

## Witnesses of the Time: A survey of clock rooms, clock towers and façade clocks in Istanbul in the Ottoman Era\*

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Measuring and communicating time has been an important activity for the Ottomans, both in the Classic Age and in the Age of Reforms. This article aims to examine timekeeping constructions such as clock rooms (hereafter *muvakkithanes* in plural), tower clocks and façade clocks in Istanbul, a cosmopolitan city and the seat of the Ottoman Court. It traces the emergence and diffusion of tower clocks and the coexistence of *muvakkithanes* and tower clocks in the nineteenth and early twentieth century. The account is based on unused archival documents, newly published studies as well as a foot expedition. Besides, it takes into account façade clocks embedded in public buildings that have been omitted in the existing works on this topic. By doing this, it attempts at giving a complete account of the time-indicating constructions of Istanbul.

Time-indicating constructions have been subject to various studies for the last half century. In 1971, historian of medicine and Ottoman culture Süheyl Ünver (1898-1986) presented a seminal paper at the ninth Atatürk Conference, on the role of clock rooms among the Ottoman Turks.<sup>1</sup> Although its title seems to indicate that the paper addresses the *muvakkithanes* in general, it focuses on the *muvakkithanes* of Istanbul. Ünver lists an aggregate of 69 *muvakkithanes*, 38 of which had disappeared. He gives information on their date of construction, donors, architecture and current situation. Even though he does not provide a bibliography of his work, he appears to have consulted with Ottoman archives, witnesses and made a foot survey. Ünver presented another paper on *muvakkithanes* at the International Symposium on the Observatories in Islam, in 1980, which focused on the relation between *müneccimbaşılık* (the post of head astrologer) and *muvakkithane*.<sup>2</sup>

For more than a decade, these two papers did not trigger new studies on the topic. In 1993, Salim Aydın completed his MA thesis on the institution of *müneccimbaşılık* in which he briefly examined the tasks of *muvakkithanes* and *muvakkits*.<sup>3</sup> Later, he extended this section, adding information on several famous



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1. Süheyl ÜNVER, “Osmanlı Türkleri İlim Tarihinde Muvakkithaneler”, in *Atatürk Konferansları 1971-1972*, Ankara, Türk Tarih Kurumu Basımevi, 1975, pp. 217-259.

2. Süheyl ÜNVER, “İstanbul Muvakkithaneleri Vazifelerinin İlmî ve Kültürel Değerleri Üzerine”, in M. DIZER (ed.), *International Symposium on the Observatories in Islam, 19-23 September 1977*, Istanbul, Millî Eğitim Basımevi, 1980, pp. 45-51. For further information see Salim AYDÜZ, “Osmanlı Asronomi Müesseseleri”, *Türkiye Araştırmaları Literatür Dergisi*, 2/4 (2004), pp. 411-453.

3. Salim AYDÜZ, “Osmanlı Devleti’nde Müneccimbaşılık”, *Osmanlı Bilimi Araştırmaları*, in Feza GÜNERGÜN (ed.), Istanbul, Istanbul Üniversitesi Yayınları, 3.911 (1995), pp. 159-207.

*muvakkits* and their works.<sup>4</sup> However, these two works of Aydüz do not add much information to what Ünver provided, except for dwelling more on the institutional dimensions of *muvakkithanes* and on the astronomical works of some *muvakkits*.

Since then, *muvakkithanes* mostly drew the attention of art historians and historians of architecture. Art historian Server Dayıoğlu published an article in a popular magazine on Istanbul in 1995 and went on to make a book out of it more than a decade later.<sup>5</sup> Historian of architect Zeliha Kumbasar finished her MA thesis on the *muvakkithanes* of Istanbul in 2008.<sup>6</sup> Unsurprisingly, both studies examine artistic and architectural features of the *muvakkithanes*, report on their present situation and rely heavily on Ünver's work. Neither of them adds anything of importance with regard to donors and construction dates. However, Kumbasar provides information regarding relevant documents in the Ottoman archives, albeit without using them herself.

In a similar vein, it was mostly art historians who first showed interest in clock towers across the Ottoman Empire. Hakkı Acun examines the ones that still exist in terms of their artistic characteristics, construction dates and donors in his book on clock towers of the Empire.<sup>7</sup> While his account includes both independent clock towers and the ones attached to the body of buildings including parts in the countenance of tower, it excludes façade clocks. He understands clock towers as means of secularizing the state. Considering that the assessment of clock towers as means of secularization of the state cannot fully explain the complex nature of the issue, Klaus Kreiser emphasises, in his preliminary survey of the Ottoman clock towers in 2010, their multifunctionality by touching upon their philanthropic and commemorative meaning, too. Yet, he, too, leaves façade clocks aside, arguing that they are beyond the aims of his article.<sup>8</sup> The same year, Mehmet Bengü Uluengin outlines different trends that played their part in the construction of tower clocks in Anatolia. Interestingly enough, he shows that tower clocks were sometimes considered as modern version of *muvakkithanes*. In his comment on Uluengin's article and his book on the transformation of Ottoman temporal culture starting from the reign of Selim III (r. 1789-1807), Avner Wishnitzer stresses the coexistence of two different hour systems, that is *alla turca* (or, Turkish-style) and *alla franca* (or, European-style), until the Republic, that enriches their explanation of the coexistence of *muvakkithanes* and tower clocks.<sup>9</sup> Vanessa Ogle investigates the adoption of mean time in a colonial city of British Empire, Bombay, on one hand and in

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4. Salim AYDÜZ, "İstanbul'da Zamanın Nabzını Tutan Mekânlar Muvakkithaneler", *İstanbul*, 51 (Ekim 2004), p. 92-97; Salim AYDÜZ, "Osmanlı Devleti'nde Küçük Gözlemeleri 'Muvakkithaneler'", Güler EREN et al., (eds.), VIII, *Osmanlı*, Ankara, Yeni Türkiye, 1999, pp. 664-675.

5. Server DAYIOĞLU, *Osmanlı'da Zamanı Belirleme Mekânları İstanbul Muvakkithaneleri*, İstanbul, Kültür A. Ş., 2010.

6. Zeliha KUMBASAR, "Osmanlı Dönemi İstanbul Muvakkithaneleri", Yıldız Teknik Üniversitesi Fen Bilimleri Enstitüsü Mimarlık Tarihi ve Kuramı Programı, Unpublished MA Thesis, İstanbul, 2008.

7. Hakkı ACUN, *Anadolu Saat Kuleleri*, Ankara, Atatürk Kültür Merkezi, 1994.

8. Klaus KREISER, "Ottoman Clock Towers: A Preliminary Survey and Some General Remarks on Construction Dates, Sponsors, Locations and Functions", Mustafa KAÇAR and Zeynep DURUKAL (eds.), *Essays in honour of Ekmeleddin İhsanoğlu*, Vol. 1, İstanbul, IRCICA, 2006, pp. 542-556.

9. Avner WISHNITZER, *Reading Clocks, Allaturca Time and Society in the Late Ottoman Empire*, Chicago and London, The University of Chicago Press, 2015.

Beirut, a multicultural commercial hub of the late Ottoman period, on the other.<sup>10</sup> Ogle points to a gradual adoption of mean time in these two different non-Western centers, and maintains that it was not dissimilar to certain European cities. This article is a contribution to this debate.

### Historical Background

Since the early days of Islam, timekeeping was considered to be of great importance. Essential practices that believers must fulfil, such as daily prayer, hajj, fasting, religious festivals etc. are all subject to timekeeping.

The number and time of daily prayers were not clearly established in the early phase of Islam, although these prayers were mandatory according to the Quran. The exact number of daily prayers was fixed in the eighth century, albeit not their precise times.<sup>11</sup> Starting from the ninth century, astronomical and mathematical principles were set by Islamic scholars to determine daily prayer times according to the position of the Sun and the Earth. These principles required precise measurements. Accordingly, Islamic scholars improved astronomical and mathematical knowledge they had inherited from Greek scholars, along with the instruments used for time measurement, namely sundials, water clocks, etc. In the very beginning of the ninth century, in 801, Abbasid caliph Harun al-Rashid (r. 766-809) sent a water clock made by Muslim technicians to the Roman Emperor Charlemagne (r. 800-814), who was astounded.<sup>12</sup> Moreover, two of the most famous early Islamic scholars, Habash al Hasib and Thabit ibn Qurra, wrote treatises on sundials in the latter part of the ninth century and the early tenth century.<sup>13</sup>

Prayer times were fixed in the eighth century –according to the prophet’s practices and sayings– at five per day: Evening prayer, when the sun disappears over the horizon; nightfall prayer, when the red light is gone from the western sky and there is no scattered light in the sky; morning prayer, when the sky begins to lighten up; noon prayer, when the sun starts to decline after reaching its highest point in the sky; afternoon prayer, when the length of an object’s shadow reach the shadow of subject at noon plus its own length.

Since the prayer times are defined according to the position of the Sun that varies throughout the year, these principles require precise astronomical measurements and observations. Whereas noon and afternoon prayers’ time can be measured using a sundial,<sup>14</sup> the other three need to be determined in a different way, as the shadow of the gnomon during the sunrise and sunset is infinite and there is no shadow after sunset. Indeed, this is where water clocks step in. Having done the required observations and

10. Vanessa OGLE, “Whose Time Is It? The Pluralization of Time and the Global Condition, 1870s-1940s”, *The American Historical Review*, 118/5 (2013), pp. 1376-1402.

11. Stephen P. BLAKE, *Time in Early Modern Islam: calendar, ceremony and chronology in the Safavid, Mughal and Ottoman empires*, New York, Cambridge University Press, pp. 3-4.

12. Carlo M. CIPOLLA, *Clocks and Culture 1300 – 1700*, New York, Walker and Company, 1967, pp. 25-26.

13. J. L. BERGGREN, “Sundials in Medieval Islamic Science and Civilization”, *The Compendium*, 8/2 (June 2001), p. 9.

14. *Ibidem*, p. 8.



calculations with the help of various instruments such as astrolabe, quadrant and so on, water clocks were used to determine the time passed from one prayer to another.

In addition, the need for timekeeping led to the establishment of a new institution in the Muslim world, which is *muvakkithane* (clock room). It appeared for the first time during the Mamluk era in Cairo in the 13<sup>th</sup> century and became prevalent across the Near East in the 14<sup>th</sup> century. A *muvakkit* (time measurer) was officially employed to determine the prayer times. Some incumbents of the post became famous owing to the treatises they wrote on timekeeping as well as on astronomy itself.<sup>15</sup> *Muvakkits* tended to use sundials and water clocks and many of them contributed to the development of these instruments. The sundial applied on a horizontal base in the complex of Umayyad Mosque in the latter part of the 12<sup>th</sup> century is one of the most elaborate ones in the Muslim world.<sup>16</sup> Water clocks, too, were to develop across the Muslim domains. Al-Djazari's (1136-1206) automated water clocks made in the early 13<sup>th</sup> century were the summit of its kind in the lands of Islam.<sup>17</sup> Water clocks became prevalent across the Muslim world by the early 15<sup>th</sup> century and became the most common instrument used by the *muvakkits*.<sup>18</sup>

Elsewhere in the world, new developments in timekeeping were taking place, too. A new type of clock was invented toward the end of the 13<sup>th</sup> century in Europe: the mechanical clock, made possible by the application of the verge-and-foliot escapement. From the late 14<sup>th</sup> century on, this invention altered the hour system in Europe dramatically. They were installed on public buildings throughout Europe with enthusiasm. Since these mechanisms were not sufficient to show seasonal hours, as they become widespread, daily life started to be organized according to equal hours.<sup>19</sup> Yet, Muslims appear to have balked at using mechanical clocks at this early period.

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### Timing Istanbul

The Ottoman Empire, that emerged east of the Sea of Marmara in the first years of 14<sup>th</sup> century, inherited the knowledge regarding timekeeping previously produced in the Muslim world. In addition, as the Ottomans almost immediately began to expand towards Europe, they got in contact with the knowledge produced in the West.

We have little information on timekeeping activities and *muvakkithanes* during the early period of the Ottoman sultanate until the conquest of Constantinople by

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15. David A. KING, "Mamluk astronomy and the institution of the muwaqqit", in *Islamic Astronomy and Geography*, Ashgate Surrey and Burlington, 2012, V, pp. 153-162.; Salim AYDÜZ, "Muvakkithane", *Türkiye Diyanet Vakfı İslam Ansiklopedisi*, 31, (2006), pp. 413-415.

16. David A. KING, "Astronomy and Islamic Society: Qibla, gnomonics and timekeeping", in Roshdi RASHED (ed.), *Encyclopedia of the History of Arabic Science*, London and New York, Routledge, Vol.1, pp. 165-166.

17. D. R. HILL, "al-Djazari" P. Bearman, et al. (eds.), *Encyclopaedia of Islam*, second edition, <[http://dx.doi.org.proxy.lib.umich.edu/10.1163/1573-3912\\_islam\\_SIM\\_8506](http://dx.doi.org.proxy.lib.umich.edu/10.1163/1573-3912_islam_SIM_8506)> (consulted 11-11-2017).

18. BLAKE, *Time in Early Modern Islam*, p.6.

19. Gerhard DOHRN-VAN ROSSUM, *History of the Hour*, Chicago and London, The University of Chicago Press, 1996, pp. 45-172.

Mehmed II (r. 1451-1481).<sup>20</sup> However, one might infer that the Ottomans would have produced or at least used knowledge concerning timekeeping and constructed *muvakkithane*(s). Right after the conquest of Constantinople, Mehmed II ordered the construction of a complex of buildings, named after him and completed in 1470, consisting of a mosque, madrasas and a *muvakkithane*. This *muvakkithane* is, according to what we know, the first and the oldest of Istanbul.<sup>21</sup> Moreover, sundials were drawn on the Southwestern wall of the Western minaret of the mosque.<sup>22</sup> Mehmed II also ordered to build a horizontal sundial, applied on a standing base, which is in the courtyard of Topkapı Palace today.<sup>23</sup>

One of the essential contributions of the Ottomans to timekeeping is the creation of a post at the Court called *müneccimbaşı* or head astrologer. Even though the term *müneccim* (astrologer) refers to people whose principal occupation is making predictions about future events, in the Ottoman context they were also charged with preparing calendars and *imsakiye* (Ramadan timetable), besides determining auspicious and inauspicious days for planned activities and campaigns. Furthermore, they were responsible for the appointment of *muvakkits*.<sup>24</sup>

By the time Constantinople was conquered, the population of the city had decreased significantly.<sup>25</sup> Mehmed II tried to remedy that, ordering massive reconstruction works aimed at reinvigorating the city as the centre of the new empire. Therefore, construction of a *muvakkithane* as a part of Fatih Mosque complex intended to tell dwellers of Constantinople its new rulers time, which is seasonal and based on daily prayers. His successors carried on in this effort. Mehmed's son Bayezid II (r. 1481-1512) had a complex built in 1506 to which, most likely, a *muvakkithane* was attached. Famous Ottoman traveler Evliya Çelebi (1611-1682) mentions that this clock room was the one that had the best reputation among Muslims and European sailors. Then, Bayezid II's grandson Suleyman I (r. 1520-1566) got built a complex completed in 1527/8 in the name of his father Selim I (r. 1512-1520) and it included a *muvakkithane* as well.<sup>26</sup> Besides, there was another *muvakkithane* in the complex that Suleyman I got built in his name in 1558. We may observe that the first *muvakkithanes* were included in the complexes built by the sultans themselves. Even though high-ranking servants (government officials) of these sultans had similar complexes built in



20. In the first decades of the 15th century Ahmed-i Dai, a scholar who worked under the patronage of Ottoman sultans, translated the famous treatise of Nasir al-Din al-Tusi, called *Si Fasl der Ma'rifat-ı Takvim (Thirty Chapters on the Knowledge of Calendar)* into Turkish. Günay KUT, "Ahmed-i Dai", *Türkiye Diyanet Vakfı İslam Ansiklopedisi*, vol. 2, pp. 56-58. Besides, there was a sundial in a mosque in Konya in the early 15th century. See Nusret ÇAM, *Osmanlı Güneş Saatleri*, Ankara, T.C. Kültür Bakanlığı Yayınları, 1990, p. 9.

21. AYDÜZ, "Muvakkithane", pp. 413-415.

22. ÇAM, *Osmanlı Güneş Saatleri*, pp.47-49.

23. *Ibidem*, pp. 107-112.

24. Salim AYDÜZ, "Osmanlı Devleti'nde Müneccimbaşılık", Feza GÜNERGÜN (ed.), *Osmanlı Bilimi Araştırmaları*, İstanbul, İstanbul Üniversitesi Yayınları, n. 3.911, 1995, pp. 163-166.

25. Yunus KOÇ, "Osmanlı Dönemi Nüfus Tarihi", *Türkiye Araştırmaları Literatür Dergisi*, 8/16 (2010), p. 195.

26. Salim AYDÜZ, "İstanbul'da Zamanın Nabzını Tutan Mekânlar Muvakkithaneler", *İstanbul*, 51 (Ekim 2004), pp. 92-97.

their name, endowing a *muvakkithane* apparently remained a privilege of the sultans and of the members of their families until the late 18<sup>th</sup> century.<sup>27</sup> This reflects the centralization project of Mehmed II, which aimed to restrict the influence of aristocratic families that had played an important role during the emergence of the Empire, by forcing them to emigrate to the Balkans and establish their pious foundations there.<sup>28</sup>

### ***Muvakkithane Boom***

In the early period of Islam, the hour system was based on the seasonal hours. According to this system, the day and the night were, separately, divided into twelve hours. The night started following the sunset and lasted until the sunrise and the day lasted from the sunrise to the sunset. Therefore, each hour either at night or during the day, understandably, had a different length depending on the season. For instance, on the 41st parallel north, where Istanbul is found, a day hour in the summer solstice happens to be 1 hour 21' 38'' and a night hour is 38' 17''.<sup>29</sup> The Ottoman Empire, undoubtedly, inherited this hour system just as they inherited timekeeping knowledge and practices produced by their predecessors. Since the very beginning, this system regulated everyday life, administrative practices, education as well as aforementioned prayer times.

Despite the fact that the seasonal hour system remained in use until the 20<sup>th</sup> century, Ottoman scholars also developed another time system in the meantime. This system relies on equal hours and divides the day, which starts right after the sunset, into two sets of twelve equal hours. The Ottomans called this system *gurubi saat* (the hour based on sunset) and in the late 19<sup>th</sup> century also *alla turca saat* (Turkish-style hour). According to the evidence, this system was in use among the *muvakkits* in several regions of the Empire already in the 15<sup>th</sup> century. They used it to determine the prayer times and the fast times. As Avner Wishnitzer stated, the development of the *alla turca* system may have been related to the spread of mechanical clocks, for the measurement of the beginning of each day calls for a precision that only mechanical clocks could have.<sup>30</sup> Indeed, the Ottomans became acquainted with mechanical clocks during the reign of Mehmed II.<sup>31</sup> However, early mechanical clocks were far away from providing the desired precision for measuring the time according to the strict rules of Islamic religious practice.<sup>32</sup> The endeavour of Tâqî al-Dîn (1525-1585), former *müneccimbaşı*

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27. Mother of Murat III, Nurbanu Valide Sultan, endowed a *muvakkithane* within the complex she got built in 1579. See Salim AYDÜZ and Zeliha KUMBASAR, "Üsküdar Semtinde Bulunan Muvakkithaneler ve Güneş Saatleri", Coşkun YILMAZ (ed.), *Uluslar arası Üsküdar Sempozyumu V*, İstanbul, 2008, vol. 1, p. 62.

28. Suraiya FAROQHI, *Subjects of the Sultans*, London and New York, I.B.Tauris, 2000.

29. Ahmet Ziya AKBULUT et al. (eds-., *Güneş Saatleri Yapım Kılavuzu*, İstanbul, Biryıl Kültür Sanat Ltd., 2010, p. 28.

30. WISHNITZER, *Reading Clocks*, p. 32.

31. Otto KURZ, *Sultan İçin Bir Saat Yakınođu'da Avrupa Saat ve Saatçileri*, İstanbul, Kitap Yayınevi, 2005, p. 27. For English edition see Otto KURZ, *European Clocks and Watches in the Near East*, Leiden, Brill, 1975.

32. CIPOLLA, *Clocks and Culture*, p. 59, see graphic.

and the founder of the Istanbul Observatory in 1580, to construct a precise mechanical clock for observational purposes<sup>33</sup> should also be assessed in this context.

Towards the late 18th century, the use of *alla turca* hour spread through the inhabitants of Istanbul, apart from *muvakkits* and astronomers.<sup>34</sup> The progress in the precision of mechanical clocks, the reforms initiated in the early 1770s to establish new military engineering schools in Istanbul and the spread of mechanical clocks across the country probably contributed to this trend.<sup>35</sup> The reforms initiated in the early 1770s, first focused on introducing new military training and technologies with the aim of enhancing Ottoman military power, but the scope of systematic reforms and transformations expanded to the bureaucracy, education and daily life throughout the 19<sup>th</sup> century and continued until the end of Empire in the first quarter of 20<sup>th</sup> century. In the mid-19<sup>th</sup> century, a different type of equal hour system came to life as well.<sup>36</sup>

The spread of *alla turca* hour went hand-in-hand with the rising number of *muvakkithanes* and of the owners of mechanical clocks. As abovementioned, until the 17<sup>th</sup> century only five *muvakkithanes* were built in Istanbul either by sultans or by their family members. In the 17<sup>th</sup> century, however, a new aristocracy of high-ranking government officials started to emerge, constituting households similar to the Sultan's.<sup>37</sup> This new class had an important role in the construction of new *muvakkithanes*. Towards the end of the 18<sup>th</sup> century, Laleli Mosque complex, completed in 1763, included a *muvakkithane*.<sup>38</sup> Another one was attached to Koca Mustafa Pasha complex, built around a mosque converted from a church in 1486, by the endowment of Shaykh al-Islam Veliyüddin Efendi (d. 1768)<sup>39</sup> probably after being appointed the head of *ulama* in 1760. Moreover, Mustafa III (r. 1757-1774) had a mosque built, called Ayazma Mosque, in the name of his mother and brother in 1760, to which a



33. Sevim TEKELI, *16'ncı Asırda Osmanlılar'da Saat ve Takiyüddin'in "Mekanik Saat Konstrüksiyonuna Dair En Parlak Yıldızlar" Adlı Eseri*, Ankara, T.C. Kültür Bakanlığı Yayınları, 2002, p. 43; David A. KING, "Takī al-Dīn", *Encyclopaedia of Islam*, Second Edition (eds.) <[http://dx.doi.org/10.1163/1573-3912\\_islam\\_SIM\\_7337](http://dx.doi.org/10.1163/1573-3912_islam_SIM_7337)> (consulted 16-11-2017)

34. WISHNITZER, *Reading Clocks*, p.33.

35. Mustafa KAÇAR, "Tersâne Hendesehânesi'nden Bahriye Mektebi'ne Mühendishâne-i Bahri-i Hümayûn", *Osmanlı Bilimi Araştırmaları*, 9/1-2 (2008), p. 71; CIPOLLA, *Clocks and Culture*, p. 59, see graphic.

36. Ekmeleddin İHSANOĞLU and Feza GÜNERGUN, "Osmanlı Türkiyesinde "Alaturka Saat"ten "Alafranga Saat"e Geçiş", *X. Ulusal Astronomi Kongresi*, İstanbul, 1996, pp. 436-437.

37. Jane HATHAWAY, "Households in the Administration of the Ottoman Empire", *Türklük Bilgisi Araştırmaları*, 40, (december 2013), pp. 127-149; Jane HATHAWAY, "Household", *Encyclopaedia of Islam*, three, <[http://dx.doi.org.proxy.lib.umich.edu/10.1163/1573-3912\\_ei3\\_COM\\_30525](http://dx.doi.org.proxy.lib.umich.edu/10.1163/1573-3912_ei3_COM_30525)> (consulted 22-1-2018)

38. Gülsün TANYELI, "Laleli Külliyesi", *Dünden Bugüne İstanbul Ansiklopedisi*, İstanbul, Tarih Vakfı Yurt Yayınları, 1994, vol. 5, pp. 190-192. The *muvakkit* of this mosque, Çınarizade İsmail Efendi translated Dominique Cassini's book *Tables de Astronomie*, into Turkish in 1765, under the title of *Tercüme-i Zic-i Kasini* (Şeref ETKER, "Salih Murat Uzdilek ve 'Logoritmanın Türkiye'ye Girişi", *Osmanlı Bilimi Araştırmaları*, 8/2 (2007), pp. 62-63 and the note 24).

39. Nazif VELİKÂHYAOĞLU, *Sümbüliyye Tarikatı ve Kocamustafapaşa Külliyesi*, İstanbul, Çağrı Yayınları, 2000, p. 155; Tahsin ÖZCAN, "Veliyüddin Efendi", *Türkiye Diyanet Vakfı İslam Ansiklopedisi*, vol. 43, pp. 40-42.

*muvakkithane* was attached, too.<sup>40</sup> In addition, during the reconstruction of the Eyup Sultan Mosque following the order of Selim III (r. 1789-1807), a *muvakkithane* was attached to the complex in 1800.<sup>41</sup> From this period on, *muvakkits* started to fix broken mechanical clocks that belonged to local inhabitants.<sup>42</sup> This period also witnessed the first attempts at regulating the official working hours.<sup>43</sup>

The first years of the 19<sup>th</sup> century witnessed further reform endeavours. Selim III established a new army called *Nizam-ı Cedid* (New Order), which cost him his reign in 1807. A year later, Mahmud II (r. 1808-1839) ascended to the throne. He was well aware that modern states needed to strengthen central administration. Therefore, he initiated systematic reforms in the army and bureaucracy. Following the abolishment of the Empire's traditional military units, the Janissaries, and the foundation of a new modern army, he implemented reforms in education, bureaucracy and daily life in order to modernise the state itself and even the subjects of the Empire.<sup>44</sup> A fair amount of decrees considering the time discipline and regulation were issued within this context.<sup>45</sup>

In 1813 he had a *muvakkithane* built right next to the New Mosque (Yeni Cami), built in 1665, and this *muvakkithane* became the principal *muvakkithane* according to which the official hours were regulated throughout the 19<sup>th</sup> century.<sup>46</sup> Thereafter, he had another *muvakkithane* built in the memory of his father Abdulhamid I (r. 1773-1789) in 1820, next to Beylerbeyi Mosque, which had been built by his father and which Mahmud renovated.<sup>47</sup> Additionally, two more mosques built by the endowment of Mahmud II, Nusretiye Mosque (1826) and Tevfikiye Mosque (1832), included *muvakkithanes* next to them.<sup>48</sup>

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Moreover, in 1812, Mahmud II ordered the renovation and refurbishment of the Sufi lodge that had been founded in the first half of the 16<sup>th</sup> century by a prominent Sufi Yahya Efendi in Beşiktaş. This Sufi group had links to the Ottoman dynasty, which granted it great prestige and led to its expansion throughout the Empire. During

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40. Server DAYIOĞLU, *Osmanlı'da Zamanı Belirleme Mekânları İstanbul Muvakkithaneleri*, İstanbul, Kültür A.Ş., 2010, p. 75.

41. M. Baha TANMAN, "Eyüb Sultan Külliyesi", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 3, 238-239.

42. AYDÜZ, "İstanbul'da Zamanın Nabzını Tutan Mekânlar Muvakkithaneler", pp. 93-94.

43. WISHNITZER, *Reading Clocks*, pp. 45-47.

44. Niyazi BERKES, *The Development of Secularism in Turkey*, Montreal, McGill University Press, 1964, pp. 89-135; J. H. KRAMERS, "Maḥmūd II", *Encyclopaedia of Islam*, First Edition (1913-1936), <[http://dx.doi.org.proxy.lib.umich.edu/10.1163/2214-871X\\_ei1\\_SIM\\_4440](http://dx.doi.org.proxy.lib.umich.edu/10.1163/2214-871X_ei1_SIM_4440)> (consulted 20-1-2018)

45. WISHNITZER, *Reading Clocks*, p. 50.

46. Gülberk BILECIK, "Gözden Kaçan Bir Kültür Mirasımız: Yeni Cami Muvakkithanesi", *Atatürk Üniversitesi Güzel Sanatlar Fakültesi Dergisi*, 10 (2006), p. 44.

47. Süheyl ÜNVER, "Osmanlı Türkleri İlim Tarihinde Muvakkithaneler", *Atatürk Konferansları 1971-1972*, Ankara, 1975, p. 235; Tahsin ÖZ, *İstanbul Camileri I-II*, Ankara, Türk Tarih Kurumu, 1997, p. 12; Zeliha KUMBASAR, "Osmanlı Dönemi İstanbul Muvakkithaneleri", Yıldız Teknik Üniversitesi Fen Bilimleri Enstitüsü Mimarlık Tarihi ve Kuramı Programı, Unpublished MA Thesis, İstanbul, 2008, p. 50.

48. AYDÜZ, "İstanbul'da Zamanın Nabzını Tutan Mekânlar Muvakkithaneler", p. 95; DAYIOĞLU, *Osmanlı'da Zamanı Belirleme Mekânları*, pp. 87-89, 108; ÖZ, *İstanbul Camileri II*, p. 66; Yasemin SUNER, "Nusretiye Camii", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 6, p. 105.

Mahmud's renovation, new buildings were attached to the lodge.<sup>49</sup> Its *muvakkithane*, which does not exist anymore, might have been constructed during the renovation. Another Sufi lodge built at the beginning of the 19<sup>th</sup> century by Feyzullah Şükrü Efendi (d. 1814), also known as Küçük Efendi, may have included a *muvakkithane* alongside a fountain endowed by Mahmud II during its reconstruction in 1825.<sup>50</sup> Additionally, this sultan ordered in 1836 the restoration of another Sufi lodge, Merkez Efendi complex, founded in the first half of the 16<sup>th</sup> century<sup>51</sup>, and its *muvakkithane* may have been built precisely during these 19<sup>th</sup>-century renovation works. Last, the *muvakkithane* called Tabbye-i Tayyibede was built upon his order in 1838.<sup>52</sup>

The unprecedented number of *muvakkithanes* built by Mahmud II does, certainly, reflect his intention to promote the generalisation of time management and discipline. However, in addition to the ones he ordered to be built, there are several *muvakkithanes* that were, most likely, sponsored by other dignitaries of his reign. For instance, Halet Efendi (1760?-1823), an Ottoman bureaucrat and diplomat, had two *muvakkithanes* built. Halet Efendi had served as the ambassador in Paris from 1803 to 1806. After returning to Istanbul he continued to deal with foreign affairs. However, he was sent to exile to Konya in 1807 for his illegal dealings with Britain. Following the accession of Mahmud II he was pardoned and came back to Istanbul. He soon became the closest person of the sultan. During this period when he was in favour at the Court, Halet Efendi endowed two *muvakkithanes*. One of them was built in 1818 within the complex of Galata Sufi lodge of which he was a disciple. The other one was built within the Sinan Pasha complex in Beşiktaş, most likely sometime after 1818 and before 1823 when he was exiled, consecutively, to Bursa and Konya.<sup>53</sup> Given that he was very close to Mahmud II and that he held high posts of the bureaucracy, it is safe to assume that either the Sultan encouraged him to build *muvakkithanes* or that Halet wanted to show his commitment to his sultan's reform effort.

This reformist sultan was also involved in the construction of clock towers in the Empire's provinces. During his reign at least six clock towers were erected outside Istanbul.<sup>54</sup> Apparently, he was also interested in the installation of clocks on the façades of buildings and already existent towers in the imperial capital, even though he did not fund the construction of any independent clock tower.

49. M. Baha TANMAN, "Yahya Efendi Külliyesi", *Türkiye Diyanet Vakfı İslam Ansiklopedisi*, vol. 43, p. 246; Haşim ŞAHİN, "Yahya Efendi, Beşiktaşlı", *Türkiye Diyanet Vakfı İslam Ansiklopedisi*, vol. 43, pp. 243-244.

50. M. Baha TANMAN, "Küçük Efendi Külliyesi", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 5, p. 150; ÜNVER, "Osmanlı Türkleri İlim Tarihinde Muvakkithaneler", p. 246.

51. M. Baha TANMAN, "Merkez Efendi Külliyesi", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 5, p. 397.

52. ÜNVER, "Osmanlı Türkleri İlim Tarihinde Muvakkithaneler", p. 252.

53. Abdülkadir ÖZCAN, "Hâlet Efendi", *Türkiye Diyanet Vakfı İslam Ansiklopedisi*, vol. 15, pp. 249-251; Necdet SAKAOĞLU, "Halet Efendi" *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 3, İstanbul, Tarih Vakfı Yurt Yayınları, 1994, pp. 498-499; DAYIOĞLU, *Osmanlı'da Zamanı Belirleme Mekânları*, pp. 74-75; ÜNVER, "Osmanlı Türkleri İlim Tarihinde Muvakkithaneler", p. 237; BAŞBAKANLIK OSMANLI ARŞİVLERİ (hereafter BOA), MVL., fold. 350, doc. 41.

54. Klaus KREISER, "Ottoman Clock Towers: A Preliminary Survey and Some General Remarks on Construction Dates, Sponsors, Locations and Functions", Mustafa KAÇAR and Zeynep DURUKAL (eds.), *Essays in honour of Ekemeleddin İhsanoğlu*, İstanbul, IRCICA, 2006, vol.1, pp. 545-546, 552-555.



In the first days of 1831, Galata Tower burnt down, and Mahmud II immediately ordered its renovation. He demanded that a clock be installed on the tower as well. Indeed, among the treasures of Istanbul Archeological Museum there is a bell from Galata Tower.<sup>55</sup> Apart from this, Mahmud seems to have ordered the installation of another clock. In 1832, modern surgery training began in a school founded within the Topkapı Palace. Yet, soon it became apparent that a bigger place was needed, linked, among other issues to the reforms of the education provided in the school, and the institution was moved in the building of *Enderun Ağaları Mektebi* (School of Enderun Aghas). Thus, the courses began in the *Mekteb-i Tıbbiye-i Adliye-i Şahane* (Imperial School of Medicine) after the restoration of *Enderun Ağaları Mektebi* completed in 1838, short after the sultan's death.<sup>56</sup> According to a document in the Ottoman archives, dated 22 April 1841, this building had a clock tower.<sup>57</sup>

### Clock Towers on the Stage

The first independent clock tower in Istanbul was erected in 1849 by order of Sultan Abdülmecid (r. 1839-1861). This clock tower was located in the courtyard of the Imperial Arsenal in Tophane. The tower was fifteen meters long, and at its top were four clock faces showing the *alla turca* hour.<sup>58</sup> Given that the first extensive regulations for time discipline were implemented in the armed forces, the choice of clock tower's location makes a good sense.

Initial endeavours to introduce time discipline during the first half of the 19<sup>th</sup> century did not work out well. Even though the Court was aware of the need for time management and took action accordingly, the regulations that were adopted had little practical impact.<sup>59</sup> Istanbul was to wait the second half of the 19<sup>th</sup> century for the implementation of a more meticulous time discipline among all strata of the society. In the course of Crimean War (1853- 1856), the Ottoman army had the opportunity to get closely acquainted with the meantime since the Ottoman military had to coordinate their actions with its allies Britain and France against Russia.<sup>60</sup> Besides, the establishment of telegraphs lines during this war, construction of railways, launching of ferry transportation and foundation of new schools based on modern institutional and pedagogical practices triggered the spread of time-showing structures, that is to say *muvakkithanes*, clock towers and façade clocks, across Istanbul.

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55. Semavi EYİCE, "Galata Kulesi", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 3, p. 360; Doğan GÜNDÜZ, "Galata Kulesi'ndeki Saatleri Ayarlama Küresi," *Toplumsal Tarih*, 126 (Haziran 2004), p. 26.

56. Yeşim Işıl ÜLMAN, "Mekteb-i Tıbbiye-i Şâhâne'de (Galatasaray Tıbbiyesi'nde) Eğitim", Hüsrev HATEMİ and Ayten ALTINTAŞ (eds.), *Türk Tıp Eğitiminin Önemli Adımları*, İstanbul, CSA Global Publishing, 2006, pp. 71-72; Hasan DOĞRUYOL, "Cerrahlık", *Türkiye Diyanet Vakfı İslam Ansiklopedisi*, vol. 7, pp. 421-423.

57. BOA, C.SH, fold. 7, doc. 334.

58. Tarkan OKÇUOĞLU, "Tophane Saat Kulesi," *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 7, p. 278.

59. WISHNITZER, *Reading Clocks*, pp. 73-75.

60. Doğan GÜNDÜZ, "Osmanlı'nın Mekanik Saatle Buluşması," *İstanbul*, 51 (Ekim 2004), p. 122.

During the restoration of the Hagia Sofia in 1853 by Swiss architects Fossati brothers, a *muvaqqithane* was attached in the southern part of it for the first time.<sup>61</sup> A few years later, sultan Abdülmecid's mother Bezmiâlem Valide Sultan (1807-1853) endowed a complex including a *muvaqqithane* near Dolmabahçe Palace, which was built by Abdülmecid in 1855.<sup>62</sup> In 1857 a benefactor named el-Hacc Hasan Ağa (?-?) endowed a *muvaqqithane* next to the Beykoz Mosque, which had been built around 1626-1628 by a janissary agha Bostancıbaşı Mustafa Ağa.<sup>63</sup>

In addition to these new *muvaqqithanes* of Istanbul, a mechanical clock was installed, most likely in 1859, in the tower rising from the middle of *Bahriye Merkez Hastanesi* (Central Naval Hospital), which had been built in 1838 and used at the beginning as *Bahriye Mektebi* (Naval Academy).<sup>64</sup> A new campus of the *Harbiye Nezareti* (Ministry of War) was finished in 1866. On the both sides of the main gate of the campus, there are two towers, shorter than the gate. Two mechanical clocks showing the *alla turca* hour were installed on both towers, which are still in existence. In 1848, the School of Medicine in Galatasaray was devastated by fire.<sup>65</sup> Its renovation finished in 1865 and the building was then put at the disposal of various military schools for short terms. Three years later, in 1868, it was sublet to Galatasaray High School. A mechanical clock was emplaced on the façade facing the courtyard.

Christian religious orders and missionary groups became very active in the Ottoman Empire in the mid-nineteenth century, founding several new schools. The schools' schedules were based, needless to say, on meantime.<sup>66</sup> Foreign schools built in Istanbul during this period tended to place mechanical clocks on their façades. The French schools of Saint Michel, built in 1870, Saint Benoît, that had been founded as a Jesuit college in 1583 and underwent a major expansion in 1879, and Saint Pulcherie, built in 1890, all installed mechanical clocks showing meantime on the façades. Furthermore, the Greek schools Fener High School and Zapyon High School, built in 1880 and 1882 respectively, included mechanical clocks on their façades, too. Lastly, Robert College, founded in 1863 and run by missionaries from the USA, had a new building added in 1892, which displayed a mechanical clock.<sup>67</sup>



61. Semavi EYICE, "Ayasofya Muvakkithanesi", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 1, p. 461; BOA, A\|MKT.NZD., fold. 36, doc. 98.

62. Çelik GÜLERSOY, "Dolmabahçe Sarayı", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 3, p. 90; DAYIOĞLU, *Osmanlı'da Zamanı Belirleme Mekânları*, p. 67; Afife BATUR, "Dolmabahçe Camii", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 3, p. 88.

63. Ahmed Nezh GALITEKIN, *Beykoz Kitabeleri*, İstanbul, Beykoz Belediyesi, 2008, vol.1, p. 141.

64. Nuran YILDIRIM, "Bahriye Merkez Hastanesi", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 1, pp. 548-549; "Kasım paşa Deniz Hastanesi Kulesi'ne Ait Saat", <<https://denizmuzesi.dzkk.tsk.tr/tr/content/328>> (consulted 10-11-2017)

65. Nuran YILDIRIM, *İstanbul'un Sağlık Tarihi*, İstanbul, Ajansfa, 2010, pp. 262.263.

66. WISHNITZER, *Reading Clocks*, p. 106.

67. İlkur Polat HAYDAROĞLU, *Osmanlı İmparatorluğu'nda Yabancı Okullar*, Ankara, Kültür Bakanlığı, 1990, p. 113; "171 Yıllık Tarih" <<http://www.sp.k12.tr/turkce/lisemiz/article/170-yillik-tarih-144>> (consulted 10-11-2017); Süleyman BÜYÜKKARCI, *Türkiye'de Rum Okulları*, Konya, Yelken Basım Yayım Dağıtım, 2003, pp. 115-116, 159-160; Sula BOZIS, "Fener Rum Erkek Lisesi", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 3, p. 283; Recep ÜLKE, *İstanbul Amerikan Kolejinin Tarihçesi*, İstanbul, Yeni Matbaa, 1956, p.17.

The reign of Abdülhamid II (r. 1876-1909) witnessed the construction of new *muvakkithanes* as well as the erection of new clock towers and installation of façade clocks. This boom of time-displaying constructions owed to the fact that new public facilities and infrastructures (such as tramways, steamship lines, schools and post offices) proliferated; these were based on stricter time regulations and required that the city-dwellers be informed widely about the exact time.<sup>68</sup> Moreover, the participation of the Ottoman Empire in the Meridian Conference organised in Washington in 1884 to determine a base meridian for the standardisation of time, stimulated the appearance of clocks showing meantime on the towers and buildings sponsored by the Ottoman court.<sup>69</sup>

In the same year just before the Meridian Conference, the Interior Ministry issued a decree suggesting that two mechanical clocks showing the meantime be emplaced in order to ease affairs (*teshîl-i muamelât*), one on the historical peninsula, where Topkapı Palace and administrative centre of the Empire located, and one in Tophane district.<sup>70</sup> In response to the decree, the institutions concerned expressed their opinions as to where and how these clocks could be installed. Two different opinions emerged in the end. One recommended that one of them be installed on one of the towers of Ministry of War, built in 1866, and the other be installed on Tophane clock tower. Second opinion suggested that two new clock towers, one in Sultanahmet Square and one in Beşiktaş Square, be built. However, as the construction of new towers would have cost too much money, the first opinion prevailed. This decision of replacing one of the clocks with new ones showing meantime is compatible with the declaration of the Ottoman representatives at the Meridian Conference indicating that *alla turca* hour and the meantime would coexist in the country.<sup>71</sup>

Later on, Abdülhamid II ordered a clock tower to be built right next to the Yıldız Palace, where he lived and governed. The tower completed in 1890 was paid from the sultan's private treasury.<sup>72</sup> In the same year, Sirkeci train station opened with two clock towers next to its crown gate. Four mechanical clocks were installed on these two towers.<sup>73</sup>

In 1892, a new building of Istanbul Post Office was built in Eminönü, of which the gate faces the port, the ferry pier and the tram lines. A few months later, a request was made that two mechanical clocks showing *alla turca* hour and meantime be attached over its gate so that everybody could learn the time.<sup>74</sup> Abdülhamid II

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68. WISHNITZER, *Reading Clocks*, p. 148.

69. *Ibidem*, p. 151.

70. BOA, İ.DH., fold. 940, doc. 74403.

71. WISHNITZER, *Reading Clocks*, p. 151. For the proceeding of the conference see *International Conference Held at Washington for the Purpose of Fixing a Prime Meridian and a Universal Day*, Washington D.C., Gibson Bros., 1884; and for the declaration of the Ottoman delegation, pp. 178-179.

72. Kemal ÖZDEMİR, *Osmanlı'dan Günümüze Saatler*, İstanbul, Creative Yayıncılık, 1993, p. 206.

73. Yıldız SALMAN "Sirkeci Garı", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 7, p. 13.

74. BOA, Y.PRK.PT., fold. 8, doc. 111; Nurcan YAZICI, "Teshîl-i Muâmelât İçin Saat: II. Abdülhamid Dönemi'nde İstanbul'da Yapılması Düşünülen Saat Kulesi Yapım Etkinlikleri", Ahmet GÜRBÜZ (ed.), *Safranbolu Saat Kulesi ve Zaman Ölçerler Sempozyumu*, Safranbolu, Karabük Valiliği Kültür Hizmeti, 2011, p. 114.

sponsored another clock tower in 1894, which is located in Dolmabahçe between the main gate of Dolmabahçe Palace and Bezmialem Valide Sultan Mosque, facing the *muvaqqithane* of the mosque.<sup>75</sup>

In the meantime, new *muvaqqithanes* continued to be built in different parts of the city. *Muvaqqithane* of Hubyar Mosque (1889), of Bala complex (1891-2), of Teşvikiye (1894) and Atik Ali Mosque are some of them. For the full list of extant and disappeared *muvaqqithanes* see *Table 1* and *Table 2*, at the end of the article.

Clock tower construction caused several controversies. In 1886, the Armenian community of Surp Kevork Church asked for permission to build a clock tower on the church during the reconstruction project. The government, however, refused to grant it, fearing that bells would be installed on it, which could spark conflict with local Muslim dwellers. Next year, the authorities changed their decision and let the community build the tower. As it turns out, the government's nightmare soon came true, and the city council had to order the community to remove the bell they had installed in the tower.<sup>76</sup>

Touraj Atabaki showed how striking clocks caused public indignation and how this phenomenon made some scholars interpret the erection of clock towers in terms of secularisation or Westernisation.<sup>77</sup> It is true that the Ottoman government's wariness of bells would seem logical with regards to preventing inter-religious conflicts, as bells are indeed a crucial part of ecclesiastic rituals. However, this obsession against new bells was not, apparently, limited to churches. Merchants and artisans of Kumkapı neighbourhood petitioned the city council for a license to build a two-and-a-half-meters-long clock tower in their neighbourhood, to commemorate the 25th anniversary of Abdülhamid II's enthronement in 1900. They volunteered to collect the money. Although the government granted the permission to build this relatively short tower, an annotation stated that this permission should not be exploited.<sup>78</sup> This annotation most probably refers to a possible outcry caused by the installation of a bell.

In the turn of 20<sup>th</sup> century, new building of the Great School of Medicine (*Mekteb-i Tıbbiye-i Şahane*) was finished. The opening ceremony took place on the 13 September 1903, whereas the construction had concluded in 1900, according to an inscription on the building. Two clock towers were located on both sides of the main gate where two mechanical clocks were installed showing the meantime and alla turca hour.<sup>79</sup> A couple of years later, Abdülhamid II order the construction of a new clock tower as well as a mosque within the complex of the hospital that he had built in 1899 in the name of his daughter Hatice who died in her infancy. The building was finished in 1907 and the tower included clocks that showed alla turca hour and the meantime.

75. Hakkı ACUN, "İstanbul'un Saat Kuleleri", *İstanbul*, 51 (Ekim 2004), p. 103.

76. Pars TUĞLACI, *İstanbul Ermeni Kiliseleri*, İstanbul, Pars Yayın Ltd. Şti., 1991, p. 160; BOA, DH.MKT., fold. 1384, doc. 112; BOA, DH.MKT., fold. 1703, doc. 112.

77. Touraj ATABAKI, "Time, Labour-Discipline and Modernization in Turkey and Iran: Some Comparative Remarks", Touraj ATABAKI (ed.), *The State and The Subaltern: Modernization, Society and the State in Turkey and Iran*, London and New York, I.B.Tauris, 2007, pp. 4-5.

78. BOA, Y.PRK.ŞH., fold. 11, doc. 36.

79. Afife BATUR, "Mekteb-i Tıbbiye-i Şâhâne Binası", *Dünden Bugüne İstanbul Ansiklopedisi*, vol.5, İstanbul, Tarih Vakfı Yurt Yayınları, 1994, pp. 378-379.



The last public building with a façade clock built during the reign of Abdülhamid II is probably the Hayrdapaşa Train Station, completed in 1908.<sup>80</sup>

Finally, the last clock tower of the Ottoman Istanbul was erected in Büyükkada (Prinkipo), one of the Princes' Islands in 1918, funded by a private company. This tower is still located on the square right across the pier.<sup>81</sup> For the full list of clock towers and façade clocks see *Table 3*, in the final Appendix.

## Conclusions

The research outlined here suggests that the power relations within the Ottoman Court reflected upon the organisation of time and space. In accordance with the centralisation project of Mehmed II, endowing *muvakkithanes* in Istanbul remained an exclusive privilege of the Ottoman dynasty until the 17<sup>th</sup> century. Rising number of *muvakkithanes* in the 18<sup>th</sup> century was grounded in the ambition of newly emerging *aristocrats* to display and promote the power of their households. The reign of Mahmud II disrupted this phenomenon. His reforms aimed at recentralising power. This attitude is reflected in his *muvakkithane*-building activities: great majority of the *muvakkithanes* built during his reign were constructed upon his order and endowment. Only his right-hand man, Halet Efendi, could afford to endow two *muvakkithanes*, owing to his intimacy with the Sultan.

Until the late 18<sup>th</sup> century, only scholars used *alla turca* hour system in order to determine prayer times across the country. As mechanical clocks progressed and became prevalent amongst the subjects of country, the use of *alla turca* hour began to spread. Moreover, it became essential to inform the city-dwellers about time, so they could arrange their daily errands and duties, regulated according to the *alla turca* hour. Sultans and bureaucratic elite of the Empire took action in this period and funded new time-indicating constructions across the city.

As I have argued, during the second half of the 19<sup>th</sup> century, many clock towers and façade clocks were installed to cater to the changes in daily life, to the newly established public transport facilities, to the new schools, to the reorganised institutions, etc. Therefore, Istanbul was furnished with big clocks, sometimes installed in order to show the sultan's power (Yıldız and Dolmabahçe clock towers), sometimes with the intent to make urban life easier, as was the case of the façade clock of the Post Office and the clocks on the train stations. In other cases, the aim was to impose time discipline: the clock towers of the Ministry of War and of the Great School of Medicine served mainly this purpose. Same period witnessed a new wave of *muvakkithane* boom too. During the last third of 19<sup>th</sup> century at least ten *muvakkithanes* were built across Istanbul. On the whole, *muvakkithanes* and clock towers and façade clocks coexisted

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80. Afife BATUR, "Etfal Hastanesi Saat Kulesi ve Mescidi", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 3, pp. 221-222; Faruk İLKER, *Şişli Çocuk Hastanesi Tarihi*, İstanbul, (n. e.), 1976, pp. 6-10, 84-85; Yıldız SALMAN, "Haydarpaşa Garı", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 4, İstanbul, Tarih Vakfı Yurt Yayınları, 1994, p. 30.

81. Yıldızay ZORER, *Tarihi Gelişim Sürecinde Büyükkada Meydanları*, İstanbul, Büyükkada Kültür Derneği Yayınları, 2005, pp. 30-32.

until the fall of the Ottoman Empire, under the condition that the clock towers were not taller than minarets.<sup>82</sup>



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82. Mehmet Bengü ULUENGIN, “Secularizing Anatolia Tick by Tick: Clock Towers in the Ottoman Empire and the Turkish Republic”, *International Journal of Middle East Studies*, 42/1 (Feb. 2010), pp. 22-24.

Appendix

Table 1: Extant *muvakkithanes* of Istanbul

#	NAME	DATE	DONOR
1	Atik Valide Mosque	1579	Nurbanu Sultan
2	Cerrahpaşa Mosque <sup>83</sup>	?	?
3	Sultan Ahmet Mosque	?	?
4	Yeni Valide Mosque	1710	Ahmed III
5	Kocamustafapaşa Mosque	1760-	Veliyüddin Efendi
6	Laleli Mosque	1763	Mustafa III
7	Eyüp Mosque	1800	Selim III
8	Selimiye Mosque	1805	Selim III
9	New (Yeni) Mosque	1813	Mahmud II
10	Galata Sufi Lodge	1818	Halet Efendi
11	Beylerbeyi Mosque	1820	Mahmud II
12	Nusretiye Mosque	1827	Mahmud II
13	Arnavutköy Mosque	1832	Mahmud II
14	Tomb of Mahmud II	1840	?
15	Emirgan Mosque	1844	Ağa Hüseyin Pasha <sup>84</sup>
16	Yenikapı Sufi Lodge	1848	Abdurrahman Nafiz Pasha <sup>85</sup>
17	İskender Pasha Mosque	1851	Sadık Rıfat Pasha <sup>86</sup>
18	Ayasofya	1853	?
19	Dolmabahçe Mosque	1855	Bezmiâlem Valide Sultan and Abdülmecid
20	Beykoz Mosque	1857	El-Hac Hasan Ağa <sup>87</sup>
21	Güzelce Kasım Paşa Mosque	1870	?
22	Murad V	1876	Murad V <sup>88</sup>
23	Bala Lodge	1891/2	
24	Teşvikiye Mosque	1892	Abdülhamid II <sup>89</sup>
25	Atik Ali Mosque	1899	
26	Suadiye Mosque	1908	Ahmed Reşad Pasha and Said Bey <sup>90</sup>
27	Şehzade Mosque	Late 18 <sup>th</sup>	?

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83 ÜNVER list this one amongst the disappeared ones. However, Ahmet Vefa ÇOBANOĞLU states that it still exists and was renovated shortly before 1994 (“Cerrah Mehmed Paşa Külliyesi”, *Dünden Bugüne İstanbul Ansiklopedisi*, Vol.2, İstanbul, Tarih Vakfı Yurt Yayınları, 1994, p. 413).

84 BOA İ.DH., fold. 340, doc. 22378. Ağa Hüseyin Paşa (1776-1849) was a member of military elite who served as a vizier.

85. ÜNVER, “Osmanlı Türkleri İlim Tarihinde Muvakkithaneler”, pp. 231-232. Abdurrahman Nafiz Pasha (d. 1853) was the first finance minister of the Empire.

86. Abdurrahman Cabir VADA, *Boğaziçi Konuşuyor ve Kanlıca Tarihçesi*, İstanbul, Kitabevi, 2004, p. 69. Sadık Rıfat Pasha (1807-1857) served as finance minister and minister of foreign affairs.

87. GALITEKİN, *Beykoz Kitabeleri*, p. 141.

88. Ömer Faruk ŞERİFOĞLU, *Su Güzeli: İstanbul Sebilleri*, İstanbul, İstanbul Büyükşehir Belediyesi Kültür İşleri Daire Başkanlığı Yayınları, n. 22, 1995, p. 84.

89. BOA, Y.PRK.ASK., fold. 27, doc. 54.

90. Hakan ARLI, “Suadiye Camii”, *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 7, p. 50.

28	Ramazan Efendi Mosque	Late 18 <sup>th</sup>	?
29	Osman Ağa Mosque	1878 ?	?
30	Mihrişah Valide Sultan Mosque	Late 19 <sup>th</sup>	?
31	Nişancı Mehmed Paşa Mosque	19 <sup>th</sup> ?	?
32	Kadıköy Pier Mosque	?	?

Table 2: Disappeared *muvakkithanes* of Istanbul

#	NAME	DATE	DONOR
1	Fatih Mosque	1470	Mehmed II
2	Bayezid Mosque	1506	Bayezid II
3	Yavuz Selim Mosque	1527/8	Suleyman I
4	Süleymaniye Mosque	1558	Suleyman I
5	Anadolu Hisarı Mosque	1883?	Abdülhamid II? <sup>91</sup>
6	Firuz Ağa Mosque	?	?
7	Arap Mosque	?	?
8	Çakır Ağa Mosque	?	?
9	Çivizade Kızı Mosque	?	?
10	Sokollu Mehmed Pasha Mosque	?	?
11	Kılıç Ali Pasha Mosque	?	?
12	Molla Çelebi Mosque	?	?
13	Bayrampaşa Mosque	?	?
14	Çinili Mosque		
15	Kemankeş Mustafa Pasha Mosque	?	?
16	Mihrimah Sultan Mosque	?	?
17	Katip Mustafa Efendi Mosque	?	?
18	Ahmediye Mosque	?	?
19	Hekim Oğlu Ali Pasha Mosque	?	?
20	Kandilli Mosque	?	?
21	Nuruosmaniye Mosque	?	?
22	Ayazma Mosque	1760	Mustafa III
23	Şeb Safa Mosque	?	?
24	Yahya Efendi Lodge	1812?	Mahmud II?
25	Beşiktaş	Between 1818-	Halet Efendi
26	Küçük Efendi Lodge	1825?	Mahmud II?
27	Galata Yeni Mosque	1821?	Mahmud II? <sup>92</sup>
28	Kuruçeşme Mosque	?	?
29	Merkez Efendi Lodge	1837?	Mahmud II?
30	Tabye-i Tayyibe Mosque	1838	Mahmud II
31	Altunizade Mosque	1865	İsmail Zühdi Pasha <sup>93</sup>



91. This mosque was first built during the reign of Mehmed II. However, it was rebuilt by Abdülhamid II in 1883. Its *muvakkithane* might have been built during this reconstruction project. Tarkan OKÇUOĞLU, “Anadoluhisarı Camii,” *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 1, İstanbul, Tarih Vakfı Yurt Yayınları, 1994, pp. 258-259.

92. This mosque acquired its current outlook after the renovation conducted in 1821 during the reign of Mahmud II. Its *muvakkithane* must have been added then. See Muzaffer ÖZGÜLEŞ, *The Women Built the Ottoman World*, London and New York, I.B. Tauris, 2017, p. 122.

## ÜÇSU Witnesses of the Time

32	Pertevniyal Valide Sultan Mosque	1871	Pertevniyal Valide Sultan <sup>94</sup>
33	Hubyar Mosque	1889?	?
34	Cihangir Mosque	1899?	Abdülhamid II? <sup>95</sup>
35	Rumeli Hisarı Mosque	?	?
36	Yeraltı Mosque	?	?
37	Nüzhetiye Mosque	?	?

Table 3: Extant Clock Towers and Façade Clocks of Istanbul erected during the Ottoman Era<sup>96</sup>

N#	NAME	DATE	DONOR	TYPE	FUNCTIONS?
1	Tophane Clock Tower	1849	Abdülmecid	Tower	No
2	Naval Academy	1859		Tower	No
3	Galatasaray High School	1865		Façade	Yes
4	Ministry of War	1866		Tower	Yes
5	Lycée Saint Michel	1870		Façade	No
6	Çiçek Passage	1876		Façade	No
7	Lycée Saint Benoît	1879		Façade	No
8	Fener Greek High School	1880		Façade	No
9	Zapyon Greek High School	1882		Façade	No
10	Beyoğlu City Hall	1883		Façade	Yes
11	Yıldız Clock Tower	1890	Abdülhamid II	Tower	Yes
12	Sirkeci Train Station	1890		Façade	No
13	Post Office Building	1892/3		Façade	No
14	Robert College	1892		Façade	Yes
15	Dolmabahçe Clock Tower	1894	Abdülhamid II	Tower	Yes
16	Şişli Children's Hospital	1907	Abdülhamid II	Tower	No
17	Haydarpaşa Train Station	1908		Façade	No
18	Büyükkada Clock Tower	1918	Antoine Sagredo (Company)	Tower	Yes

93. İsmail Zühdi Pasha (1806-1888) was an architect and vizier. See Hakan ARLI, "Altunizade Külliyesi", *Dünden Bugüne İstanbul Ansiklopedisi*, vol.1, pp. 230-231.

94. Pertevniyal Valide Sultan (1812-1883) was consort of Mahmud II and mother of Abdülaziz (r. 1861-1876). See Afife BATUR, "Valide Camii", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 7, pp. 360-362.

95. This mosque had been built during the reign of Suleyman I. Due to several fires, Abdülhamid II reconstructed it in 1899. Its *muvakkithane* might have been built during this reconstruction. See Hakan ARLI, "Cihangir Camii", *Dünden Bugüne İstanbul Ansiklopedisi*, vol. 2, p. 431.

96. This list does not include clock towers and façade clocks planned to be erected.