Medieval Islam: The Origins of Modern Western Civilization

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Outline

Introduction

On February 10, 2015, Fox News reported on a father in Florida who was angry that his son, a sophomore in high school, was instructed to "recite an Islamic prayer in a 10th grade history class."[1] The father laments: "For it to be mandatory and part of the curriculum and in the textbooks didn't seem right."[2] He further claimed that his son's textbooks neglected information about Judaism and Christianity, a claim that was legitimate because, according to the source, 100 pages concerning both religions were missing due to a manufacturing defect. Approximately eight months later, on October 7, 2015, the same source reported on a mother in Bakersfield, California who was angry that her son was asked to list the Five Pillars of Islam and "summarize Islamic beliefs and practices."[3] Furthermore, the assignment provided a barcode that could be scanned by a cell phone providing students an audio file of an online Muslim prayer. The mother noted on the assignment that her son would "not be a part of this in any sort of way, [that] this is bad teaching material, and if [the teacher had] a problem with it, [they could] call [her] lawyer."[4] Finally, on November 19, 2015, just four days after a brutal terrorist attack on Paris, France which left approximately 129 dead, a different news source reported that a grandmother from Orange County, California was distressed that her seventh-grade grandson was instructed to learn a song about Islam as a tool to "help…seventh-graders learn about the religion."[5] The grandmother stated: "by

[1] "Florida Dad Protests Islam Lessons in Son's H.S. History Class," last accessed on November 11, 2015, http://insider.foxnews.com/2015/02/10/florida-dad-protests-islam-lessons-sons-high-school-history-class.
[2] Ibid.
[3] "READ: Mom's Angry Note to Teacher About Islam Assignment Goes Viral," last accessed on November 11, 2015, http://insider.foxnews.com/2015/10/07/read-angry-mom-sends-note-teacher-about-homework-assignment-islam.

[4] Ibid.
[5] "Shocked Grandmom Says She Would've Never Found Out About Teacher's Islam Song if Her Grandson Didn't Accidentally Bring the Lyrics Home," last accessed on November 19, 2015, http://www.theblaze.com/stories/2015/11/19/shocked-grandmom-says-she-wouldve-never-found-out-about-teachers-islam-song-if-her-grandson-didnt-accidentally-bring-the-lyrics-home.

singing this song, the children feel comfortable that maybe Allah is the only god, and maybe that they should start following him… and THAT I'm not OK with."[6]

While it is impossible to determine a precise percentage of the population represented by the above father, mother, and grandmother, it is safe to say that such reports have become more frequently conveyed on news websites, television, and social media feeds. This is partly due to increasing activities of radical terrorist groups claiming to be driven by Islamic teachings. Terrorist attacks in the last decade have caused some, including those mentioned above, to question the rationale behind school curriculums' inclusion of Islamic history. In a sense, such an attitude is understandable due to the lack of attention afforded to the contributions of medieval Islam to modern Western society. This paucity of attention, coupled with a historical narrative that has traditionally favored the contributions of western minds over those of the East, has helped to create a modern society that views the 'other' with skepticism and animosity. As fears of radical terrorists pervade modern Western society it is all the more necessary to understand the interconnectedness between Europe and the Middle East. Indeed, events in the Middle East helped lay the foundation for modern Western thought. This interconnectedness had its genesis in the time period ranging from approximately 661 to 1258 CE. During this time, Arab Muslims conquered a territory that, beginning from the Arabian Peninsula, stretched west through North Africa and Spain, north as far as Syria and Iran, and east into India. Within this vast empire, Islamic scholars, under the direction and financing of various caliphs, embarked on an intellectual journey that resulted in a deluge of knowledge and scientific advancement. Over the course of several centuries, this knowledge was transmitted to Europe through trade, scholarly exchange, and the Crusades, laying the foundation for the European Renaissance. While historians have written books addressing the innumerable ways that the West was changed by Islam,[7] for the purposes of this work, the fields of mathematics, geography, health

[6] Ibid.

[7] *See* Jonathan Lyons, *The House of Wisdom: How Arabs Transformed Western Civilization*, New York: Bloomsbury Press, 2010.

and medicine, and philosophy are discussed. In each of the aforementioned fields, Muslim scholars made groundbreaking contributions, changing the intellectual course of the Western world.

Origins of Islam

Before discussing the innovations of the medieval Muslim empire, it useful to first understand the origins of Islam and the empire. Islam originated in the Arabian peninsula during the seventh century. The peninsula was inhabited by Arab or Bedouin tribes. Some of the Bedouin were nomadic and raised flocks of sheep and camels while others settled in mountain villages and engaged in a variety of agricultural endeavors, especially "grain, oil, [and] wine."[8] These two communities lived in symbiosis; the settled communities provided leadership, while the nomads, who were expert horsemen, provided the military support.[9] The peninsula was an important junction for various trade routes, connecting Asia with cities such as Alexandria in Egypt and Constantinople in the Byzantine Empire. Through these routes, merchant caravans transmitted goods, people, and knowledge. Important cities began to distinguish themselves as centers of trade and religion, especially Mecca around the sixth century. Mecca became an important religious center, attracting various peoples to a shrine that was built around a large, black meteorite known as the Kaaba. The Kaaba held religious significance to polytheistic Arabs, as well as Jews and Christians who claimed the shrine was built by Abraham.[10] Surrounding the Kaaba was an area known as the *haram*, "in which violence was forbidden."[11] This was a useful area for "hostile tribes…to do business, exchange goods, and information."[12] Thus, every year, people traveled across vast distances on pilgrimage to visit the Kaaba in order to worship and conduct business. In the latter part of the sixth century, a wealthy Arab tribe known as the Quraysh controlled the shrine and much of the trade flowing in and out of the *haram*. The Quraysh are significant because Muhammad was born of this tribe around

[8] Hugh Kennedy, *The Great Arab Conquests: How the Spread of Islam Changed the World We Live In*, Philadelphia: Da Capo Press, 2007, 45.
[9] Ibid.
[10] Ibid, 44.
[11] Ibid.
[12] Ibid.

570. In the early part of the seventh century, Muhammad claimed divine providence and began preaching a monotheistic religion that claimed Allah as the one true God and that he was Allah's sole prophet. Those who refused to follow this new doctrine faced eternal punishment. Muhammad's strict teachings threatened the prosperity of the Quraysh who profited from the diversity of peoples and religions who flocked to the Kaaba each year and he was subsequently forced out of Mecca in 622, when he and his followers and family moved to Medina, a city divided by tribal rivalries. Muhammad, who had become somewhat well-known by this time, was invited to Medina to serve as a mediator in their inter-tribal disputes and ultimately united the warring tribes, becoming their leader. From Medina, Muhammad and his armies waged war against his enemies in Mecca, defeating them by the year 628. By 630, Muhammad occupied Mecca and most of the Arab tribes accepted his rule and the new religion of Islam.

Conquest: The Umayyad Caliphate

Muhammad's death in 632 initiated a conquest that resulted in the creation of a vast Muslim empire. Muhammad's succeeding caliphs, Abu Bakhr, Umar ibn Al-Khattab, and Uthmann ibn Affan, wrested Syria, Iran, and Egypt from Byzantine, Sassanid, and Roman control between 632 and 656. After Uthmann was assassinated in 656, a civil war between various Arab factions ended with the new empire under the control of Muawiya ibn Abi Sufyan. Muawiya's reign ushered in the era of the Umayyad Caliphate, which lasted from 661-750. Under the Umayyad, Muslim expansion extended into Central Asia, India, North Africa, and Spain. The Muslim conquest was halted in France in 732 after Islamic forces were defeated by heavily armored European knights under the leadership of Charles Martel. After continual civil wars between rival Arab tribes, power was seized from the hands of Umayyad rulers and the Abbasid Caliphate ruled the now vast Muslim empire from 750 until the Mongol invasion of 1258.

There are several items worthy of consideration concerning the early Muslim conquests of the Umayyad Caliphate. First of all, conquest of Byzantine, Persian, and Roman territory was accomplished with relative ease. This was due to religious and socio-economic divisions existing within each empire. The Byzantine Empire was divided between wealthier urban Christians who maintained that Jesus of Nazareth contained a dual nature, both divine and human (Diophysites); and poorer citizens of whom many held that Jesus contained only a single, divine nature (Monophysites). The wealthy oppressed the poor and considered them heretics. Likewise, in the Sasanian Empire, wealthier citizens were often Zoroastrian while the poorer citizens were Christians. Again, the wealthy oppressed the poor. Egypt too, was divided between Coptic Christians (often Monophysites) and Diophysite rulers. These religious and socioeconomic divisions created disunity, allowing for relative ease of conquest. Furthermore, the poor and oppressed often viewed Islamic occupation as a welcome alternative and in some cases aided the invading Muslim armies. This brings up a second point for consideration, which is that Muslim conquerors were often merciful and tolerant to those they conquered. Muslim leaders usually provided the cities they prepared to invade with three options: surrender and convert to Islam; surrender and agree to pay an annual tribute as well as the *jizya* or poll tax; or war. Many cities and nations opted to offer tribute and pay the *jizya*. In doing so, non-Muslims were allowed to live in relative peace in an empire that was efficiently governed by educated Muslim rulers. Furthermore, Christians, Jews, and other religious groups were allowed to worship in their churches, synagogues, and temples, unmolested. In the city of Homs, for instance, when Muslims and residents enacted a treaty, the residents were "obliged to pay taxes…at a fixed rate…or at a variable rate according to their prosperity at the time."[13] Also, the citizens "lives, property, city walls, churches, and water mills were guaranteed to them except for a quarter of the church of St. John, which was to be turned into a Mosque."[14] The portion of the treaty that stipulates part of a church be converted to a Mosque was a fairly regular practice within the early empire and shows that

[13] Kennedy, 86.
[14] Ibid.

Christianity and Islam "could and did coexist, if not in harmony, at least in a measure of mutual tolerance."[15]

A final point for consideration is the fact that conversion to Islam opened up a variety of opportunities to non-Muslims. To begin with, it exempted one from having to pay the *jizya*, but also allowed an incredible amount of social mobility. Conquered people "could move to being conquerors, members of the new ruling class and, at least theoretically, equal to all other Muslims."[16] Nusayr, for instance, was an Armenian captured during the Muslim campaigns of Iraq. After his conversion to Islam, his son "went on to become governor of North Africa and supreme commander of the Muslim forces in the conquest of Spain."[17] This social mobility lay in stark contrast to Roman and Persian citizenship where "membership of aristocratic families was an exclusive, privileged position to be defended by those who enjoyed it."[18] As time progressed and depending on the prerogatives or territorial governors, conversion to Islam became less of a requirement and non-Muslims served in important positions throughout the Muslim empire based on merit. This tolerance for diversity is exceedingly important to note, because such a society allowed for the freedom of thought and expression of ideas which were characteristic of Islamic society during the Umayyad and Abbasid Caliphates. It is during these Caliphates, from roughly 661 to 1258, that scholars from around the empire, Muslim and non, were encouraged to engage in philosophical and scientific debates that yielded an abundance of intellectual information.

The Umayyad Caliphate had conquered an empire, bringing a wealth of cultures, religions, and ethnicities together. They had also upset the original order of Islamic leaders when they seized power after the death of Uthmann in 656. After Muhammad's death in 632 and lasting until the death of Uthmann in 656, Muslim caliphs were chosen by an electorate comprised of Islamic elders. Beginning

[15] Ibid.
[16] Ibid, 374.
[17] Ibid, 375.
[18] Ibid.

with Muawiya ibn Abi Sufyan, the first Umayyad caliph, succeeding caliphs became dynastic.[19] This dynastic method of leadership angered many Muslims and discontent plagued the dynasty throughout its existence. Nevertheless, the innovations of Umayyad Caliphs laid the foundation for the explosion of knowledge produced by the succeeding Abbasid Caliphate. One innovation was the paying of a stipend to support a standing army necessary to ruling a vast empire. This stipend "necessitated a taxation system for revenue…and directly opened opportunities for mathematics scholars to balance and improve the caliphate's budgets."[20] Furthermore, after transferring the imperial capital to Damascus, the Umayyad rulers instituted a "ruling elite to help govern the territories."[21] The Umayyad focus on governance caused Muslims within the empire to lament the lack of spiritual guidance coming from the caliphate. This caused the Umayyad rulers to embark on a campaign to "Islamicize"[22] their governance in order to gain public approval. Mosques were built throughout the empire, monuments dedicated to Muhammad were created, and coins were minted with Arabic phrases, all of which helped to spread the Arabic language throughout the empire.[23] As Arabic spread and became the lingua franca, the third Umayyad caliph, al-Walid ibn Abdul Malik, became interested in translating ancient Greek works. Translated works included the subjects of "medicine, astronomy, and chemistry."[24] The push to translate ancient sources ultimately became a main focus of the Abbasid rulers. Finally, under the Umayyad, *ulemma* or religious leaders, differentiated between various forms of knowledge, allowing for the study of academic sciences separate from religious studies. In doing so, the *ulemma* "neither banned science nor restricted its content, but simply required that science and religion remain independent."[25] Such innovations established scientific

[19] John L. Esposito, *Islam: The Straight Path,* New York: Oxford University Press, 1998, 38.
[20] Morgan J. Smith, "From the Quran to Algebra: The Abbasid Caliphate's Patronage of Al-Khwarizmi's Algebraic Innovation," 143.
[21] Ibid.
[22] Ibid.
[23] Ibid.
[24] Shahrul Nizam Ishak, "The Importance of Translation Mathematics Old Script," *Malaysian Journal of Mathematic Sciences*, 3(1), 2009, p.58.
[25] Ibid.

liberty and expression, allowing the succeeding Abbasid Caliphate "to make considerable cultural and intellectual developments."[26]

The Abbasids: The House of Wisdom and the Translation Movement

As aforementioned, many Muslims questioned the religious dedication of the Umayyad caliphs causing discontent within the empire. Even more pressing however, were Persians who, after coming under control of the Umayyad's, felt as if they were being mistreated by Arabs "whom they regarded as half-civilized nomads."[27] Many Persians had converted to Islam, but adhered to Shiism.[28] With Persian help, Abdul Abbas al-Saffah seized the caliphate from Umayyad control in 750 and established the Abbasid Caliphate. Like the Umayyad, the Abbasids were from the Quraysh tribe and Sunni however, unlike the Umayyad, Abbasid's were tolerant of Persians, as many of the Abbasid's military leaders and administrators were Persian. While al-Saffah established the Abbasid caliphate, it was not until the reign of his successor Al-Mansur, that the Muslim world and Europe was changed by a revolution of science and intellectual discovery thus far hinted at.

Al-Mansur ascended the Abbasid throne in 754 and transferred the capital of the empire from Damascus to Baghdad in 762. Prior to his ascension, Muslim conquest under the Umayyad had "restored ancient ties among historic centers of civilization across a huge landmass… creat[ing] an invaluable melting pot for intellectual traditions that had been forcibly kept out for centuries."[29] Scholars from across

[26] Ibid.
[27] De Lacy O'Leary, *How Greek Sciences Passed to the Arabs*, London: Routledge and Kegan Paul Ltd, 1949, http://www.aina.org/books/hgsptta.htm#ch11.
[28] After the death of Muhammad in 632, there was a question as to who should succeed him. Some believed that his successor should be chosen by merit (Sunnis), while others believed that Muhammad's son-in-law Ali should be the successor (Shiites).
[29] Jonathan Lyons, 57.

the empire, including "Muslims, Christians, Jews, Zoroastrians, the star-worshipping Sabeans, and assorted other pagans were all able to exchange ideas and teachings."[30] Also, conquest had brought Muslims into contact with China and central Asia in 751. This contact resulted in the Islamic discovery of paper, an efficient and inexpensive medium for intellectual distribution.[31] Under al-Mansur the knowledge of the diverse peoples of the Muslim empire began to be purposefully collected and translated into Arabic under the financial auspices of Mansur's government. During his reign, Al-Mansur created a vast royal library where government funds provided for scholars to "translate, copy, study, and store the swelling volume of Persian, Sanskrit, and Greek texts"[32] flooding into the capital. In 876, the caliph Harun al-Rashid converted al-Mansur's royal library into what was known as "Bayt al-Hikma" or the House of Wisdom[33] which was later expanded under his son al-Mamun. The House of Wisdom in Baghdad was the center of world knowledge for approximately 500 years. Within the building, scholars not only translated sources from across the empire, but expanded upon them, making new discoveries. The House of Wisdom contained "an astronomical observatory, a translation office, and a great library…[and was] staffed by scientists, librarians, and other employees…who were assisted by excellent scribes, copyists, and bookbinders."[34] Other parts of the Muslim empire became learning centers as well. When al-Saffah seized power from the Umayyad, he murdered all descendants of the Umayyad family except for Abd al-Rahman "a nineteen-year-old prince…who slipped through North Africa to Spain and founded the independent kingdom of the Moors."[35] In time, translated works and knowledge filtered into and out of the caliphate in Spain, which lasted for 750 years.[36] By the end of the Translation Movement, "practically all the extant works that were part of the Greek scientific tradition had become accessible to

[30] Ibid.
[31] Ibid, 57.
[32] Ibid, 63.
[33] Rahim Kaviani, "The Significance of the Bayt al-Hikma (House of Wisdom) in Early Abbasid Caliphate (132 A.H.-218 A.H.), *Middle East Journal of Scientific Research*, 11 (9), 2012, p. 1275.
[34] Ibid.
[35] Benson Bobrick, *The Splendor of the Caliphs: Islam and the West in the Golden Age of Baghdad*, New York: Simon and Schuster, 2012, 12.
[36] Ibid, 95.

the Muslim reader."[37] Furthermore, these translations were transmitted to Western Europe through "Latin translations made in Spain and Sicily of Islamic scientific and philosophical works."[38] What follows are some-what brief descriptions of the innovations of Muslim scientists.

Mathematics

One of the early sciences important to Islam was mathematics. When Al-Mansur built the city of Baghdad, he did so using principles of Euclidian geometry garnered from translated Greek works. In 771, however, al-Mansur was visited by a Hindu delegation which brought Sanskrit texts "known as the *siddhanta"*[39] The *siddhanta* "contained all Hindu knowledge of the spheres, stars, mathematics, and other sciences…"[40] and relied heavily on the use of the sine function. Within less than a century, all trigonometric functions were known in the Muslim world, five of which (cosine, tangent, cotangent, secant, and cosecant) were purely Arab discoveries.[41]

Under the reign of al-Mansur's son, Al-Mamun, the exploration of mathematical principles accelerated due to the religious needs of the people. Of all the Muslim scholars concerned with mathematics, none's accomplishments stand out as much as those of Muhammad ibn Musa al-Khwarizmi who, while working in the House of Wisdom, produced several important works at the request of al-Mamun. One of al-Khwarizmi's first endeavors was the translation of Indian star charts known as the *zij al-Sindhind.* These charts became widely used throughout the Muslim empire and provided the ability to "pinpoint the positions of the sun, the moon, and the five visible planets; tell the time day or night based on stellar or solar observations…;and determine the possibility of sighting the crescent moon..."[42] With such charts, Muslims could know the exact moment to perform their five daily prayers and to calculate

[37] Nezameddin Majafi, "An Analytical Approach to the Rise of Translation Activity in Baghdad During the Early Abbasid Period," Masters Thesis, Allameh Tabatabai University, 2006, vii.

[38] Ibid.
[39] Lyons, 71.
[40] Ibid.
[41] Ibid.
[42] Lyons, 72.

the beginnings of important months on the Muslim calendar.[43] Also studied by al-Khwarizmi was the Hindu decimal system of using "nine numerals and a zero,"[44] which al-Khwarizmi explains in his book *The Book of Addition and Subtraction According to the Hindu Tradition*, are "capable of expressing any number." [45] Khwarizmi's book ended up in Europe by 1500 and Europeans "called the new numbers 'Arabic' numerals,"[46] essentially the same system used in the West today. His book further discussed a process for "carrying out a computation, a method later given the name 'algorithm,' which is the Latinized version of al-Khwarizmi's name."[47]

Possibly al-Khwarizmi's greatest contribution to mathematics was his work *The Book of Restoring and Balancing* which, in Arabic is called *Kitab al-Jabr wa'l-muqabala*, of which *al-Jabr* was eventually termed *algebra* in the West.[48] His work was used in a variety of ways, ranging from the calculation of the *zakat*, or Muslim equivalent of a tithe, to situations involving rules of inheritance. By using algebra, al-Khwarizmi was able to solve quadratic equations by combining early Babylonian and Hindu works with proofs grounded in Greek geometry which corroborated the results.[49]

Al-Khwarizmi died in 850, however scholars within the House of Wisdom carried on and improved his works. Ibn Turk, a contemporary of al-Khwarizmi, "developed highly detailed geometric proofs for some of al-Khwarizmi's equations."[50] In 870, Thabit ibn Qurra "provided additional geometric proofs to… solidify al-Khwarizmi's algebra as a tested discipline"[51]. Finally, al-Karaji "enabled the idea of the general polynomial and led to the most complete theory on algebraic calculous in the Islamic scholarly community."[52] The work of these and other Arab scholars continued in Baghdad until the

[43] Ibid.
[44] Ibid, 73.
[45] Ibid.
[46] Stanley M. Burstein and Richard Shek, *World History: Medieval to Early Modern Times*, New York: Holt, Rinehart and Winston, 2006, 96.
[47] Morgan J. Smith, 151.
[48] Lyons, 73
[49] Ibid, 75
[50] Morgan J. Smith, 152.
[51] Ibid.
[52] Ibid.

Mongol invasion of 1258, which destroyed the city. Arab scholars in Spain, however, survived and Arab works there were absorbed by Europeans who, by the eleventh and twelfth centuries, had begun to delve into the Arabic texts and translate them into Latin. European scholars such as Leonardo of Pisa and Adelard of Bath, then "began their own innovations, which initiated a movement towards the Renaissance."[53]

Geography

Islamic advances in Mathematics coincided with great strides in the realm of geography and navigation as well. Islamic trigonometric innovations, Al-Khwarizmi's translation of Indian star charts, and Khwarizmi's successor's work in the realms of algebra and geometry opened new avenues for which to measure time and space. During the Abbasid period, al-Mamun considered himself responsible for the physical and spiritual needs of his people.[54] Such needs included accurate directions for the position of Mecca in order to perform daily prayers, as well as the calculations of distances between major cities in the empire. Due to their access to ancient Greek sources such as Ptolemy, Muslim scholars knew the earth was spherical and understood that, to project a sphere onto a flat surface, presented problems.[55] This knowledge allowed them to accurately measure the distance between cities and the distance between individuals and Mecca by using curved lines of measurement rather than straight lines; a concept known as *azimuth.* Using such acquired knowledge, al-Mamun commissioned the creation of a world map in order to take account of the empire and the peoples he ruled. Among the map's features included "an accurate description of the Great Wall of China… 350 important cities and towns, five seas, 290 rivers, and 200 mountains.[56] The map further corrected ancient Greek maps which depicted a landlocked Indian Ocean, describing for the first time that "a global body of water surrounds the inhabitable world."[57]

[53] Ibid, 153.
[54] Lyons, 87.
[55] Ibid.
[56] Ibid, 89.
[57] Ibid, 90.

During the mid-twelfth century, Spain was ruled by a Christian king named Roger II. Surrounded by Muslim influence, Roger adapted his rule to resemble that of a Muslim caliph. Thus, tolerance and freedom of scientific expression continued under his reign. During such time, Roger summoned the Arab scholar al-Sharif al-Idrisi, where the pair embarked on the creation of what became known as *The Book of Roger*. Within this book, not only could highly accurate maps depicting lands ranging from Korea to the Canary Islands be found, but also "the most comprehensive descriptions to date of the peoples, lands, and cultures of the seven climates."[58] As useful as the map proved to be, even more useful, especially to future Western European navigators, was the idea that "the world as a place that could be mapped, charted, and explored in a systematic and scientific fashion."[59] As with mathematics, Arab studies in geography and cartography were later absorbed by European explorers. Christopher Columbus, for example, used Latin translations of Arab star charts for navigation as well as the Arab knowledge of a "symmetrical Earth…support[ing] Columbus' strategy of going east by sailing west."[60] It was said that Portuguese explorer Vasco da Gama, who was the first European navigator to sail around the Cape of Good Hope in 1497, employed the services of a Muslim pilot and used Muslim maps.[61] These explorations and those which followed fueled European conquests of Africa and the Americas in the fifteenth century.

Health and Medicine

Prior to Muslim conquest, Nestorian Christians [62] had established medicinal schools and hospitals in the Byzantine Empire in the sixth century and had translated Greek works into their Syriac language. Under Chosroes, a Persian King in the sixth century, a university was established at Jundi

[58] Ibid, 94.
[59] Ibid, 95.
[60] Ibid, 96.
[61] Ibid.
[62] Followers of Nestorius, the Bishop of Constantinople who, in 431 CE was excommunicated for his denial that Mary was the mother of God.

Shapur, which "combined classical learning with Indian philosophy and medicine."[63] Jundi Shapur housed Nestorian translations, and upon conquering Byzantine territories during the Umayyad period, Muslim conquerors demanded that the translations be turned over to them.[64] What followed was the dissemination of classical medicine which, like mathematics, was consumed and expanded upon by Muslim scholars.

As with mathematics, religious needs were the early focus of Islamic medicine as the Quran stressed a need to heal the sick. Using knowledge of ancient Greek sources acquired from the Nestorian Christians, the Muslim empire, by way of the House of Wisdom, developed "new medicines and new methods for preparing the active ingredients for these drugs.[65] Hospitals, medical schools, and public pharmacies were established in major cities through the Islamic empire including "Damascus, Baghdad, Cordoba, and Cairo."[66] Under caliph al-Mamun, a regulatory institution known as the Hisba was created and an appointed official called the Muhtasib "protected the citizenry from unethical practices in business and other public transactions"[67] including medical malpractice. The Hisba also regulated the relationship between doctor and patient. Doctors were required to 'do their rounds' and make records of their patients daily; records which were subject to audit.[68] Under the Abbasid caliph al-Muqtadir in 931, medical examinations were required of physicians, and Sinan ibn-Thadit, the court physician of al-Muqtadir, was said to have examined approximately 860 aspiring doctors.[69] Muslims made advances in optometry and surgery as well. Yuhanna Ibn-Masawayh, a Nestorian physician under al-Mamun, produced a wealth of medical treatises on "ophthalmology, fevers, headache, melancholia, diatetics, the testing of physicians,

[63] Nigel J. Shanks and Dashe al-Kalai, "Arabian Medicine in the Middle Ages," *Journal of the Royal Society of Medicine*, Vol. 77, Jan. 1984, 60.
[64] Ibid.
[65] Ibid.
[66] Lyons, 86.
[67] Shanks and al-Kalai, 62.
[68] Ibid.
[69] Ibid,

and medical aphorisms."[70] Ibn Musawayh was also reputed to have performed dissections on apes, which he was supplied by al-Mamun.[71] In the tenth century, Ibn Sina, also known as Avicenna, wrote the *Canon of Medicine*, which was based largely on the works of Galen, a Greek living in the Roman Empire during the second century CE. The *Canon of Medicine*, illustrated "keen clinical observations of various diseases,"[72] and "served as the leading medical text in the West for more than five hundred years."[73]

While placing a high priority on medicine, public and private health was also a major concern of Islamic society. One of the primary responsibilities of the Muhtsasib, the official of the Hisba, was preventing the spread of infectious disease; a concept which Islamic physicians understood could be accomplished by abstaining from contact with infected persons. To accomplish this, the Muhtasib prevented "lepers, those suffering from elephantiasis, and other afflicted from using public baths."[74] The Muhtasib also oversaw the collection of trash, a concept that even Europeans in the nineteenth century struggled with. Such innovations seem natural as personal hygiene was very important to practitioners of Islam. For instance, coinciding with the five daily prayers facing in the direction of Mecca, Muslims were commanded to purify themselves prior, washing their "hands, feet, and face."[75] Several mosques and public facilities contained "sophisticated water-delivery systems"[76] made possible by the studies and inventions of scholars such as Ibn al-Razzaz al-Jaziri, a twelfth-century scholar and mechanical engineer. His book *The Book of Knowledge of Ingenious Mechanical Devices* was based on the research of ancient Egyptian, Byzantium, Roman, and Greek scholars who accomplished incredible feats of fine mechanical

[70] "Yuhanna Ibn Masawayh," *Middle East Health*, last accessed on November 11, 2015, http://www.middleeasthealthmag.com/cgibin/index.cgi?http://www.middleeasthealthmag.com/jan2006/feature7.htm
[71] Shanks and al-Kalai, 61.
[72] Lyons, 177.
[73] Ibid, 86
[74] Shanks and al-Kalai, 62.
[75] Ibid.
[76] Ibid.

engineering including water clocks, pipe organs, and automated statues.[77] Jazari himself, not only translated ancient works, but recreated similar mechanical automata, as well as invented some of his own. His book provides detailed descriptions of his creations which included water clocks, statues and automata capable of pouring and dispensing water and wine, fountains and musical machines, phlebotomy devices, water-raising machines, and locks.[78]

Islamic advances in medicine and hygiene stood in stark contrast to the lack of such knowledge demonstrated by the first Crusaders. When Christian European knights invaded the Muslim empire in the latter part of the eleventh century in what became known as the "People's Crusade," Muslim chroniclers of the eleventh century noted that the Europeans were devoid of common hygienic and medicinal practices. While Islamic physicians understood that disease was transmitted by way of personal contact, many Europeans believed that disease was divine punishment. In his work *The Book of the Companion*, educated Arab soldier Usama ibn Munqidh describes a situation where Western European practices proved especially appalling. He relates an instance in which two Christian patients were being treated by an Arab doctor until the arrival of a European physician. A woman was experiencing stomach and intestinal problems for which the Arab physician had prescribed a strict diet, while a Christian knight suffered from a mild infection in his leg.[79] Ignoring the advice of the Arab physician, the European doctor "lopped off the Knights infected leg with an ax and made in incision in the shape of a cross into [the] woman's head, before rubbing her skull with salt; both died on the spot."[80] The Crusades, while brutal, ultimately brought Europeans into contact with sophisticated Arab medicine and health practices, even though such medicine was apparently spurned initially. By the thirteenth century however, European

[77] "Islamic Automation: A Reading of al-Jazari's *The Book of Knowledge of Ingenious Mechanical Devices (1206),"* Paper presented at the REFRESH Conference, First International Conference on the Media Arts, Sept.29-Aug. 4, 2005, pp. 5-6.
[78] Ibid, 7-8.
[79] Idib, 21.
[80] Ibid.

leaders such as Pope Urban III established a "network of hospitals…across Europe which appear to have been modeled on the famous Islamic hospitals of Cairo and Damascus."[81]

Philosophy

The discovery of ancient knowledge as well as the innovations conceived of during the Umayyad and Abbasid periods forced Islamic scholars to attempt to reconcile their strict monotheistic beliefs with scientific thought. To a large degree, their studies of Aristotle, Plato, and their successors provided, at least in their own minds, justification for their religious beliefs. Take for instance, Plato's story of universal creation. According to Plato, the universe was created by an entity known as 'The One' surrounded by a band of stars called 'The Same.' The One and The Same represented eternity, uniformity, and perfection.[82] Beneath the Same, lay 'the Different,' a "band around the Earth that represented change, diversity, and imperfection."[83] Plato's successors added the notion that ideas of perfection and corruption "only existed in the mind of 'The Divine One,' well apart from any material objects."[84] Islamic scholars were quick to associate terms like the 'One' or 'Divine One' as Allah who, according to the Quran, created the universe and everything within it, although a debate ensued as to whether or not the universe and God were eternal; a debate which later spread to Christian scholars in the thirteenth century. Nevertheless, Islamic scholars found seemingly ancient support for their belief system.

Aside from universal creation, Muslim scholars reconciled ancient Greek philosophical ethics and religion, arguing that the two worked in harmony with one another. One such scholar was Abu Nasr Muhamad al-Farabi, who lived in Baghdad during the ninth and tenth centuries. His works including *The Book of Religion* and *The Book of Happiness* which discussed the idea that philosophy and religion have

[81] Shanks and al-Kalai, 64.
[82] Lyons, 48.
[83] Ibid.
[84] Ibid.

the same goal of bringing about happiness.[85] Al-Farabi gives philosophy a somewhat higher position however, and contends that, while knowledge is acquired through investigation and revelation, the "soundness [of the revelation] should be vouched for by philosophy."[86] Avicenna, the aforementioned twelfth-century scholar known for his *Canon of Medicine*, acknowledged the relationship between religion and philosophy, however he placed a greater emphasis on religion. To Avicenna, happiness was achieved by "turning away from political life and all bodily concerns."[87] Avicenna further asserted that while happiness could be attained through the acquisition of secular knowledge, such happiness was "inferior to that of the prophet -presumably because the prophet alone is able to purify [the] soul."[88] Averroes, a twelfth-century Islamic scholar in Cordoba, Spain argued, like al-Farabi, that divine law "enjoin[ed] the study of philosophy."[89] He also exclaimed that the investigation of religion and study of different culture's philosophies should be allowed to occur without the fear of heretical stigma.[90]

The struggle to understand the place of scientific thought in the Islamic world had a profound impact on Western European religious and philosophical thought. Prior to the translation of Arabic sources such as those mentioned above, European religious scholars gave preeminence to religion over philosophy. Mostly, works of philosophy were officially forbidden to study until the Dominican order issued a charter in 1228 authorizing students to "consult the works of pagans and philosophers."[91] Slowly, Europeans began to acquire Arab texts from years spent in the Middle East during the crusades, but also due to European scholars such as Adelard of Bath and Michael Scot, who readily sought out Arabic learning. Such scholars translated Arabic texts as well as knowledge of ancient civilizations into Latin so that Europeans had access to them. Like their Islamic counterparts, early Christian scholars struggled to make sense of and reconcile ancient Greek philosophers with Christianity. Thomas Aquinas, a thirteenth-

[85] Charles E. Butterworth, "Ethics in Medieval Islamic Philosophy," *The Journal of Religious Ethics*, Vol.11, No.2, (Fall, 1983), p.228.
[86] Ibid, 230.
[87] Ibid, 233.
[88] Ibid.
[89] Ibid, 234.
[90] Ibid.
[91] Lyons, 187.

century Dominican priest, did much to spread Arabic knowledge, especially that of Averroes, to Western Europe. The main source of Aquinas' concern was whether or not the universe existed prior to God. Church canon dictated that God created the universe however, Islamic disputes on the subject based on ancient Greek philosophy had caused considerable commotion within European universities and schools. In his work, *On the Eternity of the World*, Aquinas, drawing on the works of Averroes who, in the realm of universal creation argued that natural laws "took over only after God created the world from nothing,"[92] exclaimed that the world and universe are "both eternal and created by God."[93] Essentially, Aquinas believed that "God's will and actions must be seen as instantaneous,"[94] an idea considered heretical at first, but was later adopted as Catholic doctrine. Such disputes, while causing uproar among Christian theologians initially, ultimately resulted in the distribution of ancient sources, throughout Europe which, as aforementioned, laid the foundation for the European Renaissance beginning in the fourteenth century.

Conclusion

It has been the purpose of this work to describe the origins of Islam, the foundations of the Islamic Empire, and the enormous contributions of medieval Muslim society to mathematics, geography, medicine, and philosophy. The list of contributions could easily continue into the realms of diet, women's education, and the arts to name a few. Sufficient evidence has been shown however, that the study of Islamic history is not only relevant to western curriculum and education, but is absolutely fundamental to understanding the ideas that emerged from the European Renaissance of the fourteenth century. Yet, upon the reading of a standard high school textbook, one finds this narrative absent. McGraw Hill's *World History and Geography: Modern Times*, a popular high school text, devotes one page to the study of medieval Islam. This page discusses, Muhammad's founding of Islam, the conquests of the Umayyad and

[92] Ibid, 191.
[93] Ibid.
[94] Ibid.

Abbasids, and unspecific scientific advancements in the fields of mathematics and natural sciences. Furthermore, Islam's impact is characterized as follows: "Islam brought a code of law and written language to societies that were previously without these features…[and] [created] a renewed trade network stretching from West Africa to East Asia, [bringing] wealth to thousands of people and a better life to millions."[95] Finally, Islam's legacy is described as a religion that "remains one of the major religions of the world."[96] There is no discussion of the Translation Movement or the House of Wisdom to say the least. If one continues in the text to discussions of the Renaissance, the reader is told about the rise of powerful Italian states where Italian ships, trading in the Mediterranean Sea "brought the ideas of the Renaissance…[which] spread north along trade routes to the rest of Europe."[97] The reader might ponder as to where these ships acquired such ideas. In discussing the ideas of Italian Renaissance Humanism, the text states that Italian humanists based their studies on ancient Greek and Roman texts, but again do not describe the origins of the texts. A slight nod to Arab navigational ingenuity however, is given in the discussion of the Age of Exploration where the Portuguese "invented a ship called the caravel…[that] used triangular, or lateen, sails, taken from Arab designs."[98]

Thus, a young reader might simply be left to conclude that ancient texts were simply lying around in Europe, unread, just waiting to be discovered. Western Europeans did not 'discover' ancient Greek and Roman texts any more than Columbus 'discovered' a continent inhabited by diverse and intelligent people, if one will excuse the comparison. Whereas Columbus initiated European conquest of the Americas, Europeans 'conquered' Arabic translations of ancient texts, translated them into Latin, and Latin translations initiated the Renaissance. Like the Umayyad and Abbasid caliphates before them, Europeans used that knowledge to conquer their world, both physically and intellectually.

[95] Jackson Spielvogel, *World History and Geography: Modern Times*, New York: McGraw Hill, 2013, 11-12.
[96] Ibid.
[97] Ibid, 22.

[98] Ibid, 53.

Aside from the contributions of Medieval Islamic society to Western Civilization, it has also been shown that a commonality exists between the Middle East and Europe. The histories of European and Middle Eastern peoples, as well as Muslims, Christians, Jews, Zoroastrians, Hindus, atheists, and any other worldview that can be conceived of have been connected for nearly 1400 years, and have shared a common intellectual and physical history. Unfortunately, such a history is quickly and easily discarded out of fear and ignorance.

Bibliography

Bobrick, Benson. *The Splendor of the Caliphs: Islam and the West in the Golden Age of Baghdad*. New York: Simon and Schuster, 2012.

Burstein, Stanley M. and Shek, Richard. *World History: Medieval to Early Modern Times*. New York: Holt, Rinehart and Winston, 2006.

Butterworth, Charles E. "Ethics in Medieval Islamic Philosophy." *The Journal of Religious Ethics*. Vol.11, No.2, (Fall, 1983).

Esposito, John L. *Islam: The Straight Path.* New York: Oxford University Press, 1998.

"Florida Dad Protests Islam Lessons in Son's H.S. History Class." last accessed on November 11, 2015. http://insider.foxnews.com/2015/02/10/florida-dad-protests-islam-lessons-sons-high-school-history-class.

Ishak, Shahrul Nizam ."The Importance of Translation Mathematics Old Script." *Malaysian Journal of Mathematic Sciences*. 3(1), 2009.

"Islamic Automation: A Reading of al-Jazari's *The Book of Knowledge of Ingenious Mechanical Devices (1206).*" Paper presented at the REFRESH Conference. First International Conference on the Media Arts, Sept.29-Aug. 4, 2005.

Kaviani, Rahim. "The Significance of the Bayt al-Hikma (House of Wisdom) in Early Abbasid Caliphate (132 A.H.-218 A.H.)" *Middle East Journal of Scientific Research*. 11 (9), 2012..

Kennedy, Hugh. *The Great Arab Conquests: How the Spread of Islam Changed the World We Live In*. Philadelphia: Da Capo Press, 2007.

Lyons, Jonathan. *The House of Wisdom: How Arabs Transformed Western Civilization*. New York: Bloomsbury Press, 2010.

Majafi, Nezameddin. "An Analytical Approach to the Rise of Translation Activity in Baghdad During the Early Abbasid Period," Masters Thesis. Allameh Tabatabai University, 2006.

O'Leary, De Lacy. *How Greek Sciences Passed to the Arabs*. London: Routledge and Kegan Paul Ltd, 1949. http://www.aina.org/books/hgsptta.htm#ch11.

"READ: Mom's Angry Note to Teacher About Islam Assignment Goes Viral." last accessed on November 11, 2015. http://insider.foxnews.com/2015/10/07/read-angry-mom-sends-note-teacher-about-homework-assignment-islam.

Shanks, Nigel J. and al-Kalai, Dashe. "Arabian Medicine in the Middle Ages." *Journal of the Royal Society of Medicine*. Vol. 77, Jan. 1984.

"Shocked Grandmom Says She Would've Never Found Out About Teacher's Islam Song if Her Grandson Didn't Accidentally Bring the Lyrics Home." last accessed on November 19, 2015. http://www.theblaze.com/stories/2015/11/19/shocked-grandmom-says-she-wouldve-never-found-out-about-teachers-islam-song-if-her-grandson-didnt-accidentally-bring-the-lyrics-home.

Smith, Morgan J. “From the Quran to Algebra: The Abbasid Caliphate’s Patronage of Al-Khwarizmi’s Algebraic Innovation.”

Spielvogel, Jackson. *World History and Geography: Modern Times*. New York: McGraw Hill, 2013.

“Yuhanna Ibn Masawayh,” *Middle East Health*. last accessed on November 11, 2015. http://www.middleeasthealthmag.com/cgibin/index.cgi?http://www.middleeasthealthmag.com/jan2006/feature7.htm