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The building of Istanbul docks 1870-1910. New entrepreneurial and cartographic data

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Abstract:
The building of modern docks in the Golden Horn was a major modernisation project undertaken in Istanbul at the end of the 19th century. The account of this venture has already been the object of extensive studies, namely the book by W. Müller-Wiener. The present paper attempts the cartography of harbour works carried out between 1870 and 1910, bringing into light new data, based mostly on unpublished material from various sources in France, Britain and Turkey. It examines the preparation of the enterprise, and its wider relevance within the broader perspective of the technical innovations introduced by foreign firms and their engineers in the Eastern Mediterranean region. It produces new evidence about unidentified projects and entrepreneurial schemes, and emphasises on the urban and architectural modernisation that harbour building entailed for the city.

Keywords: *Harbour works, urban modernisation, concrete technology.*

The port of the Golden Horn before harbour works

Due to its privileged location, the port of Istanbul was never in need of a breakwater for its protection. The port was naturally formed by the Golden Horn (7 km long, 500 m broad and more than 70 m deep). It was divided into three parts: The outer port was largely frequented by steamers and specifically by the steamers of various navigation companies; on the right bank was the railway station was to be established after 1872. The inner port, between Karakeuy and Azapkapou bridges, welcomed especially vessels supplying goods from all coasts of the Empire; it served also as their shelter port. The third part, the upper Golden Horn, was reserved to the Ottoman Navy warships and the arsenal (Guides-Joanne, 1912:208-9), located on the left bank. The most visited port of the Mediterranean at the time when Byzantine Constantinople was the largest city on the continent retained its position as the hub of the trade for the Black Sea and the Anatolia region during the following Ottoman centuries.

However in the mid-19th century, the city with some 390,000 inhabitants in 1848 (Tekeli, 1994) was still confined within its walls, and its port was far from satisfying the needs of maritime trade. Hitherto, the banks outside the

walls were bordered with old wooden quays and small piers –often private– surrounded by warehouses, stores and khans, and custom-houses at Tophane and Sirkedji. The development of the international trade and navigation starting from the 1840s forced the authorities to undertake minor rearrangements at the busiest spots of the Golden Horn for laying out small docks, followed by new masonry building for the needs for the customs, while the inauguration of coastal navigation since 1851 involved the creation of landing docks at various points on the Bosporus (Müller-Wiener, 1994:85-88).

The exact topography of the strip of docks outside the walls on either sides of the Golden Horn in 1855 is revealed in the detailed map prepared by E.W.Brooker, 2nd Master and Assistant Surveyor of the British ship Spitfire (found in the Public Record Office). This valuable document shows the piers and landing places, the docks reserved to commercial ships and to navigation companies under various flags, the custom-houses, sanitary buildings, coal stores, etc., and the Imperial Arsenal dockyards and Admiralty installations.

However, at the end of the 19th century, the lack of wharves and modern facilities on the shores of the Golden Horn, and its negative impact on the trade, navigation and military operations were strongly felt. As British Harbour Master H. Newbolt noticed it, in 1874: *"... In other countries they spend thousands of liras to build docks allowing the boats to load and unload by all times, while Constantinople has natural docks which it refuses to use"* (Newbold, 1874). Istanbul's port was the nerve centre of the country's trade in the Black Sea and Anatolia, and the natural docks of the Golden Horn were the busiest place of city, flanked by its most dynamic districts: the Europeanised part of Galata and Pera, attracting embassies, foreign companies, commercial houses etc. (Bareilles, 1918:71-84), and the famous traditional bazaars on the bank of Stamboul. Thus the construction of a modern harbour became an economic necessity, supported by the demand of the Levantine communities for a rational and functional business environment.

The advent of harbour works: The broader perspective

Since the mid-19th century, the new maritime technology and the opening of the Suez Canal reordered naval traffic. Steamers connected at high speed the cities and the countries of the Eastern Mediterranean, and requiring transport facilities that Levantines cities, port-cities without ports did not possess. Ships anchored at large and the operations were always done by lighters, which was both dangerous and expensive. Hence, the construction of modern harbours became absolute imperative for those cities of which connected their economic prospects to the sea.

Several ways led eventually to that direction. Due to the extension of the European sea-trade, major coastal cities witnessed an increasing economic activity became heads of the railway lines built from 1851 onwards assuming new functions which ordered transit trade facilities. Pressing the governments for improvements, the consuls of European powers intervened in favour of navigation companies, trading firms, banks, and contractors. Local merchants frequently played a decisive role, undertaking initiatives for the improvement of docks and roads for transit trade (Hastaoglou-Martinidis, 2010).

Hence, soon after the end of the Crimean war an intense activity of harbour building took place in all important towns of the region, such as Alexandria, Izmir, Beirut, Istanbul, Piraeus, and Thessaloniki, as well as for smaller sea-trade centres such as Patras, Scio, Syra, Dedeagatch (Alexandroupolis), Varna, Samsun, Trabzon, Alexandretta, Haifa etc.

Harbour works were virtually monopolised by French contracting companies, which also secured long-term concessions and special follow-up privileges. Marseille was the main exporter of technical know-how, and all towns involved in maritime trade acquired modern port facilities, with new quays on extensive embankments, solid moles, spacious wharves, breakwaters, and specialised building equipment. In every case, the harbour works also entailed radical changes to the traditional waterfront (Hastaoglou-Martinidis, 2010).

In Alexandria, the building of modern harbour facilities was undertaken after the “cotton boom”, and the work –one of few British ventures in the Eastern Mediterranean– was granted in 1869 to the London Company W.B.Greenfield & Co; the new harbour, encompassing 2,700 m of docks, was ready by 1880. Between 1901 and 1907, along the East port a 4,000 m long corniche was built by the municipality on a large landfill of 52.6 ha.

The harbour of Izmir was the first and most successful in the Ottoman Empire. It was built between 1869 and 1875 by Dussaud Frères, a French contracting company with extensive experience in France and abroad (Suez, Port Said, Algiers, and Trieste). It included the construction of a quay 3.5 km long and 18.5 m wide along the old sea front, and two well protected wharves.

In Beirut, a concession was issued in 1888 to the society Compagnie Impériale Ottomane du Port, des Quays et des Entrepôts de Beyrouth set up by the French shareholders of the Beirut–Damas road company, and the work was completed in 1895. The modern docks were built on an extensive embankment of 5-6 ha, with a 1000 m long sea front, and an 800 m jetty and 350 m mole forming a spacious wharf of 16 ha.

In Thessaloniki, harbour works started in 1870, with the construction of a linear quay of 1,650 m along the old sea front, on ca 6.2 ha landfill, by the state enterprise Société des Quays de Salonique initiated by the vali Sabri Pasha. However, this quay rapidly proved inadequate, and the construction of a proper harbour on 10.5 ha of new ground gained on the sea was granted in 1896 to the Société Anonyme Ottoman de Construction et Exploitation du Port de Salonique of E.Bartissol, public work contractor and former MP from Paris.

The new seaport Piraeus was laid out in 1834 with no provision for adequate harbour facilities. The development of its harbour was undertaken by the port Fund and the municipality, and in 1907, it encompassed docks of 4,000 m length, moles and a navy yard, on 17.0 ha landfill; it was connected by rail to Athens in 1869 and to the rest of the country after 1880.

Istanbul was the last of these large cities to implement harbour works. Although projects for modern docks had been under preparation since 1872, construction works were eventually undertaken only after 1890 in the Golden Horn. Moreover, this undertaking, when completed, proved to be the

smallest harbour project as compared to the ones mentioned above, on an overall dock landfill of 3.0 ha, and a total length of quays of 1,128 m (758 m in Galata and 370 m in Sirkedji). Additional harbour works were to be curried out later, between 1900 and 1903 at Haydar Pasha, the railhead of the Anatolian railways (Hastaoglou-Martinidis, 1998).

Harbour works: Projects, contracts, contracting companies and engineers

The first harbour project is related to the obligations of the Porte vis-à-vis the contracting company of baron Maurice de Hirsh for the railroads in the Turkey of Europe. According to convention signed between the company and the Ottoman government, the later was bound to build roads and harbour facilities in Istanbul, Salonica, Dedeagatch and Varna. In 1872, while the construction of the line was in course, the company ordered Louis Barret, engineer of the port of Marseilles, to prepare the plan for a quay in front of the train station of Sirkedji in Stambul (Hastaoglou-Martinidis, 2003).

Louis-Julien Barret (1828-1887) was trained at the *Ecole des Arts et Métiers* in Aix and the *Ecole Centrale* in Paris, and he began his career as an engineer in Ch. Reynaud shipyard, to pass thereinafter in the French shipbuilding company *Forges et Chantiers de la Méditerranée* in La Sevne-sur-Mer, in Provence. In 1859, he entered the service of the *Société des Docks et Entrepôts de Marseille*, where he stayed until his death. He was called to undertake several projects for harbours or railways in St Petersburg, Odessa, Istanbul, Varna, Thessaloniki, Fiume (Riyeka) and Trieste. He prepared the preliminary schemes for the harbours of Istanbul, Thessaloniki and Dedeagatch for the Railway Company of Turkey in Europe (*Dictionnaire de Bibliographie Française*, Tome V, p.595).

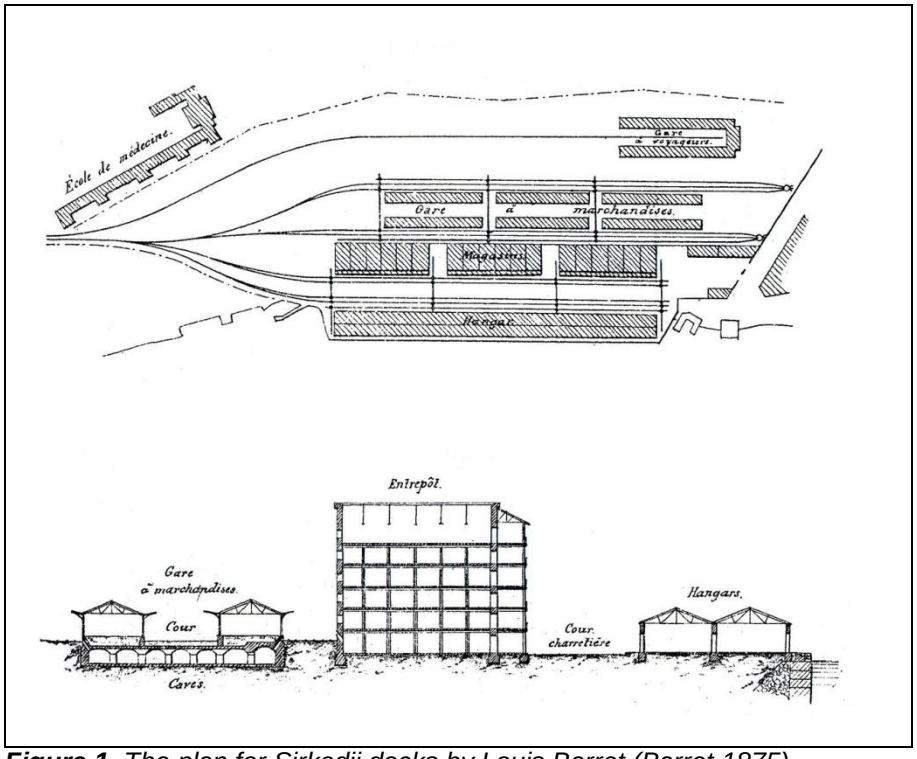

Figure 1. *The plan for Sirkedji docks by Louis Barret (Barret 1875)*

His project, was prepared under the supervision of Hilarion Pascal, engineer of the Ponts et Chaussées and Inspector-General of the port of Marseilles, and was to be finalised next year by the later. It was placed on the site allocated to the company for this purpose and occupied a surface area of 12.83 ha (11.13 ha of solid ground and 1.7 ha to be gained on the sea). Barret proposed a dock surface of 315 m long by the seaside and 236 m. wide, orderly organized in 4 parallel rows: the first one by the quay wall comprised the dock sheds; on the second one, three groups of 6-storey warehouses were arranged; on the third one, the fright terminal was located, formed by 3 vaulted cellars supporting 2 sheds each. Behind these, the 74 m long passengers' terminal was to be located, in front of a vast open area. All buildings were served by rail served by rail lines and vehicular ways.

According Barret's report, the most crucial part of the project was the construction of the quay wall – a problem that was to recur at a later time, when dock works were in course at that spot. At the time, except for the grand pier of Alderney (in England), there was no analogous underwater work, founded at such large sea depth, the ports of Cherbourg, Delaware, Marseilles etc., having been built at water depths varying from 16 to 22 m. Thus, after considering the technical difficulties owed to the 42 m water-depth on the shore, he recommended an underwater dike built from artificial blocks and natural rock fill, 7 m above the sea bass (Barret, 1875:87-91). Anyhow the project did not have a continuation, not more than that which he drew up in the same year for Salonica.

Table 1. *Inventory of engineers, contractors and work concessions*

Location	Engineers – Projects	Contracting companies	Management
Golden Horn	Louis Barret 1872 Hilarion Pascal 1872	Compagnie des chemins de fer de la Turquie d'Europe by baron Hirsch	Concession of the Ottoman government
	George Crawley & Co 1879 Dussaud Frères 1879 Marius Michel 1879	Proposals submitted to the Porte	
	Marius Michel, 1890 Alphonse Cingria (port engineer) 1894-1900 Adolphe Guérard 1896-1900 (consulting)	Société des Quays, Docks and Entrepôts de Constantinople, 1891 by Marius Michel	Concession of the Ottoman government
Haydar Pasha	Warpol 1900	Société du port de Haidar-pasha 1900 (subsidiary of the Société des chemins de fer d'Anatolie 1889)	Concession of the Ottoman government

When in 1879, Abdülhamit took the decision to build modern port facilities, the ideas of regularisation were already asserted in the Capital; some parts of the traditional fabric damaged by fire (Hocapasa, Akseray, and Pera) were refashioned, and a number of streets were enlarged or opened by

breakthroughs, especially in Galata (Çelik, 1993:77-81). Infrastructure works were multiplied, such as the Constantinople-Sofia railway as early as 1874 with its terminal station located in Sikedji (1887-91), and the new iron bridge was constructed at Karakeuy in 1878.

According to the report by the British Consul Wrench, in 1879 three projects were presented for the acceptance of the Porte, for the construction of quays, bonded warehouses, and improvement of the custom-house accommodation in Stambul and at Galata. The first project, presented by George Crawley & Co, an English firm of large capital, and great engineering experience, despite the support found with the Grand Vizir Haireddin Pasha, encountered nevertheless considerable opposition. Thus, Dussaud Frères, the contractors for the Smyrna quay, were invited to submit to the government a counter-proposal; according to Consul Wrench this project could not be seriously entertained, being only used of as a hindrance to the realisation of Crawley's plan. The third project was put forward by Marius Michel, the French merchant navy officer and Administrator-General of the Lighthouses of the Empire since 1860. "These rival schemes were discussed and by turns opposed and encouraged; the negotiations dragged on month after month, until at last Crawley left Constantinople disheartened, and Mr Michel obtained an Imperial Firman authorising the adoption of his scheme, but this document added further stipulations and conditions which were too onerous for Mr Michel to accept, and thus it happens that we are now apparently as far from obtaining improved quay and custom-house accommodation as ever." (Consul Wrench, 1879)

This first convention to Marius Michel, was issued for a period of 75 years (Müller-Wiener, 1994:109), and his plan (found in the Prime-ministerial archives in Istanbul) is rather a preliminary sketch by no means mature in its technical aspects: it laid out continuous docks of 20 m wide, stretching for more than 3,500 m along the Golden Horn, from Ounkapan to Seraglio Point in the southern side, and from Azapkapou bridge to Top-Hane in the northern side, with important embankments in front of the existing shores.

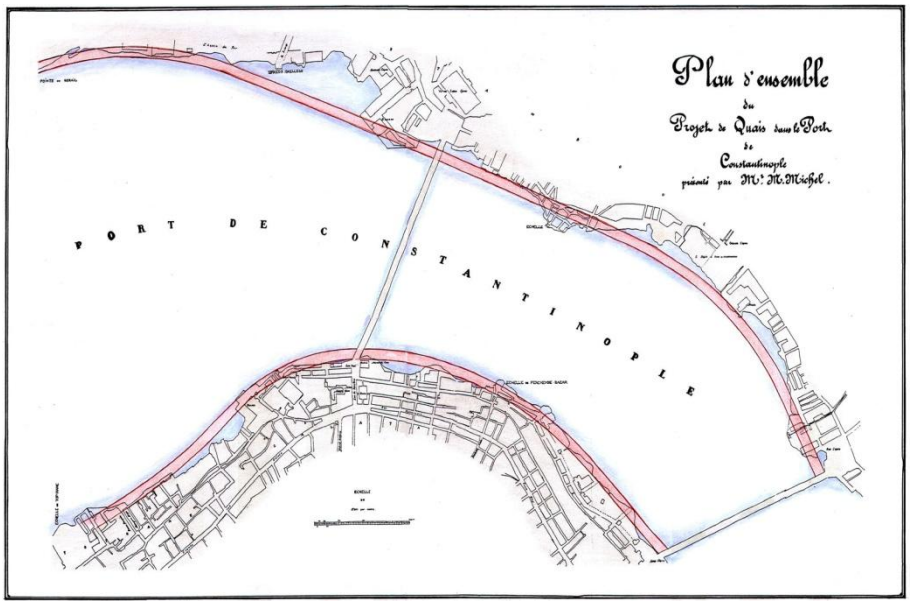

Figure 2. *The plan for the docks of the Golden Horn by M.Michel, 1879 (source: Prime-ministerial archives, Istanbul)*

Despite the Consul's inauspicious judgment, next year a second concession concluded the business. The convention issued on 30 October 1890 (and ratified by the Imperial Irade in 1891), (Convention, Archives Nationales de France, fonds 12/7189 Constantinople), granted to Marius Michel the construction and operation of the port for 85 years, while imposing tight deadlines: a company had to be created in 18 months, and the work started in two years to be implemented fourteen years later (Müller-Wiener, 1994:109 and Hastaoglou-Martinidis, 1998). It provided for the establishment of quays on both shores of the Golden Horn: in Stamboul, between the Sirkedji and the Unkapan bridge, and in Galata between Tophane artillery park and the old bridge of Azapkapou. The company was to build docks and warehouses, custom-houses and sanitary facilities, install mobile equipment and the means of transport on the new quays - railways, tramway and omnibus lines, and a service of steam ferry linking the two shores of the Golden Horn. Work completed, the city would be in possession of a modern quay of 3,000 m long –770 m on Galata side and 390 m on Stamboul side, as well as another 1.840 m quay between Karakeuy and Azapkapou bridges (Verney, 1900:330). In return, the company would be the owner of a part of the surface area gained on the sea, of approximately 30,000sq.m suitably placed for trade, especially in Galata and Stambul.

In January 1891, Marius Michel set up the *Société Anonyme Ottomane des Quais, Docks et Entrepôts de Constantinople*; he became its first President and was awarded the title of Pasha. Capital was set to F 23.875.000, and the work was entrusted to Michel Duparchy, friend of Michel Pasha's and large shareholder (Thobie, 1977:162).

The implementation of harbour works

Construction works began in April 1892 under the direction of Duparchy and Diricq, starting from the Galata docks, and laws of expropriation for public utility settled the conflicts that emerged between the company and the shore-owners (Müller-Wiener 1994:109 and Çelik, 1993:75). In December 1895, 758 meters of docks in Galata were completed, based on concrete blocks, following the type of the quays of Marseilles (Godard, 1909:359). Along the 20.0 m wide embankment calculated from the quay-wall to the building line of the edifices to be erected (a standard previously applied in the quays of Smyrna and Salonica) a 3.0 m. sidewalk was to be left, and parallel to this a 9.0 m. vehicular road, leaving a 8.0 m. parapet along the quay for vessels to load and unload (Convention, contact specifications, art.3). Besides the high construction cost (15,277,000 golden francs), the company met the opposition of the caïkiers and lightermen, however the inauguration of docks, in Mars 1896, was hailed with enthusiasm by the European community of Galata (Issawi, 1980:167).

The construction on the side of Stambul delayed more. Works started in 1894, at the same site where Barret's project had been positioned some 12 years ago, only to meet difficulties which raised construction cost to 28,448,550 golden francs. The banks of the historic peninsula had been filled in for more than 50 m during the Ottoman centuries, and the particular construction site used to be the most important Neorion of the Byzantine era. The soil on that spot was not safe, formed by demolition debris, as was the seafloor along the shore, which consisted of unstable overlapping layers. This situation caused successive collapses of the docks hardly built and pushed back up to 1900 the completion of some 370 m long docks from Sirkedji to the foot of Galata bride in Eminönü, after extended repair works

carried out by the company's head engineer Alphonse Cingria (*Société de Constructions des Batignoles,* AQ 1709, file 89).

Figure 3. *The Galata docks, plan by H. Huber 1895 (source: British Library)*

To cope with this thorny task, after the serious sinking of the quays on July 10 and October 7 1896, the company was addressed for assistance to the Société du Port de Marseille, and between 1896 and 1900 the highly skilled engineer Adolphe Guérard, Inspector General of the *Ponts et Chaussées,* was appointed as standing consultant of the company by its Managing Director Félix Granet (*Société de Constructions des Batignoles,* AQ 1709, file 89).

Adolphe-Marie-Nicolas Guérard (1841-1921), Inspector General of the *Ponts et Chaussées* had a remarkable activity outside France, carrying out missions for foreign governments (in Europe and South America) such as the projects for Costanza port of (1891), the Bourgas and Varna ports (1895), the Danube ports (1898), and Montevideo port (1895). His activity as project or consulting harbour engineer for French or foreign private companies is equally impressive: Varna, Dédéagatch, and Salonica harbour projects (1873), Jaffa (1879), Libau-Russian (1880), Tunis (1882), Lisbon (1885), the Suez port and Heraclea (1891), Istanbul (1896-1900), Salonica (1892), and the Moroccan ports (1905). In Latin America: Santa Fé (1903), Buenos Aires (1908), Valparaiso (1906), and Rio de Janeiro-Pernambouco (1910). (École Nationale des Ponts et Chaussées, Fichiers des ingénieurs du Corps).

The collaboration of Guérard with Cingria set up the course of action to be followed. After thorough geotechnical investigations, the remedy adopted was to cover the seabed along the quays with a layer of sand at least 2 m. thick; this overlay should prevent the underwater dike to give way and the rubble filling to slide indefinitely (W-M: 110) (Godard, 1909: 359). Moreover, the initial quay-line was to be removed to a greater distance from the shore, so that the underwater dike could be founded on more solid seafloor. A third collapse, on May 1898, hindered the continuation of the works, and necessitated additional drillings and soundings. Under Guérard's guidance, Cingria elaborated a work resumption programme, which was adopted by the company in June 23, 1898. On the company's decision, the initial layout

of the docks, which followed the zigzag shape of the shore, was modified and replaced by a straight quay-line, stretching from Sirkedji street to the foot of the Galata bridge; and the order was given to resume work.

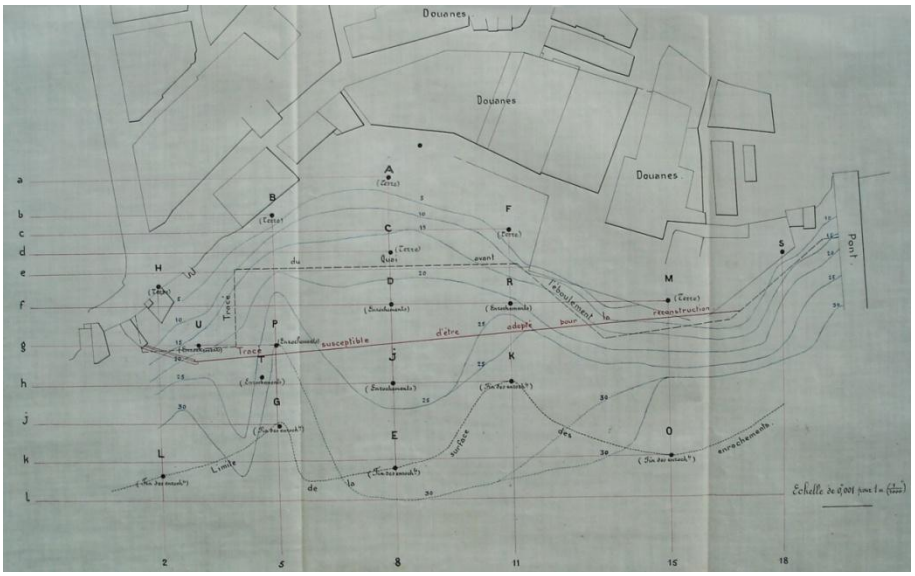

Figure 4. *Project for the repair of the Sirkedji docks by Cingria and Guérard, April 1897 (Société de Constructions des Batignoles, AQ 1709, file 89)*

In 1904, Guérard's judgement was requested once more by F. Granet, concerning the implementation of the sewage works' project prepared par Cingria (in 1900) for the Galata docks. The detail account of the repair works is held in the records of the *Société de Constructions des Batignoles* (file 89 AQ 1709, Dossier d'A.Guérard sur les travaux de réfection des quais, 1896-1900).

After this costly experience, in 1897 the Company obtained the Government's permission to postpone the construction of quays between the two bridges indefinitely. These works faced further difficulties in addition to the already mentioned ones, because they implied the expropriation of a large number of workshops and warehouses existing on these shores and belonging to private individuals (Derya, 1982:148).

The modern docks increased the capacity of the port whose traffic grew in a spectacular way despite of the unfavourable economic circumstances for the maritime trade of Istanbul at the time (Issawi, 1980:168), and regardless of the shadow cast by the newly established port in Haydar Pasha, terminus of the Anatolia railroad on the Asian cost of Scutari since 1900 (Le Génie Civil, 1904).

Urban changes and the new architectural image

If the execution of the second section of the initial project was pushed back to a later date, the construction of harbour buildings on the new docks was to start immediately. In 1905, Michel Pasha's firm submitted to the Ottoman authorities the plans for the harbour building for approval, and hence a dispute emerged between the government and the company over the construction method: Although the convention specified that all buildings were to be built out of stone and bricks (Convention, contact specifications,

art.5), the company insisted on employing the worldwide novel concrete technology. The dispute resolved in 1907, after a two-year debate, the use of reinforced concrete was authorised by the Ottoman inspectors (Celik, 1993:76) By 1910, new structures for the custom-house, the port office, the medical service, stores and multi-storey warehouses were erected on both banks, according to plans approved by the government. In Galata new warehouses and offices occupied a surface area of 7000 sq.m, – the Rihtim hanı was built in 1911 as was the Merkez Rihtim hanı (today Denizcilik Bankasi) in 1912-14. In Eminönü the custom-house of 14,436sq.m surface area was erected in 1909, followed by a second building of 7,000 sq.m (Müller-Wiener 1994:110).

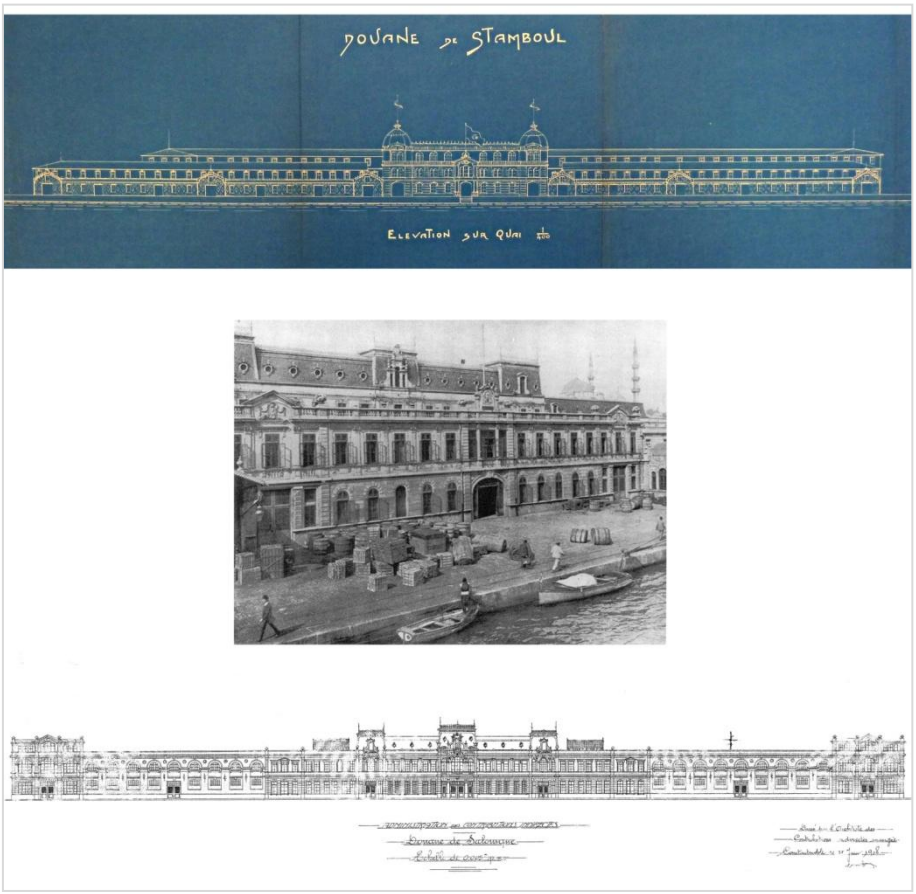

Figure 5. *The new custom houses. Above: Preliminary plan by the engineer S.Saboureaux for the custom house in Karakeuy, 1906 (source: CNAM/SIAF/Cité de l'architecture et du patrimoine/Archives d'architecture du XXe siècle, Fonds BAH). Middle: The Sirkedji custom house by Alexandre Vallaury (source: German Archaeological Institute, Istanbul.) Below: plan by Alexandre Vallaury for the custom house of Salonica, 1908 (source: CNAM/SIAF/Cité de l'architecture et du patrimoine/Archives d'architecture du XXe siècle, Fonds BAH)*

The new harbour and office buildings in Galata and Stambul emphasised with their imposing architecture the modern facade of the city on the sea. The two emblematic custom houses in Karakeuy (designed by the engineer S. Saboureaux), and in Sirkedji (designed by Alexandre Vallaury), were built entirely with reinforced concrete in 1907. Vallaury, author of many

prestigious buildings in the city (such as the Ottoman Bank, the Archaeological Museum, the Pera Palace hotel, etc.), was to called by Djavid bey, the Ottoman Minister of Finance, to prepare the plan for the custom house of Thessaloniki, a replica of the one in Sirkedji, in 1906-09 (L.C., 1913).

These new buildings types introduced novel construction technologies, and paved the way for the diffusion of concrete and iron structures in the building of the city. During this period another French firm, the *Bureau Technique de François Hennebique,* the concrete-patent holder from Paris, energetically entered the picture. François Hennebique (1842-1921), a self-educated builder and engineer who patented his pioneering reinforced-concrete system in 1892, soon expanded his business with a worldwide network of firms acting as agents for his system. By 1902 his agencies and concessionaires carried out 7,205 building sites (including civic buildings, industrial premises, bridges etc.), for a total amount of 120 millions of golden francs (Le Béton armé, 1910). In the East Mediterranean region, the Bureau held regional agencies and associate concessionaires in Istanbul, Izmir, Thessaloniki, Athens, and Cairo. Its activity in Istanbul commenced in 1902, when its licensed concessionaire, the architect E.Vuccinos, built the Messadet Han in Stambul, the first structure to use the Hennebique system. In 1913, the Istanbul associate concessionaire was Marcos Langas, co-founder with G.Mongeri, E. de Nari of the *Fabriques Unies de Ciment Arslan* and director of the *Société Anonyme Ottomane des Constructions* (S.A.O.C.), and the proliferation of the concrete technology is impressive: There were 37 building sites (12 in Stambul, 20 in the European side and 5 in the Asiatic side) under way using the Hennebique system, a most appropriate technique to apply “in the country of fires and earthquakes”, especially after the repeated fires occurred in the city between 1908 and 1912 (B.A.H., 1913).

To complete the refashioning of the waterfront, a new pontoon bridge replaced the existing bridge built in 1875. The contract for the new bridge was granted to the German firm MAN (Maschinenfabrik Augsburg Nürnberg) in 1909, although the company had been busy in preparing a series of projects for this bridge since 1894. The work commenced in 1910 and took about two years of putting together about 8,000 tons of constructional steel work, its cost amounting to 5.5 million FF. The bridge was built on 12 pontoons, arranged in two rows parallel to its longitudinal axis; the distance between abutments was 466.5 m and the width between railings 25 m, this being made up of a 14 m roadway and two footways of 5.5 m each. The central part of the bridge could swing electrically through an angle of 180 deg. towards Galata, leaving a clear throughway of 62 m. For smaller boats traffic, with the movable span closed, the two clear arched openings each of 12 m wide and 5.3 m height were provided. The surface of the bridge followed a parabolical curve with the steepest gradient of 4% at both ends, allowing for the building of waiting rooms underneath. On the Bosporus side, the fixed part provided landing steps for vessels to Skoutari, Kadikeuy, Haydarpasha, while on the Golden Horn side one landing step for vessels to Eyoup and another reserved for the Imperial Navy. With its iron railings and adornments, balconies, flights of steps, and the toll kiosks at both ends, the bridge was assigned an oriental aspect in harmony with the mosques’ skyline of Stambul, asserting as well the advent of technological innovations in the city (Dantin, 1913, and The Engineering, 1912). The bridge was badly damaged in a fire in 1992 and replaced by the one actually in use.

Table 2. *Works of the Bureau Technique de François Hennebique in Istanbul, 1902-1912*

Public buildings	• Base slab of the School of Civil Engineering, State property, architect Kaymal bey, contractor Adamandidis and Co. • Reservoir of 600 m3 in Beşiktaş, Prefecture property, contactor Fouquian. • Base slab for three adjacent buildings in Stambul, State property, engineer Franghia effendi, contractor Adamantidis & Co. • Three Central Office buildings for the Telephone Company, in Kadiköy, Pera and Stambul, Telephone Company property, architect Sprowson, contractor Kaul (1912) • Terrase-promenade in Prinkipo, P.Y.C. property, architect Karakasis, contractor "Archimedes" (1912) • Coverage of the ravine in Kasim Pasha**,** Municipal property, engineer Auric, contractor Fouquian (1912). • Passage way in Yildiz, State property, architect Vıdad bey, contractor "Archimedes" (1913) • Deutsche-Orient bank building, Bank property, architects Schütte, contractor S.A.O.C. • English High School in Nişantaşı, English Community property, architects Angelidis and Casanova, contractor Séminati. (1912) • Building in Sirkeci, State property, architect Verad bey. • Saint Anthony church in Pera, architects and contractors G.Mongeri, E.Nari and M.Langas (1909) • 1st Vakif Vani Han, State property, contractor S.A.O.C. • 4th Vakif Han (on the old Hamidie Imaret), State property, contractor S.A.O.C. • Hangar shell in Sarayburnu, Ministry of War property, contractor S.A.O.C. • The chimney of Dolma-Bahce Palace, contractor "Archimedes"
Private buildings	• Messadet Han in Stambul, architect and contractor Vuccino (1902) • Fabriques Unies de Ciment Arslan (in Darinca) et Eski-Hissar, owners and architects G.Mongeri, E.Nari and M.Langas (1912) • Shop and storehouse in Galata, Antonakis property, contractor Manoussos (1913) • Han in Bahçe kapu, Houloussi bey property, architect Tachjian, contractor S.A.O.C. (1913) • Stables and barn in Kuruçeşme, architect Vıdad bey, contractor "Archimedes" (1913) • Apartment building in Pera, Lampros property, contractors Aggelidis and Casanova (1913) • Immeuble de rapport in Galata, Marco Langas and Tchalian property, contractor Marco Langas (1913) • Building heightening in Pera, Semadeni property, architect-contractor Varthaliti • Yachting Club in Prinkipo, architect Karakasis and C.Amaneiche, contractor "Archimedes" • Mechanical bakery in Nisantasi, Aslanian property, contractor S.A.O.C. • Vehicles' garage in Pera, Azarian property, contractor S.A.O.C.

Source: B.A.H., 1913:65-78.

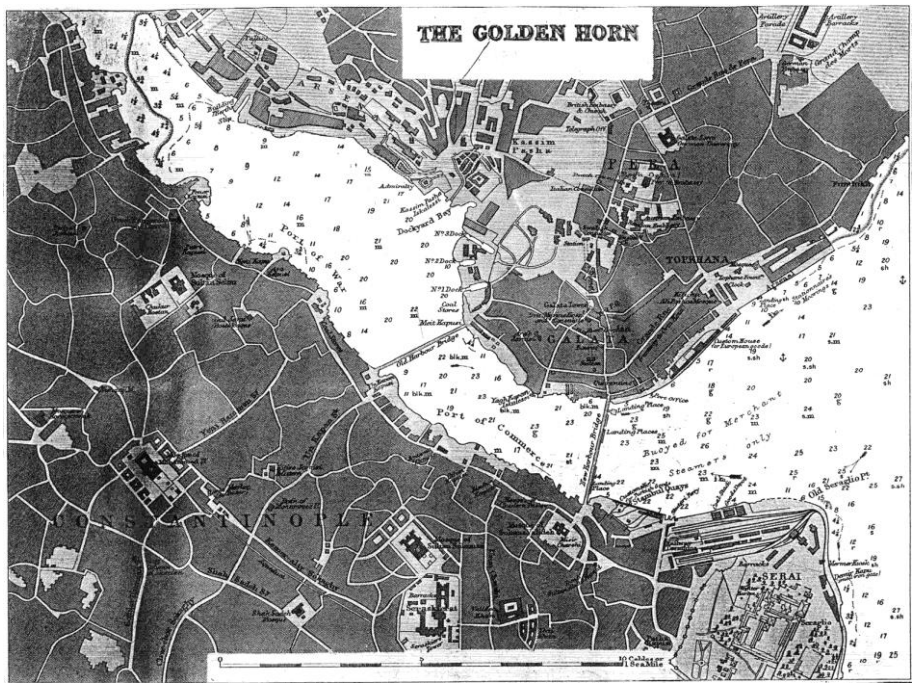

Figure 4. *The Golden Horn docks in the beginning of the 20th century (author's collection)*

The construction of modern docks constituted a major urban innovation, fostering various transformations in the traditional physical and social structure of Istanbul. It reordered the city towards the sea, and endowed it with specialised spaces for exchanges with the Occident. As singular urban creation as well as "device" of development, the new docks restructured the traditional urban patterns. They introduced an early form of zoning with specialised functions and rational organisation of the site, contracting the surrounding traditional fabric; and introduce a new architectural aesthetic and modern construction technology, both of which influenced the conception of the buildings within the city. The fire insurance cadastral plans, drawn up by E. Goad in 1904 and by J. Pervititch in 1922-45, portray the radical renewal of the maritime facades in Galata and Eminonü, in front of the otherwise dense and irregular urban quarters: the urban fabric was regularised in the perimeter of the docks, the neighbouring streets were aligned, and soon new services relative to harbour operation were attracted: navigation companies, stations, offices of commercial houses, banks and insurance agencies, hotels, department stores, etc. (Sakellaridou, 1902: 272-6), creating the emblematic modern image of Istanbul on the sea.

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