toderini mentioned in late 18th century “une carte hydrographique de la mer noire gravée en grand cuivre” and noted that the map was edited by skilled geometers.[[28]](#footnote-28) In 1805, the Naval Engineering School received from the State’s Printing House (*tabhane-i hümayun*) charts (*portolans*) of the Marmara Sea, the Black Sea and the Mediterranean which were newly engraved on copper plates and printed.[[29]](#footnote-29) Information lacks however about the identity of the cartographers. Apparently, maps produced and printed locally did not meet the need of the Navy, because in 1797, European maps were purchased from merchants.[[30]](#footnote-30)

Early attempts to teach cartography in the Naval Engineering School have been pursued throughout the 19th century. In 1830, courses on map making and map printing became included in the curriculum.[[31]](#footnote-31) This might have increased the production of maps in the printing press of the school which came to be known as The Naval School (*Mekteb-i Bahriye*) following the proclamation of the Reforms (*Tanzimat*) in 1839. Copies of maps of the Mediterranean, the Persian Gulf, and the Aegean Sea were produced.[[32]](#footnote-32) An example pertaining to the Straits is the copy of a map drawn by a British Captain Simson / Simpson. This military map dated 1270 (1853-54) depicts the fortifications set along the shores of the Bosphorus as well as indicating the calibres and ranges of the cannons (**ISTANBUL UNIVERSITY LIBRARY Nr. 92688,** manuscript map). It bears a linear scale (1:12.000) in British feet. This map is part of an atlas including the technical drawings of the aforesaid fortifications constructed to defend the Bosphorus. Bearing in mind its date, the original map and its copy were made at the beginning of the Crimean War (1853-1856) when the British naval and land forces came to Istanbul to block Russian expansion towards the Mediterranean.

A bathymetric map (*iskandil haritası)* of the Marmara Sea has been produced in the Naval School in 1256 (1840-41) (**ISTANBUL UNIVERSITY LIBRARY Nr. 93644**, printed map) This anonymous map also displays the topographical features of the shores. It includes two inset maps focusing on the Bosphorus and the Dardanelles with linear scales of 7 miles and 11 miles respectively. Bathymetrical maps of Marmara were produced by Russian scientists in 1845-1847 when the Russian navy officer E. Manganari measured the depths of the sea on board of the Turkish war ship *Gülsefid.* During this missionhehadmappedthe seabed on which he had detected 9 large basins. His measurements were validated by the British in 1872 and 1879-80.[[33]](#footnote-33) Turkish navy officers who did participate to the expedition were no doubt provided with the bathymetrical data collected.

A bathymetric map of the Dardanelles with English and Turkish inscriptions deserves attention. **(ISTANBUL UNIVERSITY LIBRARY Nr. 92924**, printed map). This undated and anonymous map displays the currents, depths, the number of cannons in strategically important fortresses, the colours of the light emitted by lighthouses, visual ranges and the topographic profiles of the coasts. It has a linear scale of 10 miles. The prime meridian is Greenwich and the longitude of Çanakkale is given approximately as 26˚. The names of the hills and villages are given in Turkish. The map is not dated but may be produced around mid-19th century. Around that time, the British Navy officers Thomas Graves (1802-1856) and Thomas A. B. Spratt (1811-1888) have been carrying out extensive hydrographic researches in the Mediterranean and the Aegean. The nautical chart “Entrance to the Dardanelles” they produced in 1840 has been printed by the Admiralty in London in 1844.[[34]](#footnote-34) This chart while comprising bathymetric data is also rich in inland details.

More bathymetric maps of the Marmara Sea and the Straits have been produced in the second half of the 19th century. A map of bathymetric lines (*iskandil hatları*) was engraved on copper and printed by the sea captain Fethi Efendi at the cartography drawing office (*harita resimhanesi*) of Military School’s printing press. (**ISTANBUL UNIVERSITY LIBRARY Nr. 93366**, printed map). Produced in 1314 (1896-97), the map shows the bathymetric lines, marks the materials of the coasts (sand, coarse sand, shells, rocks, coral reefs, stones, mud, pipe clay) as well as the lighthouses. Depths are given in fathoms (*kulaç*). The magnetic deviation (*inhiraf-ı tabii*) for the year 1896 is given as 5 mn. The numerical data may have borrowed from various sources including the measurements made by Nikolai Ivanevich Androusov (1861-1924), a naturalist from St-Petersbourg University, on board of the Ottoman vessel *Selanik* in 1894 during the expedition organised by the Russian Geographical Society.[[35]](#footnote-35)

The Naval School (*Mekteb-i Bahriye*) was not the only institution producing maps of the Straits. The legend of a map of Dardanelles dated 10 Şaban 1280 (20 February 1864) reads that it was arranged (*bi’t-tanzim*) by *Bahriye.* **(ISTANBUL UNIVERSITY LIBRARY** Nr. 92648, manuscript map). The term *Bahriye* may well point to Ottoman Naval Forces since the Ministry of Navy (*Bahriye Nezareti*) ) was only established in 1867. In case the map was produced in the Naval School, the legend should openly mention the name of the school, the *Bahriye Mektebi*. The fact that places to be fortified and the anchoring points for ironclads are indicated on the map, suggests its making by the Naval Forces and not in the school. The map was drawn after the Sultan’s edict sanctioning the renewal of imperial fortresses which were regarded inadequate by Ottoman Naval Forces. The Sultan had also decreed the construction of new fortifications to appropriate places to secure Dardanelles. The map also indicates the ranges of the artillery set in coastal fortifications and ironclads.

***Cartography at the School of the Military Engineering (Mühendishane-i Berri-i Hümayun)***

The last decade of the 18th century witnessed a new development in the training of engineers in Turkey: A new engineering school, *Mühendishane-i cedid,* opened in 1794 in Hasköy, annexed *to* the barracks of bombardiers and miners, not very far away from the dockyards. Training of military engineers would thus be carried on in an autonomous building.[[36]](#footnote-36) To differentiate this new school form the Naval Engineering School, the new Mühendishane was named *Mühendishane-i berri-i hümayun* (lit. School for Land Engineering). A few years later, this new engineering school at Hasköy was endowed with a printing press. The machines were provided from the former Müteferrika press and also purchased from the French Embassy. In 1802, the printing press moved to Üsküdar where it printed both textbooks for the engineering school students as well as maps.

The most spectacular of the printed works in the school’s press was the *Cedid Atlas Tercümesi* (Translation of New Atlas, 1803)[[37]](#footnote-37) compiled from the European atlases by Mahmud Raif Efendi (d. 1807) during his mission in London at the Ottoman Embassy. According to the historian Joseph Hammer-Purgstall, Raif Efendi’s sources included the works of the British cartographer William Faden (1749-1836).[[38]](#footnote-38) No maps of the Straits are included in this general atlas of 26 maps. The atlas is prefaced with an introduction on geography. This atlas was soon sent to the library at School of the Military Engineering and was apparently used in teaching. Abdurrahman Efendi,[[39]](#footnote-39) the professor (*hoca*) of the School of Military Engineering and the director of its Printing House from 1802 to 1807, is said to have produced maps of Europe, Asia, Africa and the Americas[[40]](#footnote-40) probably by making use of European atlases. Bearing in mind his experience in delineation and demarcation survey of land borders, he may have drawn other maps and given surveying courses in the Engineering School.

A map dated 1221 (1806-07) of the southern entrance of the Bosphorus and displaying the bastions newly constructed can be regarded as one of the earliest extant maps prepared for the defence of Istanbul **(ISTANBUL UNIVERSITY LIBRARY** Nr. 92671, manuscript map). The specifications, quantity and ranges of the cannons placed in the bastions on both European and Asian shores of the city are indicated. The map is anonymous, but may have originated from the *Mühendishane*, the Engineering School. The linear scale is of 4000 Ottoman *zira*s.[[41]](#footnote-41) The calibres and the ranges of the cannons are indicated in a table appearing on the upper left corner of the map.

A surveying project has been conducted by the students of the School of Military Engineering in 1840s. As a result, a map of Istanbul, covering the districts located along the Golden Horn and the Bosphorus was produced and printed in the school’s press in 1845. Mosques, districts, military constructions, various other buildings, public and imperial roads, squares, vegetable gardens, orchards, and piers and other places were plotted on the map (**ISTANBUL UNIVERSITY LIBRARY Nr. 92760**, printed map**).** According to the key, the map was produced and drawn (*ahz u tersim*) based on geometric measurements (*bi’l-hendese mesaha*) carried on by students. This implies that students were charged with surveying work in and around Istanbul and that the map they produced was printed at the school’s press.

Correspondence exchanged between the School of Military Engineering and other state institutions kept at the Ottoman Archives (Istanbul) reveals that a large number of maps, especially those depicting the borders of the Ottoman Empire, were often produced at the school or printed at its printing press. Seemingly, the school was endowed with necessary equipment for map making as reveals the inventory of its library and the dispatches requesting the sending of cartographical material from the school to the engineers in the field charged with the mapping of the borders.[[42]](#footnote-42) Orders to purchase surveying and cartographical material (i.e. chronometer, telescope) for the engineers of the army were issued.[[43]](#footnote-43) Unfortunately no archival material (sketches etc.) is available on how the students and staff of the School for Military Engineering made measurements, collected date, carried on surveying work and produced the maps.

***Cartography at the Military School (Mekteb-i Harbiye)***

The need to train officers for the modern army (*Asakir-i Manusre-i Muhammediye*) newly created by by Sultan Mahmud II in 1826 led to the institution of the Military School (*Mekteb-i Harbiye*) in Istanbul in 1834. Students who completed the preparatory classes were admitted to attend a program consisting of courses on various sciences including cartography. The regular teaching of cartography may have started from 1846 on when the curriculum of the Military School was re-organised by a group of Europe trained Turkish military officers in collaboration with the French officers Mouginot, Magnan and Dubreuil.[[44]](#footnote-44) From that time on, the curriculum of the Military school was enriched with courses on advanced mathematics, astronomy, topography, surveying and geodesy, topics necessary for mapmaking as well as special courses on mapmaking (*Harita inşaası*, *Harita tersimi*).[[45]](#footnote-45) Surveying instruments and cartography tools were ordered to Paris and Vienna.[[46]](#footnote-46) In mid-19th century, the number of cartographers graduated from the school was rather low: there were only 4 cartographers in the graduating class of 32 students.[[47]](#footnote-47)

The creation of the Military School brought along the need for professors trained in modern sciences, new techniques and military arts. To meet the need, graduates of the schools were sent to Europe to be trained in various arts.[[48]](#footnote-48) References are made to students who were sent in 1850s to be trained in cartography. The lack of archival documents renders difficult to prove the veracity of this information. It is clear however that a group of officers left for France, England and Prussia to study cartography in 1862. Among them was Hafız Ali Eşref Efendi (Ali Şeref Paşa, 1842-1907), a student of the Military School who studied the art of engraving in Paris. [[49]](#footnote-49) While in Paris, Ali Eşref had translated an atlas from Louis Bonnefont, professor of geography and history at Lycée Condorcet. He published it in Paris after having engraved himself the maps on stone. Back to Istanbul and promoted brigadier, Ali Şeref pursued his cartographical work in the Military School. He translated Heinrich Kiepert’s (1818-1899) maps of Anatolia and the Balkans (73 sheets); ordered the preparation of large wall maps for the school.[[50]](#footnote-50) In the final years of the 19th century, he compiled and published a number of geographical atlases either by himself or together with his colleagues.

The Military School produced a number of maps depicting the Straits. A topographic map of the Bosphorus was made by the painting teacher (*resim muavini*), the second lieutenant Ali Rıza Bey. The map is undated but believed to be made during Abdulhamid II’s reign (r.1876-1909) (**ISTANBUL UNIVERSITY LIBRARY Nr. 93361**, manuscript map).The scale (1:90 000 m / 1 cm = 900 m) is metric. It is a coloured map with contour lines. Barracks (Davutpaşa and others), old and new fortifications /bastions, names of administrative divisions (villages and municipalities), topographical features (streams, hills etc.) are plotted or shown on the map. As far as Dardanelles are concerned, Ali Haydar Bey, professor of hatching at the Military School (**ISTANBUL UNIVERSITY LIBRARY Nr. 93360,** manuscript map) compiled a map with a scale 1: 190 000. Three torpedo lines between East and West coasts and the localities of new and old fortifications were plotted on this undated map.

Lieutenant commander Nuri Efendi, painter at the Military School, drew (*tersim*) a topographic and a bathymetric map of the Bosphorus in 1280 (1863-64) **(OTTOMAN ARCHIVES HRT 706-2,** manuscript map**)**. A note on the map reads that geometrical and trigonometrical rules (*destur-i müsellesat ve usul-i hendese*) were applied. The depths were given in *sajin,* a Russian unit of measure.[[51]](#footnote-51) The map denotes the equivalent of *sajin* as 6 British feet. The depths are indicated by curves (*hutut-ı münhani*). Although administrative districts are delineated on the map, their names are not given. Bathymetric data are given for the Bosphorus and the Golden Horn. Signs points to sandbanks, depths, and anchor points for small and large ships. The map bears the marks of a compass, meridians, point of observation, currents and direction du canal. Nuri Efendi also composed a bathymetric map of southern Dardanelles (**OTTOMAN ARCHIVES HRT 706-1,** manuscript map) to which he annexed a map of the islands situated at the entrance of the Dardanelles, including Bozcaada (Tenedos). The fact that depths have been given in Russian linear units in both maps implies that Manganari’s maps of 1845-47 were among his sources.

The foundation of an International Geodetic Association in Berlin in 1861 initiated the idea of creating a triangulation network in Europe. This generated the idea of starting triangulation work throughout Ottoman territories and to prepare a triangulated map of the Empire, based on triangulation. For that purpose, high quality instruments were bought for the Military School and the School of Military Engineering. Before long it was realized that the job would last for decades and it was decided to make the triangulated work only for Istanbul. According to this decision, a base line survey has been made on the Bozdoğan aqueduct. Following this, a triangulation was constructed and a partial plan of Istanbul city (scale= 1:500) was drawn.[[52]](#footnote-52) Bosphorus would be triangulated in 1916 by navy officers Ali, Sezai and Burhanettin on the corvette *Zühaf*, a survey vessel of the Ottoman Navy.[[53]](#footnote-53)

**Cartography Office of the General Staff Department (Erkan-ı Harbiye-i Umumiye Dairesi Harita Şubesi)**

The work undertaken to modernise the administration of the Ottoman State and its army in the 19th century paved the way for the foundation of the General Staff Department (Erkan-ı Harbiye-I Umumiye Dairesi) in 1860 within the Ministry of War (*Harbiye Nezareti*). The department was founded by the field marshal Namık Pasha (1804-1892) who was also charged with the foundation of the Military School in 1834. During its early years, the General Staff Department produced only maps of fortified places and regional maps of the Empire.[[54]](#footnote-54) The Cartography Office of the General Staff Department became established in 1880. Named “Technical Office Nr.5” (*5. Fen Şubesi*), its staff probably consisted of graduates of the Military School. The office was given the task of producing the maps of Anatolia and the Balkans by Field Marshall von der Goltz Pasha who was entrusted with the re-organisation of the Ottoman army after the Turco-Russian War of 1877-78. The Office published in 1892 a map of the Balkans, based on maps previously made by Austrians and Russians, and performing a number of mesaurements on the field. The Anatolian map published in 1895 was based on some new fieldwork but mostly drew from Heinrich Kiepert’s maps of Asia Minor. [[55]](#footnote-55)

The most original work of the Cartography Department was carried on in Eskişehir in 1896. During this 6-month-project, Turkish staff captains in collaboration with two French officers started the triangulation of the Ottoman Empire and performed geodetic measurements with gravimetric and astronomical instruments as well as a theodolite purchased from France. [[56]](#footnote-56) Unfortunately this project failed due to political reasons.

A topographic map of the Eastern Marmara region was drawn and printed (*bi’t-tersim tab*) by the General Staff Department display the Bosphorus and the Dardanelles. Dated 1299 (1881-82) this topographic map depicts a portion of the railway line (*Rumeli Demiryolu*) starting from Sirkeci, running through Thrace and linking the capital city with Balkan cities (**ISTANBUL UNIVERSITY LIBRARY Nr. 93244**, printed map**).** The scale (1:300 000) is in kilometres. Another map (Nr. 93244) reproduced from the above Marmara map is an Istanbul map depicting the Bosphorus. The scale is 1:20.000 (5 mm equals 1 km). A second map of Marmara that issued from the Cartography Office in 1303 (1885-86) is in all likelihood a copy of the above Eastern Marmara region map (**ISTANBUL UNIVERSITY LIBRARY Nr. 92433**, printed map**)**.

A map of the Bosphorus (*İstanbul Boğazı Haritası*) prepared in the same office in 1311 (1893-94) did not see the press (**ISTANBUL UNIVERSITY LIBRARY Nr.** 93579,manuscript map**).** It is a topographical map depicting the rivers flowing into the Bosphorus and the surrounding mountains. Villages, lighthouses lined up the Bosphorus, current directions and the administrative divisions of Istanbul are indicated. The map was arranged and drawn (*tanzim ve tersim*) by Süleyman Asaf Efendi, an infantry major employed at the drawing room (*resimhane*) annexed to the Cartography Office. The map bears two scales: the fractional scale is 1:36.500; the linear scale is given in meters.

**Mapping the fortifications and measuring the depths**

As mentioned earlier, it is not clear when the Ottomans first drew maps depicting the Straits. A few maps came down to us, embedded in the few geographical works of late 16th and 17th century. The mapping of the Straits came to the fore in the second half of the 18th century: The Russians, by destroying the Ottoman fleet in 1770 in Çeşme had become a threat for Istanbul and this required the Dardanelles to be fortified. On the other hand, the loss of Crimea in 1774 and the decline of Ottoman domination in the Black Sea urged the Ottomans to fortify the Bosphorus. Fortification work necessitated the mapping of the Straits which was initiated by the European allies of the Ottomans. These maps were reproduced by Ottoman officers in various ways. The Crimean war (1853-1856) provided further impetus to take stock of the fortifications guarding the Straits and led to new mapping work.

The opening of cartography courses in the military educational institutions prompted the formation of a group of Ottoman cartographers. However, Ottoman armed forces did often buy the maps produced in Europe or provided them through various channels. In the 19th century, several maps were reproduced, based on acquired maps and printed in military printing houses. Ottoman institutions, who participated to the Expositon Géographique of 1875 in Paris with 48 maps, were rewarded with 4 medals and 3 mansions. All maps, however, could not be affiliated with the institutions introduced in the present study. The below map of Dardanelles is such an example **(ISTANBUL UNIVERSITY LIBRARY Nr. 93315).** The mapdepicts the fortifications which were completed, under construction and scheduled. Topographic features are partly given, the scale (1:20 000) is given in meters. This map might have been prepared during the Crimean War.

Although Ottomans should have measured the depths for secure sailing much earlier, modern bathymetric maps of the Marmara Sea were made by foreigners (Russian, British, Austro-Hungarian) in mid-19th century with the aim of exploring Marmara Sea for navigational and scientific purposes. The data obtained were published and used in Ottoman maps later on. Attempts to use triangulation in map making started in 1860s but only a partial triangulated map of Istanbul city has been produced.

The present text should be considered as a draft survey on the mapping activities carried on in Ottoman military and educational institutions focusing on cartographical material of the Straits conserved in Istanbul University Collections. Future studies analysing both the visual and archival material will certainly give us a better understanding and evaluation of Ottoman mapping activities of the 19th century.

**CAPTIONS FOR**

**Mapping the Straits in Ottoman Military Institutions: A Survey for the XIXth Century**

1-Bathymetric map of the Dardanelles, 19th c., 106x81 cm, Istanbul University Library Nr. 92924

2- Bathymetric map of the Marmara Sea, 1840-41, Naval School, 56x81 cm, Istanbul University Library Nr. 93644.

3- Bathymetric maps of the Marmara Sea and the Straits engraved by Fethi Efendi, 1896-97, Military School’s printing press, 68x127 cm, Istanbul University Library Nr. 93366

4- Map of Dardanelles, 1864, 102x129 cm, Istanbul University Library Nr. 92648

5- Topographic map of the Eastern Marmara region, 1881-82, General Staff Department, 47x53 cm, Istanbul University Library Nr. 93244

6-Map of the Marmara Sea, 1885-86, Cartography Office of the General Staff Department, 48x53 cm, Istanbul University Library Nr. 92433.

7-Map of the Bosphorus by Süleyman Asaf Efendi, 1893-94, Cartography Office of the General Staff Department, 179x119 cm, Istanbul University Library Nr. 93579.

8-Map of Dardanelles depicting the fortifications, 19th century, ?x?cm, Istanbul University Library Nr. 93315.

9-Topographic map of the Straits by Ali Rıza Bey, late 19th century, the Military School, 58x43 cm, Istanbul University Library Nr. 93361.

10-Map of the Dardanelles by Ali Haydar Bey, late 19th century, Military School, 63x42 cm, Istanbul University Library Nr. 93360.

11- Map of Istanbul, 1844, Printing press of the School of Military Engineering, 1845, 152x192 cm, Istanbul University Library Nr. 92760.

12- Map of Istanbul, 1844, Printing press of the School of Military Engineering, 1845, 152x192 cm, Istanbul University Library Nr. 92671

13-Map of Bosphorus depicting the fortifications, 1853-54, the Naval School, 110x74 cm, Istanbul University Library Nr. 92688.

14-Bathymetric map of southern Dardanelles, 19th century, ?x? cm, Ottoman ArchivesHRT 706-1.

15- Topographic and bathymetric map of the Bosphorus by Nuri Efendi, 1863-64, the Military School, ?x? cm, Ottoman ArchivesHRT 706-2.

1. D. Adolf Deissmann, *Forschungen und Funde im Serai – Mit einem Verzeihnis der nichtislamischen Handschriften im Topkapu Serai zu Istanbul*, Berlin und Leipzig: Walterde Gruyter & Co., 1933; pp.24-34; Julian Raby, “East and West in Mehmed the Conqueror’s library,” *Bulletin du Bibliophile* , 3 (1987) p. 297-321. [↑](#footnote-ref-1)
2. Jerry Brotton, *Trading Territories, Mapping the early modern World*, London: Reaktion books, 1997, pp. 100-102. [↑](#footnote-ref-2)
3. İbrahim Hakkı Akyol, “Tanzimat devrinde bizde coğrafya ve jeoloji,” *Tanzimat II*, İstanbul: MEB, 1999, pp. 511-571 (p.517). [↑](#footnote-ref-3)
4. Doğan Uçar, “Turkish cartography in the 16th century,” in *Science in Islamic Civilisation*, ed. E. İhsanoğlu, F. Günergun, Istanbul: IRCICA, 2000, pp.215 [↑](#footnote-ref-4)
5. Kemal Özdemir, *Ottoman Cartography*, Istanbul: Avea, 2008, p. 49. [↑](#footnote-ref-5)
6. *L’Etat militaire de l’Empire ottoman, ses progrès et sa décadance par Mr. Le Comte de Marsigli*, La Haye & Amsterdam 1732, p.142. For a Turkish translation of the 1737 edition published in St. Petersburg, see Graf Marsilli, *Osmanlı İmparatorluğunun Zuhur Ve Terakkisinden İnhitatı Zamanına Kadar Askeri Vaziyeti*, Türkçeye çeviren Kaymakam Nazmi, Ankara, Büyük Erkânıharbiye Matbaası 1934, p. 143. Plate nr.37 includes a map of the entrance of the Dardanelles depicting the four fortresses of *Eski Kilit* and *Yeni Kilit*. [↑](#footnote-ref-6)
7. For a Istanbul map in 1629 copy of Kitab-ı Bahriye see Walters Art Museum, MS 658. [↑](#footnote-ref-7)
8. Kâtip Çelebi, *Cihannüma*, İstanbul: Darüttıbbat-ı Mamure, 1732, p. 672. Photo taken from Halet Ef. No.638. Kemal özdemir s. 131, 182. [↑](#footnote-ref-8)
9. *Images of the Earth*, p.100-101. [↑](#footnote-ref-9)
10. For Belon’s map of the Dardanelles see http://eng.travelogues.gr/item.php?view=43843; http://www.forumrarebooks.com/Belon-Pierre-Les-observations-de-plusieurs-singularitez.html [↑](#footnote-ref-10)
11. *Images of the Earth,* p.153-154; http://tr.travelogues.gr/item.php?view=33102. [↑](#footnote-ref-11)
12. *Images of the Earth – F. Muhtar Katırcıoğlu Map Collection*, Istanbul: Yapı Kredi Kültür Sanat Yayıncılık, 2000. For Coronelli’s map of Bosforo tracio dated 1688 see pp. 92-95; For von Reben’s map of Bosphorus Thracicus dated 1764 see p. 104-105 (http://gallica.bnf.fr/ark:/12148/btv1b530228139) [↑](#footnote-ref-12)
13. See Pascal Lebouteiller, “……, “. [↑](#footnote-ref-13)
14. Mustafa Kaçar, “Tersâne Hendesehânesinden Bahriye Mektebi’ne” *Osmanlı Bilimi Araştırmaları / Studies in Ottoman Science*, vol. IX, nr.1-2, 2007-2008, pp. 71-77. [↑](#footnote-ref-14)
15. *Journal d'un voyage sur le côtes de la Mer Noire du 28 avril au 18 septembre 1784 par lafitte-Clavé publié par Dimitris Anoyatis-Pélé.* Bibliotheca Ottomanica III,Istanbul: Isıs Yayıncılık 1998, 179 pp., maps. [↑](#footnote-ref-15)
16. Mustafa Kaçar, “Osmanlı İmparatorluğu’nda askeri teknik eğitimde modernleşme çalışmaları ve mühendishanelerin kuruluşu (1808’e kadar),” *Osmanlı Bilimi Araştırmaları II*, yay. haz. F. Günergun, Istanbul 1998, p.92. [↑](#footnote-ref-16)
17. For a more detailed account of French cartographers’s activities see P. Lebouteiller…. [↑](#footnote-ref-17)
18. “elle est tapissée des cartes géographiques imprimées, turques et françaises...” Giambattista Toderini, *De La Littérature des Turcs*, Tome Premier, Paris 1789, p. 163. [↑](#footnote-ref-18)
19. Although a printed copy of this map does not exists, a copy was made from its woodcut found in the State Printing Press (Istanbul), by Selim Nüzhet Gerçek. See S. N. Gerçek, *Türk Matbaacılığı*, vol.1, İstanbul 1939, p.55. [↑](#footnote-ref-19)
20. İsmail Hakkı Uzunçarşılı, *Merkez-Bahriye Teşkilatı*, s. 508. [↑](#footnote-ref-20)
21. Danyal Bediz, “XIX. asırda Türkiye’nin coğrafya sahasındaki büyük hamlesi ve milletlerarası bir yarışmada Türk başarısının 90. Yıl dönümü,” Coğrafya Araştırmaları Dergisi (Ankara Üniversitesi DTCF), sayı 1, 1966, s.17, dipnot 2 (Maliye Defteri 8905, s.47-48); Mustafa Kaçar, “Tersâne Hendesehânesinden Bahriye Mektebi’ne”, s. 64. [↑](#footnote-ref-21)
22. Tuncay Zorlu, *Innovation and Empire in Turkey*, New York – London: Tauris Academic Studies, 2008, p.88. [↑](#footnote-ref-22)
23. Danyal Bediz, *op. cit*., p. 18. [↑](#footnote-ref-23)
24. Mustafa Kaçar, “Tersâne Hendesehânesinden Bahriye Mektebi’ne”, s. 69. [↑](#footnote-ref-24)
25. Mustafa Kaçar, “Tersâne Hendesehânesinden Bahriye Mektebi’ne”, s.64. [↑](#footnote-ref-25)
26. Kemal Beydilli, *Türk Bilim ve Matbaacılık Tarihinde Mühendishâne, Mühendishâne Matbaası ve Kütüphanesi (1776-1826)*, İstanbul: Eren, 1995, s.34; [↑](#footnote-ref-26)
27. The name of this instrument appears in the inventory (1804, 1816) of instruments kept at the Imperial School of Engineering. See Beydilli, *op.cit*. p. 289, 384, . [↑](#footnote-ref-27)
28. Toderini, vol.1, p.103. [↑](#footnote-ref-28)
29. BOA, Cevdet Maarif 688. [↑](#footnote-ref-29)
30. Kemal Özdemir, *Ottoman Cartography*, s.192. See also BOA, Cevdet Bahriye 40/1885. [↑](#footnote-ref-30)
31. Cevat Ülkekul, *Türk Seyir, Hidrografi ve Oşinografi çalişmalarının 1909 öncesi tarihi : Deniz Kuvvetleri Komutanlığı Seyir, Hidrografi ve Oşinografi Dairesi Başkanlığı'nın yüzüncü kuruluş yılına armağan*, İstanbul: Seyir, Hidrografi ve Oşinografi Dairesi Başkanlığı, 2009, p.48. [↑](#footnote-ref-31)
32. For the images of these maps see Kemal Özdemir, pp. 218-221, 227 [↑](#footnote-ref-32)
33. *Marmara More,* Minutes of the Imperial Geographical Society, Vol. XXXIII, no.2, St. Petersburg 1896, p.1 (in Russian). [↑](#footnote-ref-33)
34. http://alteagallery.com/stock\_detail.php?ref=12428 [↑](#footnote-ref-34)
35. Feza Günergun, Michael Türkay, Namık Yalçın, “Exploring the Sea of Marmara, the 1894 Maritime Expedition of the Russian Scientists on board of the Ottoman Vessel Selanik,” Paper presented at the 2nd International Congress of Eurasian Maritime History – Russian Maritime History,” St Petersburg,23-26 July 2014. [↑](#footnote-ref-35)
36. M. Kaçar, “Osmanlı İmparatorluğu’nda askeri teknik eğitimde modernleşme ...,” pp.100-103 [↑](#footnote-ref-36)
37. K. Beydilli, *op. cit*., pp.100, 169-170. [↑](#footnote-ref-37)
38. K. Beydilli, *op. cit*., p.169. [↑](#footnote-ref-38)
39. K. Beydilli, *op.cit.*, p. 34 [↑](#footnote-ref-39)
40. See the 1816 inventory list of the Engineering School’s library in K. Beydilli, *op.cit.*, p. 299. [↑](#footnote-ref-40)
41. The Ottoman z*ira* is a linear unit of 0,758 m. [↑](#footnote-ref-41)
42. BOA, A.}MKT, 98/94, 08 Za 1263 [18 October 1847]. [↑](#footnote-ref-42)
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44. Feza Günergun, “Science in the Ottoman World,” in G.N.Vlahakis, I.M.Malaquias, N.M. Brooks, F.Regourd, F.Günergun, D.Wright, *Imperialism and Science- Social Impact and Interaction.* Santa Barbara California: ABC-Clio, 2006, pp. 100-101. [↑](#footnote-ref-44)
45. İsrafil Kurtcebe ve Mustafa Balcıoğlu, *Kara Harp Okulu Tarihi*, Ankara: Kara Harp Okulu, 1991, s. 131. [↑](#footnote-ref-45)
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47. Mustafa Önder, *Geçmişten Günümüze Resimlerle Türk Haritacılık Tarihi,* Ankara: Harita Genel Komutanlığı, 2002, p.126. [↑](#footnote-ref-47)
48. F. Günergun, *op.cit.*, p.95. [↑](#footnote-ref-48)
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50. *Türk haritacılığında 75 yıl, Ankara:* M.S.B. Harita Genel Müdürlüğü, 1970, unpaginated. [↑](#footnote-ref-50)
51. *sagen* *(saschen, zajen)* a Russian linear unit of 2.13 m. See William D. Johnstone, *NTC’s Encyclopedia of International Weights and Measures*, Lincolnwood, Illınois USA: NTC Publishing Group, 1996, p. 48. [↑](#footnote-ref-51)
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54. *Haritacı Mehmet Şevki Paşa,* p.49. [↑](#footnote-ref-54)
55. *Haritacı Mehmet Şevki Paşa,* p.50, İ.H. Akyol, *op.cit.,* p.543. [↑](#footnote-ref-55)
56. *Haritacı Mehmet Şevki Paşa*, p.51-53; İ.H. Akyol, *op.cit.,* pp.543-44; *Türk Haritacılığında 75 yıl*, numarasız 6. sayfa ) [↑](#footnote-ref-56)