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Role and Contribution of Ottoman Science Institutions in the Development of Muslim Civilization: Spotlight on 16th Century Ce

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ABSTRACT

This study aims to discusses the role and contribution of Ottoman science institutions in the development of Muslim civilization in the 16th century CE. The writing of this article is focused on science institutions related to medicine and astronomy, encompassing hospitals, Suleymāniye Medical Madrasah, Office of Chief Physician, Office of Chief Astronomer, Muwaqqithana and Istanbul Observatory and analyses the role and contribution of these institutions. This is a qualitative study based on the methods of historical study and content analysis. Textual research data is gathered and analysed using a descriptive approach. Our findings suggest that Ottoman science institutions in the 16th century played an important role in developing science and technology based on the innovations developed by said institutions, such as new medicines, musical therapy in dentistry and new astronomical equipment. The importance of this study lies in the many innovative contributions by Ottoman scholars to the world community, particularly in the fields of medicine and astronomy, which led to development of civilization.

Keywords: Islamic Science, Istanbul Observatory, Ottoman Hospital, Ottoman Madrasah, Ottoman Science, Ottoman Technology

INTRODUCTION

Ottoman science institutions were among the factors which contributed towards development of Ottoman science and technology. Throughout their history, these institutions had succeeded in contributing to the Ottoman Empire, not just in improving the quality of life in terms of health and prosperity but also encouraged Ottoman society to learn and be active in scientific activity. According to Ihsanoglu (2002), there were six medical and astronomy science institutions which encouraged development of Ottoman science and technology. These science institutions established within the Ottoman administrative organization functioned as state support to develop, encourage as well as monitor scientific activity.

In the context of medicine, for example, there were three institutions, namely, hospital, Office of Chief Physician and Suleymāniye Medical Madrasah. These institutions were established at

different times. Out of the three, Sari (1998) revealed that the hospital institution was earliest established due to its close link to public interest. In the field of astronomy, there were three Ottoman institutions involved, namely, office of Chief Astronomer, Muwaqqithana (time-keeping (horology) houses) and Istanbul Observatory. All three played an important role in the development of science and technology activity.

This article aims to analyse the role and contribution of the Ottoman science institutions in the development of Islamic civilization in the 16th century AD. The focus of this article focused on institutions related to medical science and astronomy include hospitals, Suleymāniye Medical School, Department of Health, Office of the Director of Astronomy, Muwaqqithana and the Istanbul Observatory by analysing the role and contribution of such institutions. This scientific institution should be debated in detail because it is an important body that can act as a catalyst for the development of science in a civilization. In fact, it can play a role coordinating all activities of the sciences in civilization.

Medical Institutions

In the Ottoman Empire, the hospital was a waqf (endowment) institution which managed public health affairs. It also played an important role in scientific studies, specifically in the field of medicine as the hospital functioned not only to heal patients but also provides professional training for interns to do their practical in medicine (Roziah 2012).

In addition to inheriting hospitals from the previous Seljuk state such as in the big cities of Konya, Kayseri and Sivas, the Ottoman Empire also built new hospitals such as in Bursa, Edirne and Istanbul (Ihsanoglu 2001). The Ottoman state had transformed the hospitals by making the hospital as part of the waqf (endowment) complex which usually was equipped with college, boarding house, sauna and mosque. Some examples of hospitals involved were Fātiḥ Hospital (built by Sultan Mehmed II in the year 1470CE), Bāyezīd Hospital (situated in Edirne and built in the year 1481CE by Sultan Bāyezīd II), Hafsa Sulṭān Hospital (built in the year 1522CE) and Suleymān Hospital (built in the year 1550CE). The hospitals involved played an important role in training doctors besides treating patients and remained functional until mid-19th Century CE.

With the significant increase in number of hospitals, the Ottoman state saw a need to supervise and monitor the running of these hospitals in order to avoid a decline in quality of health services and misuse for the purpose of personal interest. In order to realize this aspiration, the Office of Chief Physician was created during the rule of Sultan Bāyezīd II (Ihsanoglu 2002; Mossensohn 2009). This office monitored the operation and activity of doctors on duty in the royal palace.

The Suleymāniye Medical Madrasah was a component of the Suleymāniye Complex which was inspired by Sultan Suleymān I and built by architect Sinān in the year 1550CE. This complex contained the Suleymāniye Medical Madrasah, hospital, kitchen or cafeteria, rehabilitation centre and pharmacy. In that era, this complex was the largest in the Ottoman Empire and

functioned as a learning, religious, social centre as well as hospital. The Suleymāniye Medical Madrasah was the first medical school in the Ottoman Empire. It was opened in Istanbul during the rule of Sultan Suleymān I. Agoston & Masters (2009) stated that its main objective was to train qualified students to shoulder responsibility as administrative centre staff of the Ottoman health institution or as madrasah teachers.

The medical study provided to students at the madrasah exposed them to theory and practical training as well as reading medical manuscript in the library. Besides medicine, they also studied religion, philosophy and Arabic language. They were also required to master branches of various sciences. Usually, throughout their study at the madrasah, they were equipped with a variety of knowledge before they were allowed to start practical training at the hospital (Bakir & Basagaoglu 2009). Management of the madrasah was supervised by the Office of Chief Physician (Agoston & Masters 2009).

In fact, the institutions mentioned above were set up rather late in time even though such institutions were already established in the earlier Muslim civilization. According to Ihsanoglu (2002: 394), the reason was because the Ottoman state preferred to set up a new institution if public interest required it. The establishment of medical institutions such as madrasah and hospital had played a significant role in the transformation of Ottoman scientific activity. For instance, Sayılı (1960) gave the example of the Ottoman hospital which functioned to give charitable aid and social contribution by providing the place for practical training to apply the theory learnt at the madrasah.

Astronomical Institutions

One of the institutions which advanced the field of science in the Ottoman Empire, particularly in astronomy, was the time-keeping (horology) institution called Muwaqqithana. Muwaqqithana was a small building situated in a mosque compound administered under the waqf system found in almost every town and city of the Ottoman Empire, especially in Istanbul. The individual on duty in the Muwaqqithana was the Muwaqqit, which means the person who determined the timings in Islam, particularly prayer times, calendar and direction of qiblah.

This institution was responsible for keeping affairs of time management, specifically, the prayer times, coordination of specific timings according to Islamic shariah such as preparing the yearly calendar and determining when Ramadan month of fasting began. Ihsanoglu (2002) stated that this institution was first introduced in the Ottoman Empire during the rule of Sultan Mehmed II (1451-1481CE) after Constantinople (Istanbul) was captured. King (1999) stated that the Muwaqqit who was widely knowledgeable or an astronomer had used Muwaqqithana as a platform to observe the stars and moon. As the Ottoman state, did not yet have an observatory until the Istanbul Observatory was built by Taqī al-Dīn, the astronomers could only continue their activity at the Muwaqqithana and in their own homes (Ihsanoglu 2002; Ilhan 2007).

The Muwaqqithana institution continued to function until the downfall of the Ottoman state even though the mechanical clock already began to be widely used in the 19th Century. Following the establishment of the Republic of Turkey, the Muwaqqithana institution was transferred to a new institution known as the Office of the Time-keeper (Basmuvakkitlik) in the year 1927 until it ceased to be used in the year 1952. Although some Muwaqqithana buildings are still extant today, most of them were either destroyed or converted for other purposes.

The Office of Chief Astronomer was established to administer and supervise the increasing number of Muwaqqithana, especially in the city of Istanbul. The Office of Chief Astronomer was also given the authority to administer affairs pertaining to the Istanbul Observatory (Ihsanoglu 2002). Ayduz (2004) stated that in terms of function, the Office of Chief Astronomer had a large staff and trained members who focused specifically on astronomy activity, and the office successfully survived until the Ottoman downfall. In comparison, the Office of Chief Astronomer of earlier Muslim states functioned only to prepare the Islamic calendar and advise the Sultan on astrological issues while the Ottoman Office of the Chief Astronomer had a broader scope such as administering and supervising the Muwaqqithana and Istanbul Observatory, determining the official calendar of the Ottoman dominion and the time for breaking fast in Ramadan. In addition, the tasks of this office included scientific studies and following the passing of the comet, earthquakes, solar and lunar eclipses. On the whole, Ihsanoglu (2002) and Ayduz (2004) concluded that scientific activities relating to astronomy were considered more prominent beginning with the rule of Sultan Mūrad II (1421-1444CE) with completion of the first calendar. During the era of Sultan Mehmed II, scientific activities relating to astronomy were more enhanced and continued to be increasingly widespread during the era of Sultan Bāyezīd II.

Ihsanoglu (2004) stated that the development of Ottoman astronomy in the 16th Century become more pronounced with the building of the observatory during the rule of Sultan Mūrad III (1574-1595CE). It was built upon the suggestion of Taqī al-Dīn to study and correct errors found in the Astronomical Table of Ulugh Beg due to the conduct of early Ottoman astronomy activities by the astronomers in their own homes and Muwaqqithana. The state Istanbul Observatory was built only in the year 1577 during the rule of Sultan Mūrad III by Tāqī al-Dīn who aimed to construct a sophisticated observatory in Istanbul to adjust the Astronomical Table. His suggestion was supported by Prime Minister Sokullu Mehmed Pasha and also the well-known scholar Khwaja Sa^{c}d al-Dīn. According to Kheirabadi (2004), the observatory built by Taqī al-Dīn in the year 1577 later became a model and example to Western scholars such as Tycho Brace in constructing his observatory at Benatky Nad Jizerou in the year 1599.

Ihsanoglu (2002) and Ayduz et al. (2014) reported that as Sultan Mūrad III was very passionate about astronomy, he had given his permission and the financial assistance so that the first Ottoman observatory could be built. In fact, he had ordered for its immediate construction. During its construction, Tāqī al-Dīn continued his research at Galata Tower until he moved to Istanbul Observatory in the year 1577 CE. This observatory consisted of a large building and a

small building as well as a library especially for astronomy and mathematics. It was managed by eight astronomers, four clerks and four assistants.

RESEARCH METHODOLOGY

This study relies on qualitative methodological approach by using historical research and content analysis. The historical research was chosen because it coincides with this research that involves the study of something that happened in the past. Whereas content analysis study refers to the observation techniques with a focus on the analysis unit in the form of writing. This methodological was chosen because it focuses on the study of the past which aims to explain the objectives planned by the researchers in this paper.

Data for this study was collected through a method comprising authoritative sources in Ottoman studies such as textual reference books, journal articles, encyclopaedia and previous studies. This method was chosen to allow researchers to explain and make their own interpretation from sources which referred. Data for this study were analysed using a thematic approach and descriptive approach. Thematic approach chosen to give a complete explanation of the literature review. Descriptive approach is used to discuss the transformation of science and technology in Ottoman Empire.

CONCLUSION

This study bears an implication mainly in the exploration of the glorious Ottoman science and technology. The author believes that the Ottomans had left a great legacy to inherit and used as a model by subsequent Muslim generation. The development of science of the Ottoman is spreading with the establishment of the institutions of science. The finding shows that the development of science and technology takes place in the stated time.

The superiority of the Muslim civilization in the field of Ottoman science and technology is clearly evident through the existence of the science institutions in the 16th Century CE. Through these institutions, Ottoman scholars studied and mastered the sciences and began to contribute new ideas, improved the works of earlier scholars and gave constructive criticism. The optimal use of Ottoman science institutions drove the development of the Muslim civilization towards excellence. As a result, the Muslim society had access to hospital facilities, Office of Chief Physician, Muwaqqithana, Office of Chief Astronomer and a state-of-the-art observatory in the 16th Century CE. The high position and key role of the Ottoman scholars are clearly proven through scrutiny of historical Muslim civilization sources which recorded their achievement and contribution to the world due to the accomplishments of these institutions.

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