

## TRANSFORMATION OF THE NINETEENTH CENTURY URBAN FABRIC IN ISTANBUL'S HISTORICAL PENINSULA: STORARI GRID LAYOUTS.

**TAN KAMİL GÜRER**

Adres: Yıldız Teknik Üniversitesi, Mimarlık Fakültesi, Yıldız, Beşiktaş, İstanbul  
E-mail: [tgurer@yildiz.edu.tr](mailto:tgurer@yildiz.edu.tr)

**PINAR GÖZEK**

Adres: Yıldız Teknik Üniversitesi, Fen Bilimleri Enstitüsü, Yıldız, Beşiktaş, İstanbul  
E-mail: [pinar.gozek@hotmail.com](mailto:pinar.gozek@hotmail.com)

### **ABSTRACT**

*Urban transformation in the nineteenth century Istanbul is under the effects of westernization. Westernization was the modernization project of the Ottoman government. It begins with the declaration of Tanzimat (Ottoman Reform) in 1839 and spreads to lots of fields of the society. Urban planning decisions and the architecture of the period were also affected from the Tanzimat project by referring to western urban planning models - grid and radial plan - and architecture. Many foreign engineers and architects were invited to the Capital for applying the new planning models commonly after the great fires occurred in the Historical Peninsula. Luigi Storari was one of them who became known with application of first grid layouts and subdivision systems in the urban fabric of Istanbul. His grid layouts had different characteristics than others, which applied after him. Regions such as Aksaray, Imrahor, Salma Tomruk, Küçük Mustafa Paşa and Boyacıköy have certain typo-morphological features in its own: grid layout, the square with the beveled corners and the widened main arteries. This study will focus on the morphological characteristics of the Storari grid layouts in the Historical Peninsula.*

### **INTRODUCTION**

Eighteenth and nineteenth centuries are known as westernization periods in Ottoman Empire. Steps taken in this regard loomed large in many areas. The most important of these steps were taken on urban planning. This attempt was reorganization of complex urban fabric of Istanbul in accordance with rational principles as parallel to the changes in the structure of the state. Small and great fires occurred in these centuries also enabled realization of new planning models. This study focuses on both the morphological characteristics of Storari layouts, which represents the beginning of the grid-planning models implemented after the fires mainly in historical peninsula in Istanbul as a part of westernization project and his difference in approaches to the grid plan.

### **URBAN PLANNING TRADITIONS IN WESTERNIZATION PERIOD.**

Tanzimat period, declared in 1839, was the beginning of westernization movement in the Ottoman Empire. The main principles of the process called Ottoman Reform focused on secular law, systematization, control and central government (Çelik, 1996). The impacts of the movement proposed radical changes not only in juridical field but also in economic, military, educational and industrialization fields. The Tanzimat was the end of pre-industrial era for Ottoman, even though the effects were felt predominantly in Istanbul (Kuban, 1996).

Centralist modern paradigm, which was created by the Reforms, denoted itself in two ways concerning the reorganization of urban space: The first was related with administrative decisions on urban issues, could not be made by qadis (an Islamic judge). Thus, by moving beyond the boundaries of religious jurisdiction, decisions on urban planning were taken centrally by municipalities (Kuban, 1996).

The second contribution was application of the Western planning models. Mustafa Reşit Pasha, who visited London in 1836, underlined the need to comply with these models because of its scientific and geometric layout (Ortaylı, 1985). The observations of Ottoman ambassadors who had stayed in Europe in eighteenth century before Mustafa Reşit Pasha were also full of emphasis about the cities with the grid plans, large and tree-lined streets and high buildings (Yerasimos, 1999).

Geometric order almost was the dominant planning system in all-modern capitals of Europe. The new arrangements of Haussmann had attracted great attention in the Napoleon Paris. Haussmann's practiced design was the radial plan in Paris and it was a model for other countries (Ardaman, 2007). Therefore, there were two models of urban planning in nineteenth century in Istanbul: *Grid and radial planning system*.

The great fires in eighteenth and nineteenth centuries provided a basis for western planning models. There were ninety fires between 1701-1800, some of them were huge fires from Haliç to Marmara coastline, ten thousands of houses destroyed in these fires. Buildings made by timber and barracks seemed to be directly related with the fires (Yerasimos, 1996). George Wheler mentioned the "small and ruined houses most of timber and soil" in the early 18th century. Pertusier's observation was the same even a century later: "All the houses of Istanbul is ruined, stone wall rises five-foot on a base and a wooden structure not more than two floors being put onto stone wall. All the houses in the same height and their roofs aligned" (Pertusier, 1820).

At the beginning of the nineteenth century, spatial structure of the city was the same: consisting of timber houses built very closely and full of many cul-de-sacs. 1/25000-scaled map drawn by engineer Kauffer in 1776, member of the French Embassy in Istanbul, exhibits this complex street pattern - neighborhood structure with cul-de-sacs (Ayverdi, 1978). The planning activities in nineteenth century were mostly focusing on improvement of the streets. According to certificate of 17 May 1839, a new urban plan was created and timber buildings without "drawings" were prohibited in Istanbul. This plan declared that the new roads as major arteries would be 15.20-meter width and planted, pavements would be 3.04-meter width and 9.12-meter width road would be for the horses and cars. The other roads would be 11.40, 9.12 and at least 7.60 meter width and cul-de-sacs never be made. In consideration of heavy charge on the budget, it was decided that the new buildings and roads would be built primarily in the post-fire areas (Yerasimos, 1996). These suggested ideas inevitably reminds of Haussmann's works in Paris.

Planning in the post-fire areas was the grid plan. Explicitly, the grid plan turned into a model, which was implemented in the new settling areas. It can be seen on the maps made at the end of the nineteenth and in the early twentieth century that the old urban fabric was broken with the grid planning in patches. The grid meant geometry and order due to its orthogonal structure and was assumed as a reflection of the central government. It also meant approaching to blocks from all directions and fire fighting easily to possible fires. Italian engineer Luigi Storari planned the first grid subdivision in 1856 after a fire in Aksaray, which occurred in 1854 - 748 buildings were destroyed. In 1848-49, Ebniye Nizamnameleri -The Building Regulations, were better than the receipt of 1839 on reorganization of the post-fire areas. A fire in Hocaşa in 1864 was the greatest one with which the Ottoman faced and it caused to burn very large area ranges from Haliç (Golden Horn) to the Marmara Sea. The fire enabled renewal of administrative center and implementation of Ebniye and Turuk Nizamnameleri in 1863 - The Building and The Road Regulation. The roads in this area were widened and the use of masonry system regarded in buildings (Tekeli, 1999).

The grid plan was also implemented in small-scale fires occurred out of the main arteries like Aksaray and Hocaşa. After the fires in Ayvansaray of 1861 and in Samatya of 1866 the grid plan was also applied. Designing of Samatya was described "with chessboard style, a good example for the best designed countries in the world" in Rehabilitation of Roads Commission's 1868 Report (Çelik, 1996). The grid plan was the model for the post-fire areas in Salma Tomruk, Imrahor, Kucuk Mustafa Pahsa and Balat regions as well. Application of the grid in these areas was not perfect due to topography, the size of land in pre-fired and property rights.

The areas in which the *radial plan* was applied were lesser than the grid ones. The plan was used in landscape design such as parks, new developing and post-fire

areas. This planning could not create a systematic hierarchy in urban space due to the fact that it had not clear rules in practice, the number of the roads - five or seven - meeting in the centre seemed to be arbitrary. "The applied examples of the radial plan did not convey the sense of having a centre and also their main spaces were not literally square although many were given that name" (Ardaman, 2007).

Şişhane Square (1865) is one of the important squares, which was designed with radial plan method. Although its situation on a steep slope which causes perceptual problems, one of the streets of the square arrives at the Sixth Division which is one of the symbol municipalities in westernization period (Ardaman, 2007). The square has lost his form today due to the changes in road network. A similar application is in the intersection of Kazancı Slope and Mebusan Slope. The radial planning, implemented in 1910 after a fire, was situated on a steep slope, thus it doesn't give the sense of centre. After a fire of 1870, which destroyed more than 300 houses in Pera, a radial planning was produced comprising the area between the British Embassy and Taksim (Figure 1). This plan was containing a large square in the centre and some of the streets were designed in a radial method. But this plan has never been applied (Kuban, 1996). According to Ardaman, the reason was not topography but the inhabitants' objection to the plan. Because, a lot of landowners who live near the centre would lose too much space. Instead of the radial plan, the grid one was applied in this area again (Ardaman, 2007).

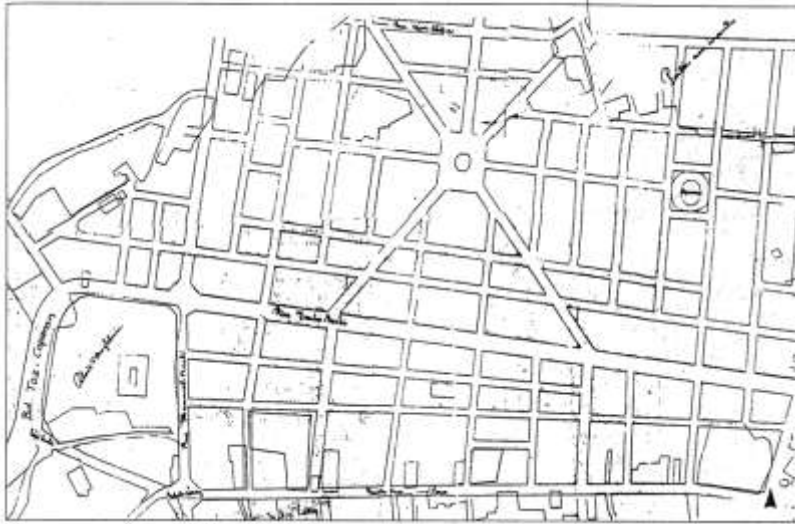


Figure 1. Radial plan project comprise from British Embassy to Taksim in Pera (Çelik, 1996)

Grid planning system left its mark on Capital's urban fabric in the nineteenth century. The plan vindicated the rights of the owners better and ensured a standard order. That's why it was appropriated easily. The radial planning did not find much range of application but the grid plan had been kept in the twentieth century and in the new settlement areas. The first application of the grid plan was the planning of Luigi Storari after a fire in Aksaray. He applied this model in Imrahor, Salma Tomruk, Küçük Mustafa Pasha and Boyacıköy in the Bosphorus. Although, most of them are post-fire applications, Boyacıköy is a new settlement.

## LUIGI STORARI AND THE GRID LAYOUTS

Luigi Storari is known as a first engineer who planned the first grid layout after Aksaray conflagration in 1856 (Çelik, 1996). By his efforts first subdivision system has appeared in the city of Istanbul. Indeed, subdivision phenomenon was the major instrument that reshaped the urban fabric of the Ottoman Capital and the other cities from nineteenth century to the end of the Empire (Yerasimos, 1995).

Luigi Storari who was born in 1822, arrived to Smyrna (Izmir) in March 1850 from Corfu. In 1851 he applied to French Embassy to go to Istanbul and stayed in the city from April 1851 to the May of 1854. Due to inadequate knowledge about the cadastral system in Ottoman Empire, he prepared the detailed map of Smyrna at 1/5000 scale between 1854 and 1856. He published the map in 1856 in Paris dedicating to the Sultan Abdülmecit. One year later he also published a guide accompanied to the map in Turin. After his success in Smyrna, he was invited to the Capital to realize the first subdivision plan after a fire. The subdivision based on grid layout for Aksaray region was prepared in 1855 but related statements about plan were published in 1856 in Journal de Constantinople. (Yerasimos, 1995).

In the conflagration areas subdivision works certainly have a number of rules. Absences of any plot plan information before the fire, properties could be distributed according to pre-fired existing condition. But the potentials for the subdivision activity in the city blocks were limited. There was no way for engineers to draw a plot within blocks, but they could distribute parts of the islets to former owners in proportion to their size earlier, and taking into account the privileges they had in the old tissue: frontage, position angle, or even provision of a well in the garden (Yerasimos, 1995)

One remarkable characteristic in the grid layouts is related with the typology of them. Widening the main streets that are connected to the existing ones and beveling the corners of the junction of the main arteries - like in many Roman grid layouts - by creating a kind of square are the distinctive properties of the subdivision planning. He used this typology also in five other grids planning in the capital city. The grid planning initiated by Storari, had spread to other neighborhoods of the city: Aksaray Horhor, Fatih Kızıtaşı, Beşiktaş Old Market Square, in the Anatolian side, Kadıköy Old Market area and Yeldeğirmeni region.

## THE MORPHOLOGY OF THE STORARI LAYOUTS

The first grid plan application by Storari is for Aksaray settlement in 1856. A big fire in 1854 had destroyed more than seven hundred buildings in Aksaray. This was the “major turning point in the history of the Istanbul’s urban form” (Çelik, 1990). In Storari’s plan, north-south - from Unkapanı to Yenikapı - and east-west directions - from Beyazıt Square to Topkapı, which is the continuation of the Divanyolu - were connected to each other and widened as main arteries (Figure 2). Intersection of arteries also forms Aksaray Square that was known in Byzantium time as Bovis Forum. Storari emphasized the connection of the arteries and beveled the corners of the crossroads that turns it to the octagonal shape. This also accentuated the importance of the Aksaray Square that’s why are described as “belle place” in January 1856 by the Journal de Constantinople (Çelik 1990). Roads constitute four edge of the octagonal shape but in the other edges buildings are taken place. Together with the Storari plan many cul-de-sacs in the environment are eliminated.



Figure 2. Changing morphology of Aksaray Square between 1850-1870. First map shows the pre-fired area of Aksaray (Mühendishane-I Berri-i Hümayun, 1847), (Kayra, 1990); Second map shows the post-fired condition of Aksaray with the grid layout (Ayverdi, 1978).

Another district with grid plan designed by Storari is Imrahor, located in vicinity of Yedikule and Samatya. After a fire in 1856 five or six blocks were destroyed. Storari, by using orthogonal grid layout system, reorganized the burned areas and widened the Imrahor street and the one which was perpendicular to it (Figure 3). In the junction point of these arteries, corners are beveled again to give a square view. Çelik (1990) points out another contribution of Storari to the area by opening the north-south artery that connects the neighborhood to the coastline. Nevertheless, connection of the region to the coastline is limited because of the railway and coastal road in current condition.

Storari replanned the Küçük Mustafa Paşa neighborhood in 1862 after a fire, which destroyed the 242 buildings from golden horn to the north hill of the city (Ergin, 1914-22). Post-fire planning system was grid one and lots of cul-de-sacs were eliminated. While block sizes were suitable with the existing conditions, Kara Sarıklı Street was widened because of its connection with the Fatih Mosque complex (Figure 4). At the intersection of the Kara Sarıklı Street with the Aşık Ali Paşa Street corners were beveled according to rule of his typology (Çelik, 1990).



Figure 3. Changing morphology of the Imrahor neighborhood between 1850-1870. First map shows the pre-fired area of Imrahor (Mühendishane-I Berri-i Hümayun, 1847), (Kayra, 1990); Second map shows the post-fired condition Imrahor with the grid layout (Ayverdi, 1978).



Figure 4. Changing morphology of the Küçük Mustafa Paşa region between 1850-1870. First map shows the pre-fired area of Küçük Mustafa Paşa (Mühendishane-i Berri-i Hümayun, 1847), (Kayra, 1990); Second map shows the post-fired condition Küçük Mustafa Paşa with the grid layout (Ayverdi, 1978).

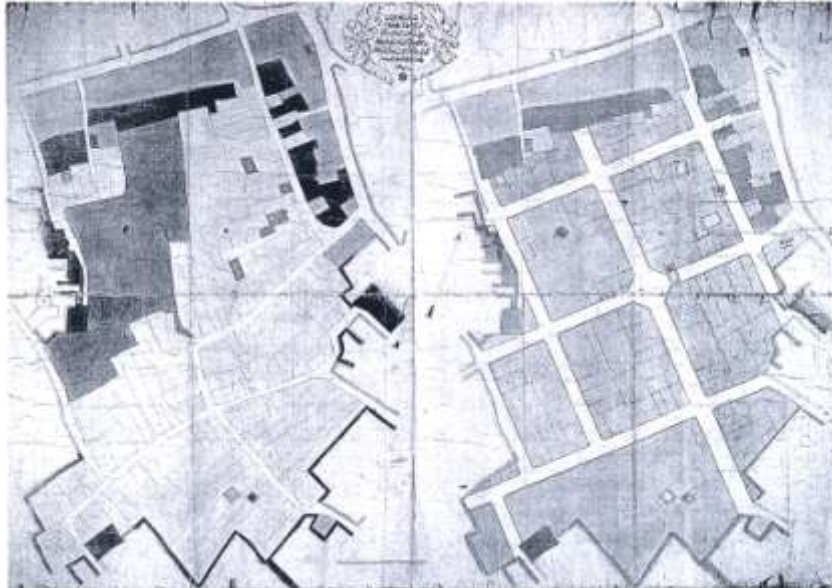
Luigi Storari also designed Boyacıköy as a new settlement area at the hillside of the Emirgan with the same idea (Figure 5). Name of the village comes from the family of Kafrariyofi whose task was painting the serge and fez in the period of Sultan Selim III. After the Storari planning some of the Armenian and Rum neighborhoods were appeared in the region (Artan, 1994). Typology of the village has same characteristics with the designs of the burned areas in the Historical Peninsula: grid layout, square with the beveled corners. Design includes forty-five blocks, which have approximately a size of seventy meters to seventy meters (Çelik, 1990).



Figure 5. Morphology of the Boyacıköy village, 1918. (Kayra, 1990)

In 1856, a fire destroyed 111 building in Salma Tomruk neighborhood close to Edirnekapi. A document which bears a seal in Arab characters and the title of Storari denotes the condition of the house and retail buildings in the environment

as topographically (Figure 6). Planning probably designed by Storari and the pre-fired and post-fired conditions of the neighborhood are drawn side by side in the document. Plans are drawn in color on the same plate, left side has the record of the previous state and the right side has the state of current project. It is mainly composed of rectangles very close to the edge, divided into four equal rectangles. Design goes to the periphery of the area. In junction of the main two arteries, corners are beveled again to emphasize the square function. Some streets are ended with the cul-de-sacs and some of them are opened to very narrow passages (Yerasimos, 1995).



*Figure 6. Changing morphology of the Salma Tomruk neighborhood between 1850-1870. Left side of the map shows pre-fired area of Salma Tomruk, Right side of the map shows post-fired condition Salma Tomruk with the grid layout (Kayra, 1990).*

## CONCLUSIONS

Two important facts structured the nineteenth century urban transformation in Istanbul. One of these is westernization activity that began with the Tanzimat philosophy and the other is the huge fires that occurred in the nineteenth century. These facts, which constitute a cause to each other, found its correspondence in western planning models in the urban fabric. At the beginning, conceptualization and the application of the projects were experienced by foreign architect and engineers.

Storari applied the first grid layout system in Ottoman Istanbul in nineteenth century. He also introduced first subdivision system in urban planning. Grid layouts designed by him have some differences from the others practiced by Turkish planners after him. His designs resemble the Roman Grid: two main arteries are widened - like in *Cardo* and *Decumanus* - and the junction of these arteries are converted to square by beveling the corners - like a Roman Forum. His grid planning system even can be supported by the concepts of centrality, orientation and landmark, its importance also lies in the social life brought to the city: geometrical planning, standardization, subdivision system, gathering place and extrovert life.

According to the morphology of planning, Storari's designs commonly settle down to the sloping areas but the squares with the beveled corners are placed to the flat areas as possible. Blocks sizes vary from forty meter to seventy and fifty meter to one hundred meter. Admittedly sizes are related with the pre-fired privileges of

the property owners. But in all occasions block sizes in the planning of Luigi Storari are in the humane limits (Siksna, 1997).

Storari plans still maintain its existence in the urban fabric of the Historical Peninsula of Istanbul as an urban memory. Altering life conditions also act on these layouts in a different ways. First effect is the changing of lot sizes. Amalgamation of the lots according to the current requirements of the inhabitants, have dramatically affected the size of the lots and scale of the environment. Increase in the number of stories of the buildings is approximately one hundred percent in many areas of the Storari layouts which cause loses of characteristics of the streets (Figure 7). In certain neighborhoods such as Imrahor and Salma Tomruk, deformations in the square corners can be observed. In former, two corners are turned to right angles and the latter, incomplete corners can be seen. Above all, Aksaray square is beyond recognition (Gurer and Gozek, 2009).



Figure 7. Increased number of stories in the Aksaray and Imrahor had caused to deformation of the urban fabric dramatically (Gürer and Gözek, 2009)

Transformation of the cities can only be understood with their historical past. Historical awareness in urban planning often remains in individual features. There is little sense of how they fit together in cityscape and relate to one another and are part of a process of change. We experience the results of a lack of this kind of awareness in last fifty years in the historical areas of Istanbul. In this process Storari grid layouts has also been affected in negative way.

## REFERENCES

- Ardaman, E. (2007) "Perspective and Istanbul, The Capital of the Ottoman Empire", Journal of Design History, Vol. 20 No: 2, 110-111
- Artan, T. (1994) "Boyacıköy", Dünden Bugüne İstanbul Ansiklopedisi, Kültür Bakanlığı ve Tarih Vakfı Ortak Yayınları, İstanbul, cilt 2, 316
- Ayverdi, E. H. (1978) 19. Asırda İstanbul Haritası, İstanbul Fetih Cemiyeti, İstanbul Enstitüsü Yayınları, Baha Matbaası, İstanbul, 4
- Çelik, Z. (1990) "The Italian Contribution To The Remaking of Istanbul", Environmental Design: Journal of the Islamic Environmental Design Research Center, 128-133
- Çelik, Z. (1996) 19. Yüzyılda Osmanlı Başkenti Değişen İstanbul, Çeviren: Selim Deringil, Tarih Vakfı Yurt Yayınları, İstanbul
- Ergin, O. N. (1914-1922) Mecelle-i, Umur-u Belediye, İstanbul, I, 1318, aktaran, Çelik, Z. (1990), "The Italian Contribution To The Remaking of Istanbul",



Environmental Design: Journal of the Islamic Environmental Design Research Center, 128-133

Gurer, T.K. and Gozek, P. (2009) "An Analysis On Sustainability of Urban Space: Nineteenth Century Small Squares of Istanbul", 5th International Symposium on Sinan: Design Language in Historical Areas, 02-03 April 2009, Trakya University Faculty of Engineering & Architecture, Edirne, 29-36

Kayra, C. (1990) İstanbul Zamanlar ve Mekanlar, Ak Yayınlar, İstanbul

Kuban, D. (1996) İstanbul Bir Kent Tarihi, Bizantion, Konstantinopolis, İstanbul, Çeviren: Zeynep Rona, Türkiye Ekonomik ve Toplumsal Tarih Vakfı, İstanbul

Ortaylı, İ. (1985) Tanzimat'tan Cumhuriyete Yerel Yönetim Geleneği, Hil Yayın, İstanbul, s. 31, aktaran, Ardaman, E. (2007), "Perspective and Istanbul, The Capital of the Ottoman Empire", Journal of Design History, Vol. 20 No: 2, 110

Pertusier, C. (1820) Picturesque Promenades in and near Constantinople and on the Waters of the Bosphorus, London, aktaran, Denel, S. (1982), Batılılaşma Sürecinde İstanbul'da Tasarım ve Dış Mekânlarda Değişim ve Nedenleri, ODTÜ, Ankara, 49

Siksna, A. (1997) "The Evolution of Block Size and Form in North American and Australian City Centers", Urban Morphology, Paris, France, 19-33

Tekeli, İ. (1999) "19. Yüzyılda İstanbul Metropol Alanının Dönüşümü", içinde, Dumont, P. ve Georgeon, F. (edt.), 1999, Modernleşme Sürecinde Osmanlı Kentleri, Tarih Vakfı Yurt Yayınları, ikinci baskı, İstanbul.

Wheler, G. (1723) Voyage de Dalmatie, de Grece et du Levant, O, La Haye, Rutger Albert, aktaran, Denel, S. (1982), Batılılaşma Sürecinde İstanbul'da Tasarım ve Dış Mekânlarda Değişim ve Nedenleri, ODTÜ, Ankara, 49

Yerasimos, S. (1995) "Quelques Éléments Sur L'ingénieur Luigi Storari", Convegno, "Architettura e architetti italiani ad Istanbul tra il XIX e il XX secolo", Istituto Italiano di Cultura, Facolta di Architettura dell' Università Mimar Sinan, 27-28 Novembre 1995, İstanbul, 117-123

Yerasimos, S. (1996) "Batılılaşma Sürecinde İstanbul", içinde Dünya Kenti İstanbul, Türkiye Ekonomik ve Toplumsal Tarih Vakfı Yayınları, İstanbul, 48-54

Yerasimos, S. (1999) "Tanzimat'ın Kent Reformları Üzerine", içinde, Dumont, P., ve Georgeon, F., (edt.), 1999, Modernleşme Sürecinde Osmanlı Kentleri, Tarih Vakfı Yurt Yayınları, ikinci baskı, İstanbul.