ISLAMIC SCIENCES AND INTELLECTUAL DEVELOPMENT IN MEDIEVAL ISLAM: THE OTTOMAN EMPIRE'S ROLE

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ABSTRACT: *This study examines the intellectual contributions of the Ottoman Empire to the growth of sciences in the Islamic world during the medieval period. It challenges the prevailing assumption that Islamic scientific progress declined significantly after the Abbasid era, particularly during the Ottoman period. Utilizing a historical approach and patronage theory, the research explores the intellectual and cultural climate of the empire, the role of state support, and the influence of Greek, Persian, and Indian traditions on the development of both rational and traditional sciences. The findings reveal that although the Ottoman period may not have matched the Abbasid golden age in scientific innovation, it played a crucial role in sustaining, preserving, and further developing Islamic scientific heritage. Through educational institutions such as madrasahs, support for translation movements, and the establishment of observatories and hospitals, Ottoman scholars contributed significantly to various fields including astronomy, medicine, theology, and literature. This study underscores the importance of recognizing Ottoman scientific contributions within the broader narrative of Islamic intellectual history and highlights their relevance to contemporary discussions on the integration of science and tradition in Muslim societies.*

Keywords: Islamic science, Ottoman Empire, patronage, madrasah, intellectual history.

A. INTRODUCTION

When the scientific landscape in Europe flourished before 1900, it was either virtually nonexistent or severely limited and poorly funded in the Ottoman Empire. The participation of Ottoman scholars in the scientific journals of the time was minimal, with not a single name from the Empire mentioned in the *Biographical Encyclopedia of Scientists* [1] The industrial sector in the Ottoman Empire remained relatively underdeveloped, with European manufacturers dominating the markets. Essential institutions such as observatories, scientific academies, research facilities, laboratories, libraries, botanical gardens, and zoos, which were abundant and well-resourced in Europe, were notably absent in the Ottoman Empire. Despite some unsuccessful endeavors, there was not even a functional university within the Ottoman Empire until the turn of the 20th century [1]. This research is to test this statement considering that the Ottoman Empire in the 15th and 16th centuries reached the peak of its political, military, and economic power, and many scholars were found within it.

Knowledge is the essence of civilization. Advanced regions throughout history have left their mark in the annals of time due to their knowledge. The eras of Ancient Egypt, Babylon, Mesopotamia, Ancient Greece, and the Golden Age of the Abbasid Caliphate illustrate the pivotal role that knowledge has played in the people's history. George Sarton wrote three out of four volumes of 'Introduction to the History of Science' about the contributions of classical Islamic civilization. He emphasized that Western science can only be envisioned with the assistance of Islam [2]. After the fall of the Abbasid Caliphate, several empires emerged, and the largest and longest-lasting among them was the Ottoman Empire centered in Istanbul. This empire thrived due to its pursuit of knowledge. Although many doubted the progress of knowledge during the Ottoman era, especially when compared to the Abbasid age, the empire made significant contributions to the development of religious and scientific knowledge, particularly within the Islamic world in the medieval and modern periods.

The development of Islamic knowledge in Chaney's classification before the Ottoman Empire is divided geographically in the Islamic world into three groups—East, Central, and West. The period between 800-1100 CE surpassed the later periods (until 1500 CE), showing that the "East" in this case, Baghdad and its surrounding areas (Abbasid Caliphate), contributed significantly with approximately 73.18% of the total Islamic knowledge while the Islamic "Central" region (the Middle East; Fatimid Egypt) contributed 12.67%, furthermore, the "West" (Al-Andalus; Umayyad Caliphate of Cordoba) contributed 14.15% [3]

In the realm of civilization advancement, the Ottoman Empire is closely associated with progress in the military and architectural fields. Since the early days of the empire, architecture has thrived and flourished. In the military domain, apart from advancements in weaponry and transportation (such as naval vessels), the empire possessed a formidable force known as the Janissary Corps. However, what about progress in other fields of knowledge? According to Badri Yatim, the development of scholarly pursuits after the Abbasid era sharply declined. Many emerging writings were mere commentaries (*hashiyah*) or summaries of previously published works, particularly during the Abbasid period [4, p. 154] According to Ahmed el-Syamsy, after the Abbasid era, the progression of knowledge experienced a decline, primarily due to the rulers' diminishing command of the Arabic language in regions geographically distanced from the Arab-speaking populations. The Ottoman Empire in Istanbul, the Safavid Empire in Persia, the Mughal Empire in India, and others further demonstrated that mastery of the Arabic language became a secondary objective. Gradually, Arabic became the preserve of certain scholars, while others focused on their respective languages [5, p. 65]

From its inception until the 17th century, the Ottoman Empire had confidence in its cultural background, scholarship, and technology. During this era of grandeur, the Ottomans were highly selective in adopting elements of Western knowledge and technology. The Ottoman Empire stood superior despite scientific advancements in the West.

However, by the end of the 17th century, as Europe began to challenge the Ottomans, they became more receptive, albeit primarily as consumers rather than producers. In the 18th century, the Ottomans began to rely on Europe, starting with military organizations and gradually expanding into education, science, and technology [6, p. 45]

The growth of science in the Ottoman Dynasty, compared to the Abbasid era, exhibited both continuities and changes. While the Abbasid era is widely regarded as the golden age of Islamic civilization, with significant advancements in various scientific fields, the Ottoman Empire made notable contributions to the growth of science during its reign. The Ottoman Empire fostered an environment that supported intellectual pursuits and the patronage of scholars. Ottoman scholars built upon the scientific knowledge inherited from the earlier Islamic civilization, engaging in fields such as astronomy, mathematics, medicine, and engineering. They continued the tradition of translating and preserving ancient Greek and Persian texts, further enriching the scientific knowledge of the empire. The Ottoman Empire's geographical position and political stability facilitated exchanges of ideas and knowledge between different cultures, including the West. While it may not have reached the same heights as the Abbasid era, the Ottoman Dynasty played a crucial role in sustaining and developing Islamic sciences, leaving a lasting impact on the scientific legacy of the Islamic world [5, p. 65]

The Ottoman Empire served as a hub of cultural exchange, facilitating interactions between scholars from different regions and intellectual traditions. By studying Ottoman contributions to Islamic sciences, researchers gain insights into the synthesis and assimilation of knowledge from diverse sources, such as Greek, Persian, and Indian. This exploration sheds light on the intellectual dialogue and cross-pollination that occurred during the Ottoman era [7]

The Ottoman Empire played a significant role in shaping the broader Islamic intellectual tradition. Its contributions to fields such as Tafsir, Fiqh, Hadith, and literature have had a lasting impact on subsequent scholarship. By studying Ottoman contributions, scholars can trace the development of key ideas, methodologies, and interpretations within Islamic sciences and understand their influence on subsequent generations of scholars. In the Ottoman Empire, madrasahs as part of the educational system grew significantly [9, p. 12]

Research Objectives:

This study aims to examine the development and contributions of Ottoman scholars , To analyze the intellectual and cultural climate of the Ottoman Empire and its influence on the growth of sciences and to explore the impact of Greek, Persian, and Indian intellectual traditions on the growth sciences in the Ottoman Empire.

B. METHOD

This study employs a qualitative historical research method with a focus on document analysis and interpretive-historical inquiry. The primary objective is to examine the intellectual and scientific contributions of the Ottoman Empire to Islamic civilization, particularly in the domains of rational and traditional sciences.

The research adopts a historical approach, aiming to reconstruct and interpret the development of sciences within the Ottoman context. It involves a critical examination of sources on the growth of Islamic science and Ottoman intellectual history.

The study is grounded in Patronage Theory, which explains the role of political and financial support in fostering intellectual and scientific achievements. It highlights how Ottoman rulers functioned as patrons who enabled scholars and institutions to thrive by providing resources, legitimacy, and institutional frameworks.

The study aims to produce a nuanced and comprehensive understanding of how the Ottoman Empire contributed to the growth and sustainability of Islamic sciences and preserved its intellectual legacy across centuries.

C. Discussion

1. The Growth of Science and The Patronage Tradition in Islam

Throughout the history of scientific development, especially within the Islamic world, both in the classical and medieval periods, the culture of patronage has played a significant role in constructing a civilization. The functions of rulers and entrepreneurs in supporting the advancement of knowledge can be observed in various aspects. Even in monumental scientific projects, with rulers' economic and political patronage, achieving knowledge progress was possible. In the Islamic world, numerous crucial moments have highlighted how a ruler or a kingdom has been able to foster the widespread growth of knowledge. Muslim rulers' support for the development of science has led to advancements in religious and general sciences.

Goitein mentions that the historical periodization of Islam can be divided into four categories: the Arab Islamic era, from 500 CE to 850 CE; the Intermediate Civilization era, from 850 CE to 1250 CE; the Institutionalized Islamic period, primarily non-Arab Islam, from 1250 CE to 1800 CE; and the transition to Nationalism era, starting from 1800 CE [10, pp. 224–228]

Chaney points out that the geographical development of knowledge in the Islamic world can be categorized into three groups: East, Middle, and West [3, p. 36] The East represents Baghdad, the Middle refers to Cairo, and the West denotes the region of Cordoba (Andalusia). Based on his research, he found that the period between 800 CE and 1100 CE surpassed later periods (up to 1500 CE), indicating that the "East" (Abbasid Caliphate) contributed significantly, accounting for approximately 73.18% of science. The "Middle" Islamic region (Fatimid Egypt) contributed around 12.67%, and the last "West" (Umayyad Caliphate of Cordoba) contributed 14.15% [3, p. 39]

Based on the pattern above, science in Islamic civilization from the 8th century to the end of the 14th century CE showed advancements far beyond those in the West and China. Developments in various fields of knowledge, such as astronomy, alchemy, mathematics, medicine, optics, and others, indicate that Muslim scholars were at the forefront. On the other hand, Islamic civilization has also inspired

modern scientific developments in the West during the 12th and 13th centuries CE and beyond [11, p. 48]

Between the 8th and 12th centuries, a transformation in knowledge occurred primarily during the era of the three Great Islamic Empires: the Abbasid Caliphate in the Eastern region (Baghdad), the Fatimid Caliphate in Africa (Cairo), and the Umayyad Caliphate of Cordoba in the Western region (Andalusia). The development of knowledge during this period was not only inspired by religious motivations (the Qur'an and the sayings of the Prophet) but also greatly influenced by interactions with other civilizations. The Muslim community encountered Hellenistic Greek philosophy and also drew from the intellectual traditions of Persia, Egypt, India, and even China. According to Chaney, the advancement of knowledge in the Islamic world from the 9th to the late 12th centuries resulted in 23,287 works from 4,056 Muslim scholars. On average, each scholar was able to write five to six books. This development surpassed the subsequent centuries, from the 12th to the 18th centuries [3, p. 36)

The term "patronage" lacks a direct equivalent in the languages used in Islamic societies for practicing mathematical sciences. However, if we consider one of the ancient Roman meanings of patronage, which refers to a relationship where a protector supports a protégé, we can explore the social dynamics involving mathematical sciences in Islamic societies. Practitioners of these sciences could indeed establish relationships with individuals of higher social status and greater wealth, providing them with stable positions and various benefits. The complexity of the terminology used to describe such relationships, along with the diverse forms of exchange involved, suggests that there was not a single type of patronage relationship in every Islamic society over the centuries. Whether all such relationships actually qualify as patronage requires further investigation. Patronage and other forms of support for mathematical sciences were part of a broader phenomenon of social and cultural dependence among individuals of different social statuses, upbringings, and access to resources. These fields of knowledge shared fundamental rituals that shaped relationships akin to client-patron dynamics seen in sectors like medicine, the arts, administration, and even the military. However, there were variations within the mathematical sciences and practitioners' access to patrons and resources. [12, pp. 301–303]

In a broad overview, one can identify two main periods of patronage for scientific knowledge, including the mathematical sciences, in the classical Islamic world. The first period spans from the eighth to the later twelfth century, while the second period extends over six hundred years to the nineteenth century. The foundations for the earlier period were established during the first two centuries of the Abbasid dynasty, particularly with the Translation Movement centered in Baghdad. This movement facilitated the translation of scientific works from Middle Persian, Greek, Syriac, and Sanskrit into Arabic, making them accessible to scholars. Physicians, theologians, astronomers, courtiers, princes, and rulers showed interest in these translated works. Scientific endeavors resulting from these translations initially took place in the Abbasid capital and other cities within the empire. As powerful governors, local rulers, and independent Muslim dynasties like the Fatimids, Umayyads, and Ghaznavids emerged, a more diverse range of courtly patronage opportunities became available. The second period began in the twelfth century, marked by the establishment of endowed teaching institutions as a regular feature of scholarly practice across regions spanning from Central Asia to the Atlantic [12, pp. 301–303]

The Abbasid's affinity for knowledge began when the Umayyad dynasty pursued them. Abbas and Ali lived among Nestorian Christian, Mesopotamian, and Western Persian groups. The Abbasid clan began to show interest in Greek philosophy. Educated Nestorian individuals were summoned to the court when they came to power. They translated Greek and Syriac books into Arabic [13, p. 351]

As a form of appreciation for scholars and scientists, the Abbasids invited them to the palace to teach the Khalifah's family and children. They were known as al-Nadhim or Nudhama', meaning scholars who resided around the Khalifah (Courtesies). They were facilitated, close to the Khalifah, and conducted research with substantial bonuses [14, p. 127].

Similar interest was demonstrated by the Umayyad Caliphate of Cordoba rulers, such as Abd al-Rahman II (822-852 CE). He sent emissaries to the East to purchase manuscripts on astronomy, philosophy, medicine, and music. Then, during the reign of Abd al-Rahman III, translation activities flourished. Hasdai ibn Shaprut (915-990 CE), a vizier of Khalifah Abdurrahman III and personal physician to Hisham II, led this translation movement. He received a gift from the Byzantine Emperor, a Greek manuscript titled "De Materia Medica" by Dioscorides, in 949 CE. Through Nicholas, the Byzantine Emperor's envoy in 951 CE, this Greek manuscript was taught to scholars in Al-Andalus under Hasdai's guidance [15, p. 61].

In addition to the caliphs, wealthy individuals close to rulers actively contributed funds to develop knowledge. The Musa family, closely associated with the Abbasid Caliphate, appreciated the translators. For example, the Banu Musa often provided 500 dinars to full-time translators for a month [16, p. 143]. At the time, a dinar was equivalent to 4.25 grams of gold. Thus, the amount was around 2125 grams (nearly 75 ounces). If valued at 320 dollars per ounce, the sum would be approximately 24,000 dollars [14, p. 138]

During the Abbasid era, translators were scholars with expertise in various fields. Besides translation, they had to master many linguistic issues, including the preliminary philological works, before starting the translation process [17, pp. 15–16]. They were trusted to translate and were rewarded with substantial salaries. Translators were required to have a deeper understanding of the Greek language than the expectations of Syrian scholars before them, as the sponsors of translations demanded excellence. Translation was a profitable profession, and they were expected to invest time and effort in learning Greek. Among the prominent translators during the early Abbasid period was Ibn al-Muqaffa' (d. 756 CE), who was proficient in Arabic and Persian. He translated Persian works into Arabic, including

"Kalilah wa Dimnah," a collection of fables, and "Shahnameh," a history of Iranian princes and heroes. He also translated "Siddhanta" from Sanskrit into Arabic [18, pp. 271–272] Another translator was Yuhanna ibn Masawayh (d. 769 CE), who translated Greek books. One of his students was Hunain ibn Ishaq (809-877 CE), who lived during the reign of ten Abbasid caliphs from al-Amin (809-813 CE) to al-Mu'tamid (870-892 CE). Hunain discovered that the development of Greek knowledge occurred in various regions such as Egypt, Palestine, Syria, Mesopotamia, and even Baghdad [24, p. 7]. Another translator, Ibrahim ibn Salt, translated Ptolemy's work on astrology titled "Tetrabiblion," later revised and improved by Hunain ibn Ishaq. During the time of al-Wathiq, Yuhana ibn Masawaih, a translator, became the right-hand man of al-Wathiq and was financially rewarded (dirhams) for his translation work [18, pp. 277–279]

In addition to the caliphs, some wealthy Muslim individuals donated, primarily to support specific legal schools (madhabs). For instance, the Hanafi, Shafi'i, and Hanbali schools received support from wealthy patrons. Abu Sa'd al-Mustaufi and Abu al-Qasim al-Halabi were patrons of the Hanafi school, Nidzam al-Mulk, and Abu Ali al-Mani'i supported the Shafi'i school, and Abu Mansur ibn Yusuf and Abu Abd Allah ibn Jurada were wealthy individuals in Baghdad who patronized the Hanbali school [19, pp. 29–30].

The education system in the Islamic Kingdom underwent a significant transformation and became more established. Students had access to expert teachers and received additional support from the caliphs. They enjoyed bonuses provided by the Khalifah or other officials, including utilizing libraries and lecture spaces, which were available in various places such as mosques, kuttab (elementary schools), ribat (monastic complex), khanaqah (sufi hospice), and bimaristan (hospital).

2. The Rise of the Ottoman Empire

The Ottoman Empire was one of the largest empires in the medieval Islamic world. Compared to other contemporary empires like the Safavid Empire in Persia and the Mughal Empire in India, the Ottoman Empire ruled longer (1290-1923), and its territory was larger than both. At the peak of its glory, the Ottoman Empire stretched across regions in Asia, Africa, and Europe, making it a powerful kingdom in Southern Europe and the Middle East [20, p. 290] Its military force, the Janissaries, was renowned and considered the best.

Originating from a small Turkic group of the Oghuz tribe, the Ottoman Empire gradually grew into a formidable kingdom, conquering various regions in Asia, Africa, and Europe, particularly during the 16th and 17th centuries [25, p. 2].

The Ottoman Empire was founded by Osman bin Ertugrul, from the Oghuz tribe originating from the Mongolian region. The ancestors of this empire were led by Suleiman Shah, a Turkoman ruler from the Kayi tribe in the late 13th century, who ruled a small region in northern Iran. During turmoil among the Mongol people, Suleiman and his clan moved toward Syria to avoid their attacks. It is said that Suleiman drowned while crossing the Euphrates River towards Syria during their journey, and two of his sons returned to Khurasan. In contrast, his other son, Ertugrul, and 400 followers moved towards Anatolia [23, pp. 10–11]

Upon arriving in this region, Ertugrul and his troops assisted Sultan Seljuk of Rum in his fight against the Byzantine and Mongol forces. Seljuk of Rum achieved victory in that conflict, and in recognition of Ertugrul's service, he was granted lands in Sogut and Domanik in the western Anatolia area. After Ertugrul's rule, his son Osman continued the legacy of this small governance at thirty years old [26, p. 22]

The development of this kingdom continued to expand, and its capital moved several times. It started in Sogut in the year 1299, then moved to Bursa in 1326, followed by Edirne in 1356, and finally, until the end of the kingdom in the mid-15th century, Constantinople, which later changed its name to Istanbul, became the center of Ottoman rule (1453-1923) [27, pp. 13–14].

According to John Thevenot, Constantinople is the most beautiful city in the world. It was situated at the end of Europe, facing the Bosphorus that connects it with Asia at a very close distance. On its right is the Propontis (Sea of Marmara), a route leading to Asia, Egypt, and Africa, while on its left is the Black Sea. In the summer, the city's air is sweltering but comfortable due to the evening breeze from the harbor. The city is triangular, facing the Propontis, the port, and the mainland, all surrounded by walls, with the landward side even having double walls. Constantinople was the ancient city of Byzantium, built by Pausanias, the King of Sparta. Emperor Severus destroyed the town due to its inhabitants' rebellion, but it was rebuilt by Emperor Constantine and named 'Constantinople' in dedication to 'the Virgin Mary.' The city fell into the hands of Venice and France in 1209 and was taken over again by Emperor Palaiologos fifty years later. When it was conquered by Sultan Muhammad Al-Fatih in 1453, the city became known as Istanbul or Stamboul [28, p. 794]. The beauty of this city was also acknowledged by Napoleon Bonaparte, who said that if the world were a single country, Constantinople would be the perfect capital city for it.

The Ottoman Empire, which had led for approximately 600 years, from the medieval period until the end of the modern era, undoubtedly made significant contributions to the development of Islamic civilization, especially in the field of knowledge [29, p. 37]. In the 16th century, the Ottoman forces were well acquainted with knowledge and science. Since the siege of Constantinople in 1453 and even earlier, the Ottoman Empire had long used mechanical weapons such as rifles, cannons, and others alongside traditional weapons. Thus, advancements in knowledge, particularly in military technology, had already occurred during this empire.

But what about religious knowledge? When compared to the Abbasid Caliphate, which had many Muslim scholars and scientists, it is believed that during the medieval period, the Ottoman Empire might not have been able to rival the Abbasids or other contemporaneous kingdoms like the Umayyad Caliphate II in Andalusia and the Fatimid

Caliphate in Egypt. Nevertheless, this research explores how significant and extensive the Ottoman Empire's contributions were in disseminating knowledge and supporting scholars and scientific endeavors during its time. This writing aims to delve into some of the Ottoman contributions to the development of knowledge, particularly in the field of religion, such as Quranic studies and exegesis, hadith, jurisprudence (Fiqh), Arabic language, and more.

Globally, the Middle Ages were a military and architectural development period in Islam and other regions [30, p. 30]. Since the discovery of gunpowder in China around the 11th century and the development of weapons in Europe, the enthusiasm for military technological advancements continued to experience rapid progress.

During this time, conflicts between Islamic and non-Islamic kingdoms occurred on land and sea, particularly between the Ottoman Empire and Christian Kingdoms in Europe. Unsurprisingly, the continuous advancement of weaponry became a crucial factor in facing rivals and enemies [42, p. 31].

The Ottoman Empire exerted significant influence over the history of Southeastern Europe for an extensive period, spanning from the 14th century to the early 20th century. During this time, it stood as the largest political entity in the region. However, the study of Ottoman history in Southeastern Europe holds importance beyond its sheer political dominance. For many nations in the region, the struggle against Ottoman rule became a defining aspect of their collective identity, often serving as a rallying cry for affiliation with Christian Europe. Additionally, Ottoman rule has been frequently cited as a factor contributing to the economic underdevelopment and political instability that persists in many Southeast European countries to this day. It is important to note that our intention is not to argue for or against Ottoman responsibility for these issues, but rather to examine various historical sources from the Ottoman period and our shared history to form independent judgments [41, p. 22].

Despite the common perception that the Ottoman Empire was a Turkish state, its composition was much more diverse. While the founders of the Ottoman State were of Turkish origin, the empire eventually encompassed a multitude of peoples with various religious beliefs and languages. Moreover, the Ottoman ruling class was ethnically heterogeneous, and the term "Turks" was often associated with rudeness and illiteracy by the ruling elite. Instead, loyalty to the dynasty was prioritized over ethnic affiliation, as evidenced by the Ottoman officials and intellectuals' preference for terms like "devlet-i aliye" ("the high state") or "devlet-i ali-Osman" ("the state of the house of Osman") rather than explicitly labeling the state as "Turkish." [41, p. 22].

The Ottoman Empire stands out as one of the most remarkable and enduring empires in world history, encompassing vast territories that once belonged to the Eastern Roman Empire and extending into regions of the northern Balkans and the northern coast of the Black Sea, areas previously beyond Byzantine control. Unlike many fleeting empires, the Ottoman Empire emerged before 1300 and persisted until after the conclusion of World War I. Its inception coincided with the decline of the powerful Sung state in China, the era of Genghis Khan's expansive conquests from China to Poland, and the onset of the Hundred Years War between France and England in Europe. Concurrently, significant developments were unfolding elsewhere, such as the rise of the Benin state in West Africa and the expansion of the Aztec state in Mexico's valley. While these events unfolded, the Ottomans emerged in Asia Minor, establishing themselves as a dominant force in medieval times and enduring until relatively recent history, within the lifetimes of many living individuals today. For instance, my own father was nine years old and my mother five years old when the Ottoman Empire ultimately dissolved. Many present-day citizens of successor states to the Ottoman Empire, including Turkey, Syria, Lebanon, and Iraq, carry Ottoman names given to them by their parents and have been raised and educated within the context of Ottoman heritage, making the empire a tangible and ongoing legacy [30, p. 3]

During the sixteenth century, the Ottoman Empire shared the global stage with several other formidable and affluent states. In the distant west, there were notable powers like Elizabethan England, Habsburg Spain, and the Holy Roman Empire, alongside Valois France and the Dutch Republic. Closer to home, the city-states of Venice and Genoa wielded significant political and economic influence through their extensive fleets and commercial networks connecting India, the Middle East, the Mediterranean, and Western Europe. To the east, the Ottoman Empire interacted with two major empires at their zenith: the Safavid state in Iran and the Mughal Empire in the Indian subcontinent. Together, these empires spanned from Vienna in the west to the borders of China in the east, enjoying prosperity under efficient administration and benefiting from the lucrative trade between Asia and Europe. During the sixteenth century, these three empires likely held considerable economic and political sway globally, particularly as Spain and Portugal were expanding their influence through the conquest of the New World and its riches.

The remarkable speed at which a people of mysterious origin emerged onto the historical stage and, through the magnitude of their conquests, brought about significant and enduring changes in Europe, presents the Turks as an extraordinary nation. Their conquests have not been fleeting; known as Ottomans, they have subjugated vast and fertile regions of Asia and Europe, maintaining, amidst the trappings of civilization, the traditional customs and ways inherited from the Turkistan mountains. While other European nations have made steady progress in areas like science, literature, and the arts, the Turks, until very recently, have disregarded any advancements that did not cater to their pride and indulgence [31, p. 1]

Despite the Ottoman Empire experiencing a decline for over 150 years, during this time, they engaged in numerous prolonged and bloody conflicts with their formidable neighbors, the Russians, and Austrians. Despite enduring various external calamities and the effects of prolonged internal oppression, they have often rebounded from setbacks

that appeared fatal to their cause, continuing to maintain their independence with resilience and determination. Even after this prolonged period of decline, few empires in history rival the nobility of the realm governed by the descendants of Othman [31, p. 3]

While the Ottoman Empire still maintains its vast territorial expanse, it no longer instills fear in its neighboring states. Neither the sagacity of its leadership nor the prowess of its military commands respect or apprehension in Europe. However, the grandeur of its past conquests and the renown of its historical persona capture the imagination of humanity. Admittedly, the wars waged by the Turks were marred by deceit and tainted by brutality, yet their fervor in pursuit and brilliance in triumph was so striking that their assertion of national superiority remained unchallenged for centuries [31, p. 3].

The initial century of Ottoman existence marked their heroic era. Functioning primarily as commanders of Turkish tribes, known as gazis, the dynasty's founders led raids and conquests against infidel territories. After the Byzantine resistance weakened, the Ottomans found it relatively uncomplicated to expand into western Anatolia and across the Dardanelles into Southeastern Europe, compared to confronting their more formidable Muslim and Turkish neighbors. Swiftly advancing through regions like Thrace, Macedonia, Bulgaria, northern Greece, Bosnia, and Serbia up to the Danube, the Ottomans established a system of governance wherein indigenous Christian princes retained their positions and lands by acknowledging Ottoman suzerainty and providing military support and finances. This success was partly attributed to the influx of nomads from Anatolia fleeing from the Mongols, who joined the Ottomans as gazis in their fight against the infidel. Additionally, early Ottoman leaders were associated with the urban *ahi* brotherhoods, which provided assistance and relief to the populace during periods of centralized state failure. Unlike other Turkoman *gazi* leaders in Anatolia, the Ottomans were in direct confrontation with the Byzantines, exploiting their weaknesses to attract manpower and conquer Christian lands across the European Straits [23, 2005, p. 11]

The foundation of the first Ottoman Empire was motivated by religious and economic factors. Its adherents aimed to expand the realm of Islam and acquire wealth through plunder. However, when the final ruler of this period attempted to utilize the wealth and influence gained from European conquests to annex the Turkish and Muslim East, he invited the wrath of a new nomadic force led by Tamerlane. Tamerlane's army defeated the Ottomans, dismantled their empire, and reduced them to a status equivalent to other revived Turkoman principalities. Consequently, the initial phase of Ottoman history, and indeed the first Ottoman Empire, concluded with an Interregnum (1402-1413), during which various factions within Ottoman society vied for power, plunging the region into chaos once more [23, p. 11]

3. The Ottoman Patronage on Sciences

Education in the Ottoman realm spanned various types of institutions, both official and private, over many centuries. Among these, the Palace School, situated within the sultan's palace, held particular significance as it aimed to educate individuals for esteemed positions in the imperial administration, focusing on military and civilian roles. Its curriculum encompassed traditional subjects alongside rational sciences, including Quranic studies, hadith, language, literature, philosophy, and mathematics. Notably, the emphasis on military and administrative studies set it apart from other educational establishments [21, pp. 198–199]

Madrasas, commonly known as religious schools, were prevalent across the empire, providing education within mosque complexes, libraries, and even private residences. Primary schools, often established through charitable foundations, operated without a formal curriculum, focusing on basic literacy, numeracy, and religious teachings, with teachers drawn from various backgrounds, including religious figures and those with basic literacy skills. The inception of Ottoman madrasas dates back to 1331 when the first one was founded by Orhan, approximately three decades after the establishment of the Ottoman state. Over the span of 120 years, a total of 84 madrasas were established, showing a steady pace of development. Following the conquest of Constantinople in 1453, Sultan Mehmed II initiated a comprehensive urban renewal project, centered around the construction of the Fatih mosque complex. This complex, named after Mehmed II, aimed to transform the capital into a cultural and educational hub. The Fatih Külliyesi, as per its waqf deed, comprised eight upper-level madrasas known as sahn madrasas, eight preparatory madrasas called tetimme madrasas, along with a primary school and a library. Additionally, it included amenities like a hospital, lodging, and a soup kitchen. Unlike previous madrasas, which focused solely on religious sciences, those established under Mehmed II incorporated both religious and rational sciences in their curriculum. Renowned scholars like Ali Kuşçu played a pivotal role in shaping this new educational tradition, laying the foundation for the integration of rational sciences alongside religious teachings. This influence continued to grow, leading to the establishment of Süleymaniye madrasas in the 16th century. Education at Süleymaniye encompassed specialized madrasas like DarülHadith for the study of Prophet traditions and Tarüttıb for medicine, with the former being highly esteemed. Between the 14th and 16th centuries, a total of 350 Ottoman madrasas were constructed, with significant concentrations in Anatolia, Istanbul, and Rumelia. Approximately 665 madrasas were established in Rumelia over the empire's history, indicating a strategic distribution of educational resources [21, pp. 198–199]

Madrasa education aimed to convey the fundamental values of Islamic society along with the practical skills necessary for social contribution. These values and skills were primarily encapsulated in seminal works, most of which were authored by the conclusion of the eighth century in the Islamic calendar. Scholars during the Ottoman, Safavid, and Mughal eras seldom engaged with these seminal works directly as standalone texts. Instead, they approached them through a plethora of commentaries, secondary commentaries, and annotations; occasionally, a commentary

would surpass the original text in significance. The foundational texts of the madrasa curriculum were organized under various subject headings, which were further subdivided into categories. Several principles governed this categorization. One common approach, observed across all three empires, distinguished between rational subjects (‘ulum-i ‘aqliyya / ma‘qulat) and transmitted subjects (‘ulum-i naqliyya/manqulat). Rational subjects encompassed disciplines such as logic, philosophy, various branches of mathematics, and medicine, while transmitted subjects included Quranic exegesis, Hadith, Arabic grammar, and syntax, as well as law and jurisprudence. The classification of theology could vary depending on the extent of philosophical influence inherent in its study. Furthermore, discrepancies in the political and social milieu could result in varying emphasis placed on subjects and their respective branches within the curriculum [22, p. 3]

The textbooks utilized in madrasah education were designed to equip every Muslim individual with knowledge relevant to both religious and secular affairs. Throughout their education, madrasah students were required to engage with a wide array of subjects across five main fields of study. The curriculum typically commenced with morphology (sarf), followed by syntax (nahiv), and logic (mantık), before moving on to ḥadīth (teachings of the Prophet) and Qurʾān commentary (tafsīr). Between the initial three studies and the latter two, subjects such as elocution (âdâb-i bahs), sermon delivery (vaaz), rhetoric (belâgat), theological philosophy (kelâm), philosophy (hikmet), jurisprudence (fiqh), inheritance laws (ferâiz), principles of faith (akaid), and legal theory and methodology (usûl-i fiqh) were explored. While the order and presentation of these studies occasionally varied, mathematical disciplines like arithmetic, geometry, algebra, and astronomy, along with natural sciences such as classical physics, were incorporated into Ottoman madrasah curricula. Analysis of autobiographies of madrasah scholars suggests that these mathematical and natural sciences were typically studied after divine philosophy (hikmet) and before the most esteemed subject, Qurʾān commentary. This comprehensive integration of rational and transmitted sciences, which flourished in Ottoman madrasahs during the fifteenth and sixteenth centuries, left behind a profound cultural and scientific legacy that endured until the nineteenth and early twentieth centuries [8, p. 113]

Higher education in the Islamic world was provided in college-mosques and madrasas, varying in size and importance based on their endowments. The early Ottoman Sultans were concerned with establishing such colleges, and converting monasteries into educational institutions. For example, after the conquest of Iznik (Nicaea) by Orhan in 1331, a monastery was converted into a college. In subsequent years, medreses (Islamic colleges) were founded in Bursa and Adrianople (modern-day Edirne), the latter becoming the Ottoman capital after Bursa. Medrese organization in Adrianople retained a special status, with professors ranking below those in Istanbul but above those in other regions. Throughout the Ottoman Empire, major towns were equipped with medreses, some dating back to pre-Ottoman times, while others were established under Ottoman rule. Istanbul, being the imperial capital, was particularly well-supplied with medreses, with each imperial mosque being accompanied by several medreses. Even the Hagia Sophia, after its conversion into a mosque, was furnished with a medrese. In the 18th century, Istanbul boasted a minimum of 275 medreses scattered across different districts of the city. The most notable among these were the medreses established by Mehmed I, Bayezid I, and Suleiman the Magnificent. Mehmed I, in particular, erected sixteen medreses around his mosque, commonly referred to as the Fatih Mosque, named after him as "The Conqueror." Approximately seventy years later, Suleiman the Magnificent surrounded his mosque, the Suleymaniye Mosque, with additional medreses. These two clusters of medreses, along with those affiliated with Bayezid II's mosque, served as the primary training grounds for the leading scholars of the time, thus holding significant importance [32, p. 145].

Mehmed II's construction of medreses occurred in two phases. Initially, he built four medreses to the north and four to the south of his mosque, collectively known as the "Medreses of the Courtyard," which lent the courtyard its name, "Courtyard of the Eight." Later, realizing the need for more educational facilities, he added eight more medreses, similarly organized into introductory and supplementary groups. The introductory medreses featured domed chambers, each equipped with a main hall for instruction, fifteen single student rooms, two rooms for assistant teachers, and two for staff. In contrast, the supplementary medreses were simpler, with each containing eight non-domed rooms accommodating three students each. In total, Mehmed II's medreses could accommodate up to 413 students simultaneously. Among the medreses affiliated with the Suleymaniye foundation, two were dedicated to specialized studies: a Dárü 'l-Hadith for the study of Tradition and a Dara 'l-Tibb for medical studies. On the other hand, the medreses at the Bayezid Mosque were primarily focused on legal studies, at least eventually [32, pp. 143–144]

Upon enrollment in a college mosque or madrasa, the student typically became affiliated with a foundation, from which they received provisions, a small allowance, or both. In many madrasas, students were accommodated within or near the building, under the supervision of the superintendent. However, at el-Azhar, due to the considerable number of students, they were allocated across various endowed hostels or riads, typically organized based on geographical origins. Each hostel had its leader (Seyh), teaching staff, and operated as an independent entity. The main foreign groups of students were Turks, Syrians, and Maghrebis, with one of the largest contingents being blind students. Inter-hostel conflicts were not uncommon, and students often participated in aggressive protests [32, p. 157]

During the Second Constitutional Period (1908–1920), specialized madrasas emerged to train various positions within the Muslim clergy, including imams, preachers, and scholars in religious sciences, calligraphy, and classical arts. Another important contribution of the Ottoman Empire to the growth of sciences was Endowments, known as waqfs, representing a prominent form of charitable giving within the

framework of Muslim law, or sharia. Individuals, both large and small property owners, could establish waqfs by donating properties whose income would support specified purposes. These revenues, stemming from various sources such as agricultural taxes, rents, or interest from loans (a distinct feature of Ottoman waqfs), were directed towards sustaining designated institutions or beneficiaries. These included mosques, schools, hospitals, hospices, public kitchens, fountains, fortresses, bridges, and more, all intended to endure indefinitely, although some ceased functioning within a generation [21, pp. 136–199].

The Vakıf, a significant social institution in the Ottoman Empire, was established for humanitarian purposes and had a profound impact on various aspects of Ottoman life. It undertook diverse responsibilities, from social welfare to the promotion of Ottoman art, culture, and civilization in conquered territories. Vakıfs provided essential public services and supported religious and educational institutions until the 19th century. They operated independently, with minimal government interference, and were considered under divine ownership, granting them considerable autonomy. The Vakıf system, largely reliant on land income, greatly influenced the Ottoman land regime. However, disputes arose over Vakıf expansion onto state-owned land. Religious and educational functions constituted the majority of Vakıf activities, with mosques and schools funded and maintained by them, including the payment of staff salaries [33, p. 202].

The beneficiaries of waqfs encompassed diverse services and entities, ranging from religious to community-oriented endeavors. Notably, Christians and Jews also made waqfs under Islamic law to support communal services like soup kitchens or schools, though they couldn't endow churches or synagogues. The grand mosque complexes in major imperial capitals like Bursa, Edirne, and Istanbul, along with those in smaller cities, were typically established as charitable endowments. These complexes served as focal points for urban life, offering spaces for religious and social activities, water sources, green spaces, and more. [21, 2009, p. 136]

The Süleymaniye mosque complex in Istanbul exemplifies this concept, incorporating not only a large mosque but also colleges for legal studies, a primary school, a public kitchen, a hospice, a hospital with a medical school, and the tombs of Sultan Süleyman I and his wife Hurrem Sultan. These complexes often received additional support from imperial contributions or the endowment of further properties. Education and medical care provided within these complexes were typically free or offered at nominal charges, reflecting their charitable nature. Unlike informal donations, waqfs left extensive written and material records, facilitating historical study. These records include foundation deeds, account ledgers, imperial decrees, and judicial proceedings, shedding light on the founders' backgrounds and the integral role of waqfs in local economies. Furthermore, waqfs provided women, including mothers, wives, and sisters of sultans, with a significant avenue for public engagement. Notable figures like Kösem Sultan and Turhan Sultan endowed various institutions, contributing to the welfare of their communities and leaving enduring legacies [21, p. 136]

The scientific literature from the classical period comprises a substantial body of original research and translated texts, primarily textbooks in astronomy, mathematics, and medicine. These works were predominantly written in Arabic, Turkish, and occasionally Persian, collectively known as elsine-i selase, which were familiar to Ottoman scholars. Initially, Ottoman scientific and educational texts were in Arabic, the primary language of Islamic civilization. However, from the 14th and 15th centuries onward, there was a movement to translate Arabic and Persian works into Turkish, spurred by a growing readership and the support of administrators unfamiliar with Arabic. Translations into Turkish, written in a clear and accessible style, covered various fields of Islamic sciences, facilitating the dissemination of Islamic culture. Simultaneously, original Turkish works began to emerge, especially after the establishment of the Müteferrika Printing House in 1729, which facilitated the production of scientific books in Turkish. Ottoman Turkish became the predominant language for transmitting modern sciences to both students and the public. An analytical study of Taşköprülüzâde İsameddin Ahmed b. Mustafa's biographical dictionary, Şakayıku'n-Numâniye fî Ulemâi'l-Devleti'l-Osmâniye, provides insight into scholarly life in the Ottoman Empire up to Süleyman I's reign. The proportional distribution of works authored by Ottoman scholars during this period reveals a focus on rational sciences, history-literature-ethics, exegesis, jurisprudence, Sufism, and creed [8, p. 8]

Regarding the commentaries and translations by Ottoman scholars on pre-Ottoman works, the breakdown is as follows: 26.6% focused on jurisprudence, 20.8% on rational sciences, 15.8% on theology, 13.5% on history-literature-ethics, 9.5% on creed, 8.5% on exegesis, 2.7% on Sufism, and 2.2% on hadith. These percentages represent the scholarly endeavors of the first 250 years of Ottoman cultural and intellectual life, clearly illustrating the primary areas of scholarly focus. Taşköprülü-zâde, who provided insights into jurisprudence, hadith, theology, literature, and history, authored a total of 20 works [8, p. 8]

Kadızâde-i Rûmî, a renowned Ottoman scholar from Bursa, made significant contributions to Ottoman scientific tradition and literature. He began his scientific career in Anatolia before relocating to Samarkand, where he authored notable works such as a commentary on Çaşminî el Mülahhas fî'l Hey'e (Compendium on Astronomy) and Şerhü Eşkalü't-Te'sis, a commentary on Shams al-Dīn Semerkandî's work on geometry. Kadızâde was appointed head of the Samarkand Observatory and Madrasa by Uluğ Bey and contributed to the preparation of the famous Uluğ Bey Zîci (Astronomical Tables of Uluğ Bey). His treatise Risale fî İstihraci Ceybi Derece hahide bi Amalin Müessetin alâ Kavâidin Hisabiye ve Hendesiye alâ Tarikati Gıyaseddin el-Kaşî elucidates the algebraic method for calculating sine developed by Jamshid el Kashî. Scholars such as Ali Kuşçu and Fetullah Şirvanî, trained by Kadızâde in Samarkand, made notable contributions to Ottoman science upon their arrival in the Ottoman lands from Turkestan. Kadızâde's works, particularly Şerhü Mülahhas fî'l Hey'e and Şerhü Eşkalü't-Te'sis, served as fundamental textbooks for students

interested in studying astronomy and geometry in Ottoman madrasas. Numerous copies of both works have survived, indicating their enduring significance. These texts were not only taught in Ottoman madrasas but also in educational institutions across other Islamic countries such as Iran, Central Asia, India, and Morocco, as evidenced by colophons dating from the fifteenth to twentieth centuries. In his introduction to Şerhü Eşkalü't-Te'sis, Kadızâde-i Rumi emphasizes the importance of geometry for philosophers, jurists, officials, and judges, underscoring the necessity of mathematical and natural sciences in both worldly and spiritual matters. This scientific outlook expressed by Kadızâde-i Rumi reflects the foundational principles of classical Ottoman science until the modernization era, distinct from the European concept of science and technology focused on human control over nature through scientific advancements [8, p. 10].

In the eighteenth century, several factors such as the weakening of central authority, political and economic instability, decline in military conquests, and continuous territorial losses highlighted the pressing need to revamp the education system, which lagged behind Western counterparts in both technical expertise and scholarly inquiry. Military education emerged as the primary conduit for the transmission of Western sciences, particularly from France, to the Ottoman Empire, marking a significant channel through which reforms were introduced [22, 1997, p. 3]

4. The Growth of Islamic Sciences in The Ottoman Empire

The Ottomans interacted with a multitude of scientific traditions as they traversed both chronological and spatial paths, encompassing the Islamic world, the Turkic-Mongol realm, the Byzantine sphere, the Mediterranean region, and Western Europe. Previously, scholars tended to isolate and compartmentalize the Ottomans, but this perspective has evolved. The Ottoman Empire is now regularly linked either to Renaissance Europe or the Far East, yet it actually existed in a state of "not only/but also," rather than a simple "either/or" dichotomy. This unique position placed the Ottomans at the nexus of a complex matrix comprising diverse scientific realms across Eurasia [34, p. 20].

Every culture builds upon the foundation laid by its predecessors, and the Ottomans were no different. However, their approach was notably eclectic. They engaged with a myriad of traditions from various geocultural origins, each possessing distinct characteristics; some were documented, while others were passed down orally, some were scholarly, while others were rooted in folklore. The Ottomans did not conceal these layers; instead, they blended them into a new synthesis, albeit not always seamlessly or without tensions. Examples such as the Chinese zodiac and the fusion of Persian and Mediterranean gardening illustrate how Ottoman cultural and scientific traditions emerged through the amalgamation and assimilation of diverse heritages. Many Ottomans delved into astrology and astronomy, largely within the framework of Islamic interpretation established by preceding Muslim scholars and practitioners. However, they also possessed a minor astrological tradition that harked back to shamanistic cosmology from the Asian plains [34, p. 20]

The entrance gate of the Seljukid school Gok Medrese in Sivas, adorned with carved animal heads, offers a striking example of the continuity of this tradition into the Ottoman era. The depiction of animals was a prevalent theme in Seljukid religious and secular architecture. Twentieth-century scholars of art and architecture painstakingly identified Seljukid figurative imagery, elucidating their origins and deciphering their symbolic meanings. It is now understood that these stylized animals carried various connotations, including astrological symbolism, symbols of power, and references to cosmic mythologies. Moreover, the influences of Armenian and Georgian Anatolian cultures are often evident and pronounced in these representations. The Ottoman Empire boasted well-established academic traditions and institutions that made the transition far more than a mere process of adoption. Those spearheading the establishment of this modern educational institution were Ottoman administrators and intellectuals who presented themselves as guardians of Islamic civilization, marking this as a distinctive aspect of the process. As the leaders of the Islamic world for centuries, the Ottomans regarded Istanbul, their capital, as the center of Islamic civilization. The Ottoman sultan, also the caliph of the Muslim world, and his government, the Divân, took on the responsibility of advancing Islamic civilization. Early on, they embraced Western science and technology selectively, adapting them to their specific needs [7, pp. ix–x]

In terms of education, the Ottomans inherited academic institutions and traditions from their predecessors, the Seljuk Turks (1037–1194). The most significant of these were the medreses, charitable centers of learning that had existed since the empire's inception until the early 20th century. The construction of medreses intensified alongside the empire's political and economic progress, peaking in the 16th century. The number of medreses doubled in each century, with Istanbul housing the largest concentration. By the 19th century, there were 166 active medreses in Istanbul alone, with 536 students attending. Additionally, the Ottomans established 665 medreses in European provinces, which now form modern nations like Greece, Bulgaria, Romania, Albania, Hungary, and the former Yugoslavia. According to Italian priest Giambattista Toderini, who visited Istanbul in the late 18th century, Ottoman medreses were often more advanced than their European counterparts, particularly in terms of scientific autonomy. Medrese education in the Ottoman era was divided into two main branches: traditional sciences, including Arabic linguistics, grammar, rhetoric, and religious studies, and rational sciences, incorporating disciplines like logic, mathematics, astronomy, and medicine. These disciplines were assimilated from classical Greek, Persian, and Indian sources [7, pp. ix–x].

The Ottoman understanding and categorization of sciences closely resembled those of the classical Islamic era. Knowledge was acquired either through the study of the Quran or through intellectual inquiry. Sciences derived from the Quran and hadith were termed as religious sciences (ulum-i nakliye), while those obtained through intellect and observation were known as rational or experimental sciences (ulum-i akliye). This dual classification, initially formulated

by al-Farabi and later developed by other Islamic scholars, was embraced and expanded upon by Ottoman scholars [21, p. 3]

Taşköprülüzade Ahmed Efendi proposed a further subdivision based on the practical utility of sciences in his work "Miftahü's-Saadet" (Key to Felicity). He categorized religious sciences, such as Quranic interpretation, hadith studies, canonical jurisprudence, theology, and mysticism, as beneficial. Additionally, intellectual sciences like medicine, mathematics, astronomy, and agriculture were considered worthy of study. He organized sciences into seven groups, with the first five focusing on rational sciences and the last two emphasizing the significance of religious knowledge. This classification, which underscored the relative importance of intellectual and religious learning, greatly influenced Ottoman scholars and shaped the curriculum of madrasas, the primary educational institutions in the Ottoman classical period from the mid-15th to the 18th century. The educational journey in Ottoman society typically began with Quranic study, followed by Arabic language, logic, literature, theoretical philosophy (including metaphysics), theology, canonical jurisprudence, hadith, and Quranic interpretation. Subjects like physics, geometry, arithmetic, and astronomy were taught both within theological works and through separate treatises dedicated to these disciplines [21, p. 3].

Tafsir

The abrupt end of the Ottoman Empire and the subsequent profound cultural changes following the establishment of the modern Turkish Republic severed connections not only between modern Turkey and the Arab world but also between Ottoman, Islamic, and Arabic intellectual histories. While historians largely overlook the Ottomans in contemporary studies of Islamic intellectual history, it appears that Istanbul was a significant center for the culmination of the medieval tafsīr tradition. Most surviving tafsīr works, including many obscure ones, are now housed in Istanbul libraries, suggesting a deliberate effort to collect and preserve them. This indicates a sophisticated understanding of the genre's history. However, this aspect of tafsīr studies has not been thoroughly explored—namely, why and how these works were preserved. Examining the manuscripts themselves is crucial for understanding their transmission and production history [35, pp. 678–679]

Based on the findings presented by Mohsen Gourdarzi, Ottoman scholars around the turn of the sixteenth century primarily focused on commentaries by al-Zamakhshari, al-Razi, and al-Baydawi, along with some glosses on these works. These commentaries did not primarily emphasize early exegetical traditions. When exegetical reports were considered, they were viewed merely as one of many sources for understanding the Qurʾan. A similar approach was observed in the works of al-Fanari, al-Siwasi, and al-Gurani. The evidence suggests that scholars from other regions of the Islamic world also did not place significant emphasis on the exegetical views of early authorities [36, p. 280]

The record, for example, the titles of the commentaries on al-Kashshāf that were utilized and studied within the madrasa system of the Ottoman Empire. Its author is the renowned Ottoman scholar and judge Qinalizāde (d. 979/1572), known in Arabic sources as Abū al-Hinā'i. Qinalizāde's presence is noted in both Arabic and Ottoman studies, albeit with different focuses. The letter analyzed here reshapes as-Suyūtī's evaluation and represents what could be called the traditional understanding of the reception of al-Kashshāf and its commentaries. They help identify which commentaries were read and considered authoritative and essential for any discussion on tafsīr. These documents are immensely valuable as they reveal how the tradition itself evaluated and managed the growing body of literature on al-Kashshāf. They enable us to map out the reception of al-Kashshāf, serving as the initial step in scholarly investigations into medieval commentaries in tafsīr [37, p. 220]

Furthermore, following a phase of translating tafsīr texts, the Ottoman Empire emerged as a hub for both elaborating on existing tafsīrs and generating new works that gained widespread popularity across the Islamic world. Notably, three significant works have endured and exerted considerable influence. Firstly, there's the Qur'an commentary authored by Abū 'l-Suʿūd (d. 982/1574), who served as the Sheikh al-Islām under Suleiman the Magnificent. This commentary became a fundamental component of Ottoman madrasa education and was widely circulated throughout the Islamic sphere. Secondly, al-Bursawī's (d. 1137/1725) tafsīr rose to prominence as the quintessential Sufi interpretation, serving as a primary source for accessing the Sufi tradition of interpreting the Qur'an. This work also saw early publication in the history of Arabic literature. Lastly, the extensive gloss on al-Bayḍāwī's exegesis by Ismāʿīl ibn Muḥammad al-Qūnawī (d. 1195/1781) was swiftly published in Istanbul after its composition. Although this work has faded from the narrative of tafsīr history, it was a cornerstone of scholastic education. The Ottoman sponsorship of tafsīr extended to their Arab territories, notably influencing the work of Maḥmūd Shihāb al-Dīn al-Ālūsī (d. 1270/1854). Istanbul rivaled Cairo as a publishing center for medieval tafsīr tradition from the mid-nineteenth century until the collapse of the Ottoman Empire [35, pp. 678–679]

In the early Islamic centuries, theologians exerted significant effort to control education, ultimately succeeding in monopolizing it. Since the establishment of the Ottoman Empire, if not earlier, the prevalent form of education in Islamic regions predominantly consisted of religious instruction. Quranic schools served as the fundamental educational framework upon which all subsequent forms of education—be it military, administrative, technical, theological, or mystical—were built. The importance of these Quranic schools is evident from the meticulous attention given by successive generations of patrons from various walks of life to their establishment and upkeep. Perhaps no other social institution in Islamic territories embodies the universalist ethos of Islam as comprehensively as these schools, as they ensured uniformity in education across vast geographical regions. The traditional subjects and teaching methods of elementary education were uniformly pursued across diverse regions, from the Niger to the Nile and the

Indus. The upbringing of children in social values took place primarily within the household, where regardless of social status, principles of discipline and reverence for elders were universally instilled. This foundational aspect of social education should not be underestimated, as it greatly influenced the pupil's attitude towards their teachers and the subjects they studied, fostering a disposition towards accepting authority prevalent in all areas of Islamic education. In affluent households, the initial stages of formal education were also conducted at home by a tutor or visiting Seyh (religious scholar). However, this instruction likely did not differ significantly from the teaching methods employed in Quranic schools, which have persisted to modern times and thus require no further elaboration [32, p. 139].

In Quranic schools, pupils were typically taught to recite portions of the Quran from memory, and at most, to read and write. Basic arithmetic might have been occasionally taught, but more commonly, it was learned through practical application such as from local tradespeople or land surveyors. Quranic schools were often found in towns, frequently situated on the upper floors of public fountains adjacent to mosques, while in villages, the mosque itself served as a school when needed. Private tutors could hold classes in various locations, and both teachers and school buildings were typically funded through the generosity of wealthy benefactors who established endowments for their maintenance. In cases where teachers relied on their earnings, parents would pay them a modest weekly fee. There was no formal system of inspection or regulation of the instruction provided by these tutors. Oversight of endowed schools and teacher appointments rested with the administrator of the endowment, often a descendant of the founder, or with the Addi, who had a general supervisory role, primarily concerning financial matters. It is generally believed that the average tutor (Fiki) was illiterate and motivated by financial gain, a perception that led to disdain from higher-ranking religious scholars (Ulemá), although they still garnered some respect from the general populace. Estimating the total number of Quranic schools and attending children is challenging [32, p. 139].

In the mid-eighteenth century, a mekteb (school) was established in Galata where students were taught writing, marking a departure from the traditional focus on calligraphy. However, this instruction primarily focused on ornamental writing rather than functional literacy. Students were not taught Arabic or Turkish language skills, and any further education they received, such as rudimentary mathematics, was likely acquired outside of formal schooling from family members or employers. Consequently, the vast majority of the population, particularly in rural areas, remained illiterate. Consequently, literacy bestowed a level of respect upon those who possessed it, particularly the Ulema, which may not have been commensurate with their achievements in a society more oriented towards book learning. In both the Arab provinces and the Ottoman territories, all mektebs (Quranic schools) owed their existence to private benefactors. While some were established by Sultans, these initiatives were essentially private endeavors, distinct from state-sponsored schooling. The difference between Sultan-founded mektebs and those established by lesser individuals, such as Kadins and Pajas, mainly lay in their scale and resources. The establishment of mektebs was considered a charitable act akin to providing hostels for travelers or constructing bridges and fountains. For instance, the endowments (wakfiyes) of the Quranic schools established in Istanbul by Sultans Mehmed I and Bayezid II specified the intended beneficiaries, such as orphaned or impoverished children, and mandated prayers for the founder. Similar to schools in the Arab provinces, students in Ottoman mektebs often received clothing, food, and occasional outings, particularly those associated with charitable kitchens (imáret). Mektebs primarily served children whose families couldn't afford private education, with wealthier families expected to educate their children privately. The typical mekteh building featured a large domed hall, with a smaller room for the teacher and assistants. Students were instructed collectively, seated cross-legged on mattresses with low desks [32, pp. 142–143]

Besides preserving and organizing the commentary tradition of medieval Islam, the Ottoman Empire emerged as a hub for translating and creating new interpretations of the Quran. Three significant works stand out for their enduring influence. Firstly, the Quranic commentary by Abū ’l-Suʿūd (d. 982/1574), Suleiman the Magnificent's Sheikh al-Islām, became a fundamental component of Ottoman madrasa education and widely circulated in the Islamic world. Secondly, al-Bursawī’s (d. 1137/1725) commentary reached the zenith of Sufi interpretations and became a primary source for accessing Sufi Quranic interpretations. Thirdly, the extensive gloss on al-Bayḍāwī’s exegesis by Ismāʿīl ibn Muḥammad al-Qūnawī (d. 1195/1781) was swiftly published in Istanbul and became essential in scholastic education, though it has faded from the narrative of Quranic commentary history. Ottoman patronage of Quranic commentary extended to Arab provinces, notably with the contributions of Maḥmūd Shihāb al-Dīn al-Ālūsī (d. 1270/1854). Istanbul's role in publishing medieval Quranic commentary rivaled that of Cairo from the mid-nineteenth century until the Ottoman Empire's decline [35, p. 679].

The collapse of the Ottoman Empire and the subsequent significant cultural changes with the establishment of the modern Turkish Republic severed the connections not only between modern Turkey and the Arab world but also between Ottoman, Islamic, and Arabic intellectual histories. Today, Ottoman history is primarily studied by historians, and it plays a minimal role in contemporary studies of Islamic intellectual history. However, it appears that Istanbul was a focal point for the development of the scholastic system of medieval tafsīr, although further research is needed regarding the Mughal Empire due to limited scholarly attention. Many surviving tafsīr works, including obscure ones, are now housed in Istanbul libraries, suggesting a deliberate effort to collect and preserve these texts beyond mere coincidence. The extensive collection of titles in Istanbul libraries indicates a systematic program to gather all available tafsīr works, reflecting a nuanced understanding of the genre's history. This aspect of tafsīr studies, focusing on preservation and collection efforts, remains largely unexplored. While the

publication of works in critical editions is essential, studying the manuscripts themselves is crucial for understanding their transmission and production history. Furthermore, Istanbul served as a significant hub for archiving cultural productions from across the Islamic world, demonstrating a comprehensive approach to preserving cultural heritage irrespective of origin or immediate relevance [35, p. 678]

Hadith

In the madrasah, students are taught a standard curriculum covering various subjects such as morphology, syntax, and logic, followed by the study of hadith and Quranic commentary. During these foundational studies, they engaged with disciplines such as elocution, preaching, rhetoric, philosophical theology, philosophy, jurisprudence, inheritance laws, beliefs, and legal theory. During the Ottoman Empire, the field of hadith studies also flourished. In the madrasahs, hadith studies were taught during the reign of Sultan Sulaiman al-Kanuni, where a madrasah focusing on the education of hadith sciences called dar al-Hadith was established. This place became a center for scholars to study and delve deeper into the science of hadith. Some hadith books were part of the curriculum in the Ottoman Empire. Besides studying hadith from experts and renowned hadith books from earlier times, some scholars wrote in the field of hadith studies. In addition to madrasahs, Darul Hadith were also established by the Sultan as centers for learning hadith. The teachers at this institution also received high salaries similar to those in madrasahs [7, p. 10].

The authenticity of Hadiths was often perceived to reside in their oral transmission. Yet, many traditionists, even when reciting traditions from memory, relied on "notebooks" dating back to the early centuries. Despite some being praised for abstaining from this practice, the writing down of Hadith was initially opposed in Islam, particularly in Bassora during the second/eighth century, and elsewhere. For example, Ibn Shibab al-Zuhri, a prominent traditionist, was said to have never written down a tradition, yet he is also depicted as a diligent writer, possibly at the request of the Umayyads. Opponents of writing down Hadith cited a tradition attributed to Muhammad, warning against writing anything besides the Quran, for fear of confusion between the two. Michael Cook has extensively addressed the history and origins of this opposition, suggesting a Jewish influence and offering a general explanation for the decline of oral tradition in Islam.

Despite the gradual dominance of written records, oral transmission continued to be idealized. Both oral and written reception of knowledge (traditions) retained ambivalence. Scholars like al-Khatib al-Baghdadi and al-Nawawi established criteria for the quality of transmission, enumerating eight modes of transmission in descending order of value. The first three modes are as follows:

1. "Direct listening" (al-sama'): The disciple listens to traditions recited from memory or read from the master's book or booklet, using terms like "I heard" or "So-and-so transmitted to me/us."
2. "Reading" or "recitation" (qira'a): The disciple reads aloud from a book or booklet or recites from memory in front of the master, using terms like "So-and-so taught me/us" or "I read in the presence of."
3. "Licence to transmit" (ijaza): The master grants permission to transmit specific works or all works included in their syllabus to a designated individual, although scholars disagree on the value of various types of licenses [38, pp. xIix–Ii]

Just as ensuring the faithful transmission of the Qur'an is paramount—meaning that believers must be confident that the Qur'an they recite contains the exact words of God as proclaimed by Muhammad and that it is conveyed in an "uninterrupted" (mutawatir) manner by reliable reciters—similarly, the transmission of Hadith must be established with an equal degree of certainty. Muslim scholars acknowledge that, to some extent, this transmission may involve conveying the meaning rather than a literal word-for-word rendition, as long as the essence remains intact. Indeed, many regard knowledge of Hadith as the quintessential "science" ('ilm), rooted in certainty, in contrast to disciplines like dialectic theology (kalam) and secular studies such as literature and philosophy. Hence, it is imperative to disseminate Hadith knowledge throughout all Muslim territories. Furthermore, within traditionalist circles, particularly those advocating the Hanbalite theological perspective in opposition to dialectic theology, individuals who have dedicated themselves solely to the memorization, study, and transmission of Hadith—essentially, the traditionists (muhaddiths)—are revered as virtuous figures [38, pp. xIvi–xIvii]

In the late 19th century Ottoman period, the establishment of numerous publishing houses led to the publication of significant works. However, the initial acceptance of publishing religious texts was gradual. The first permission for book publication was granted by Shaykh al-Islām Yenişehirli Abdullah Efendi, stipulating that only dictionaries or books on instrumental sciences like logic, hikmah, and astronomy could be published. Religious works were initially prohibited until Imam Birgivi's Risāla was published in 1803, marking the first religious work to be printed. Despite this, the publication of fundamental hadith works and the Quran was still restricted. The ban on religious publications was reportedly lifted in 1873, but before that, Ahmad Ziauddin Gümüşhanevi independently published his Rāmuzu'lahādīh in 1858-59, containing over seven thousand hadiths. The delay in officially permitting the publication of religious works during the Ottoman era was due to restrictions on hadith and Quran texts. It was not until later that hadith commentaries and usul texts were published. This delay explains why Sahīh-i Bukhārī was first published in Delhi (1850-1853) and Leiden (1862) rather than in Istanbul or elsewhere in the Ottoman Empire. The surge in publishing activities in the latter half of the 19th century made primary hadith sourcebooks and their commentaries more accessible to a broader audience. Various works, including Sahīh-i Bukhārī, were published in different regions, with indexes aiding in identifying the compiled hadith sources. Ömer Ziyâeddin Dağıstānī compiled the qawlī hadiths of Sahīh-i Bukhārī in 1890-91, offering concise versions of 4541

hadiths. Subsequent editions of Sahīh-i Bukhārī were published with the support of II. Abdülhamid in 1895, and Mehmed Zihni Efendi published it in Istanbul in 1913 [39, pp. 50–51].

The expansion of publishing activities in the latter part of the 19th century facilitated the accessibility of both primary hadith sourcebooks and their interpretations to a broader audience. To aid in identifying the sources of compiled hadiths in these published works, indexes were either separately published or included in the introductory sections of the books. Notable among these works is Sahīh-i Bukhārī, which was initially published in India between 1850-1853, in Leiden in 1862, and multiple times in Egypt. Additionally, Ömer Ziyâeddin Dağıstānī (d. 1920) compiled and published the qawlī hadiths of Sahīh-i Bukhārī in a work titled Sunenu *aqwāli'n-nabawaiyya* mina'lahādīthi'l-Bukhāriyya in 1308/1890-91, providing concise versions of 4541 qawlī hadiths. After these publications, another edition was released with the backing of II. Abdülhamid (1876-1909) in Bulaq in 1313/1895. Following this, Sahīh-i Bukhārī was published by Mehmed Zihni Efendi (d. 1332/1913) in Istanbul at the Matbaa-i Amire publishing house. In the 19th century. Qastallanī's (d. 923/1517) Irshādu's-sārī was published many times since 1267/1850-51 onwards. Nawavī's (d. 676/1277) commentary on Sahīh-i Muslim was published in Cairo (1271/1854-55) and in Lucknow (1285/1868-69) as a separate work, and on many occasions as an appendix to Qastallanī's Irshādu's-sārī. Ibn Hajar's (d.852/1449) Fathu'l-Bārī was published in Delhi in 1307/1890 and then in Bulaq in 1300/1882-83. 'Aynī's (d. 855/1451) commentary 'Umdatu'l-qārī was published in Istanbul at Matbaa-i Amire publishing house in 1308-311/1890-94. Following the publication of these hadīth books and their commentaries, some index studies were carried out in the Ottoman era. In these indexes, we notice that not only the mention of any given hadīth in the sourcebooks but also the references in the commentaries were taken into consideration [39, pp. 50–52]

The significance of the Ottoman hadith indexes lies in being among the earliest examples of indexes that continue to be relevant for publication today. An example of this enduring relevance is seen in Miftāhu's-Sahīhayn, published in Beirut in 1975, which demonstrates the work's enduring scientific quality even in more recent times. Below, we will discuss the Ottoman period indexes in chronological sequence and then introduce Concordance along with its overall characteristics [39, pp. 52–53]

Fiqh

Similarly, the fields of jurisprudence and principles of jurisprudence. As branches of knowledge that deal with aspects of Islamic law, these sciences have developed quite rapidly. Jurisprudence often intersects with matters of state, providing Islamic jurists with golden opportunities to hold strategic positions, including roles as judges, prosecutors, and even muftis in the regions surrounding the Empire, with substantial salaries [40, pp. 51–77]. In the 15th century, starting from the time of Sultan Muhammad al-Fatih, the position of mufti was granted to those considered competent in the field of Islamic scholarship, particularly in the field of jurisprudence.

In the book "The Mufti of Istanbul," R.C. Repp lists the sequence of muftis from the mid-15th century to the 16th century. Certainly, by the end of the sixteenth century, the position of the Müfti of Istanbul, also known as the Şeyhülislâm, had evolved into the highest rank within the Ottoman scholarly hierarchy. This group of scholars held crucial responsibilities, primarily focused on the administration and interpretation of the law, as well as overseeing education throughout the empire. The Müfti, often likened to the Pope by Western writers, had undeniably attained a level of prestige comparable to, and in some aspects, even rivaling the Grand Vezir, who served as the sultan's ultimate representative. While the role and duties of the M üfti in the later stages of the empire, following the passing of one of the most esteemed Müftis, Ebüssu'ûd Efendi, in 1574, are relatively well understood in general terms, the origins and evolution of this office remain somewhat obscure. This book aims to explore the early history of the M üfti position, tracing its beginnings (traditionally believed to have emerged around 1425, initially referred to as the Müftilik of the capital) up to the era of Ebüssu'ûd Efendi's tenure [40, p. Xix]

Sufism

In the field of Sufism, the Ottoman Empire played a significant role in fostering the growth and development of various Sufi orders, spiritual practices, and mystical teachings. The Ottoman rulers, elites, and common people alike were patrons and followers of Sufi orders, contributing to the flourishing of Sufism within the empire.

In the Ottoman Empire, particularly in Anatolia, Ibn Arabi wielded significant influence, rivaled only by Jalal al-din Rumi. In the early 13th century, Ibn Arabi was invited to Konya by Sultan Kay Kaus of the Seljuk dynasty. His devoted disciple, Sadr al-Din, played a crucial role in establishing Ibn Arabi's ideas as a substantial force in Turkish intellectual circles. Despite facing opposition from certain scholars, Ibn Arabi's influence extended across a wide spectrum of scholars, from Mulla Mehmed Fanari, the initiator of the Ottoman madrasa tradition, to Shaikh al-Islam Kemalpashazade, who issued a fatwa endorsing all Ibn Arabi's works. This influence persisted into the 18th and 19th centuries, as evidenced by figures like Hasan al-Attar, who journeyed to Damascus to study Ibn Arabi under Shaikh Umar al-Yafi. However, by this time, he was beginning to attract criticism from reformers. Even in the 20th century, Ibn Arabi's ideas continued to resonate in Anatolia. Sayyid Nursi, a Sufi reformer critical of Ibn al-Arabi's perspective, nonetheless wrote in a style influenced by him. In the Isparta-Afyon region between 1925 and 1950, most questions posed to Nursi by his disciples revolved around issues related to wahdat al-wujud, indicative of Ibn `Arabi's enduring impact [22, pp. 22–23]

Just as the bonds between teacher and pupil served as the cohesive force within the intentional community of scholars, similarly, the relationships between disciple and master, and among all disciples and masters, to the holy sites of their respective orders, especially to the founding saints, formed

the framework of the mystical realm. Through these connections, novel ideas spread, and new directions were established. Certain Sufi orders provided connections primarily at a regional level. For example, the Bektashiyya and the Mawlawiyya in the Ottoman Empire. According to Evliya Chelebi in the mid-17th century, the former boasted 700 lodges and enjoyed significant popular support from eastern Anatolia to the Balkans. The latter operated fourteen prominent lodges in major cities and seventy-six in towns, all overseen from the central lodge within the shrine complex of their founder, Jalal al-Din Rumi, in Konya [22, pp. 27–28]

During the Ottoman era, Sufism also experienced significant growth and influence within the empire. Sufism, or Islamic mysticism, played a crucial role in shaping the spiritual and cultural landscape of the Ottoman Empire. The Ottoman sultans and elite class often patronized Sufi orders and their leaders, providing financial support and political protection. This imperial patronage helped Sufism thrive and expand its influence within Ottoman society.

D. CONCLUSION

This study has shown that the Ottoman Empire played a significant, though often underappreciated, role in the continuation and development of Islamic sciences during the medieval period. Contrary to the prevailing narrative that positions the post-Abbasid period as one of intellectual stagnation, the Ottoman era demonstrated a nuanced and strategic engagement with both traditional religious sciences and rational disciplines such as astronomy, mathematics, and medicine.

Through a well-established system of madrasahs, the patronage of sultans, the endowment (waqf) system, and a rich translation tradition, the Ottomans preserved the intellectual legacy of earlier Islamic civilizations while also fostering original contributions. Institutions such as the Süleymaniye Complex, Fatih madrasahs, and the Palace School exemplify the integration of scientific and religious learning within state-sponsored education.

Ottoman scholars such as Taqi al-Din, Ali Kuşçu, Kadızade-i Rumi, and Qinalizade contributed not only to the preservation of classical knowledge but also to the production of new works in astronomy, philosophy, jurisprudence, and tafsir. The intellectual climate was further enriched by cross-cultural interactions with Greek, Persian, Indian, and European traditions, making the Ottoman intellectual world one of synthesis rather than mere transmission.

Although the Ottoman scientific enterprise may not have achieved the same level of innovation as the Abbasid Golden Age, its enduring infrastructure, academic institutions, and patronage culture ensured the continuity of Islamic intellectual traditions into the modern era. Therefore, the Ottoman contribution must be recognized as a vital chapter in the broader history of Islamic science and civilization.

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